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Obituary

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Dr Quentin Bone, 1931–2021

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Quentin Bone joined the Marine Biological Association (MBA) in 1959 while completing his postgraduate studies. These had been carried out largely at the Stazione Zoologica, Naples, where he held an Oxford Naples scholarship. He had obtained a first class BA in Zoology from Oxford in 1954 and his DPhil was awarded in 1960 by Magdalen College.

Quentin's postgraduate research applied modern cytological and histological approaches to understand the evolutionary relationships between chordate species, with a primary focus on *Amphioxus*. During this time he also began his anatomical studies of pelagic tunicates and ascidians. Quentin had spent significant time at the MBA prior to his move to Plymouth, attending the marine biology Easter Class and to continue his work with *Amphioxus*. Quentin's research while a member of the scientific staff of the MBA covered an exceptionally wide range of subjects. He made many significant contributions to the understanding of chordate evolution as well as elucidating structural/functional relations in a wide range of vertebrates and invertebrates. Examples include: evolutionary lineages of fish and vertebrates (e.g. Bone & Pantin, 1960); functional anatomy of the *Amphioxus* central nervous system (Bone, 1960); mechanisms of fish locomotion – anatomy and physiology of fish muscle (Bone, 1966); fish buoyancy (Bone & Roberts, 1969); photophores; bioluminescence (Mackie & Bone, 1978); cephalopod muscle biology (Bone *et al.*, 1995); anatomy and physiology of gelatinous zooplankton (Inoue *et al.*, 2002). All of these works were characterized by meticulous and painstaking anatomical analysis, combined with elegant functional and physiological experimentation (Figure 1).

Quentin's work on fish locomotion, involving a combination of electrophysiological, anatomical and biochemical studies led to the discovery of the function of the two known types of fish muscle fibre. He showed that red muscle was involved in cruising behaviour while white muscle underpinned vigorous swimming and that different metabolic pathways (aerobic or glycolytic) provided the energy in the two different muscle types (Bone, 1966). During this period the MBA had increasingly become a focus for physiologists who came to use the tractable models for electrophysiology provided, for example, by the squid axon. Quentin's expertise in relating structure and function, coupled with his encyclopaedic knowledge of marine zoology was a strong driving force, contributing substantially to the dynamic culture of experimental biology at the MBA and internationally.

Quentin pioneered the application of electron microscopy to marine organisms, securing one of the first electron microscopes in a marine laboratory. This greatly enhanced the power of combined anatomical, physiological and histological studies of a range of marine organisms in order to understand structure-function relations, often with important general biological and ecological implications. His studies of the filter mesh of pelagic tunicates were the first to point to an important role in the capture of the smallest planktonic size

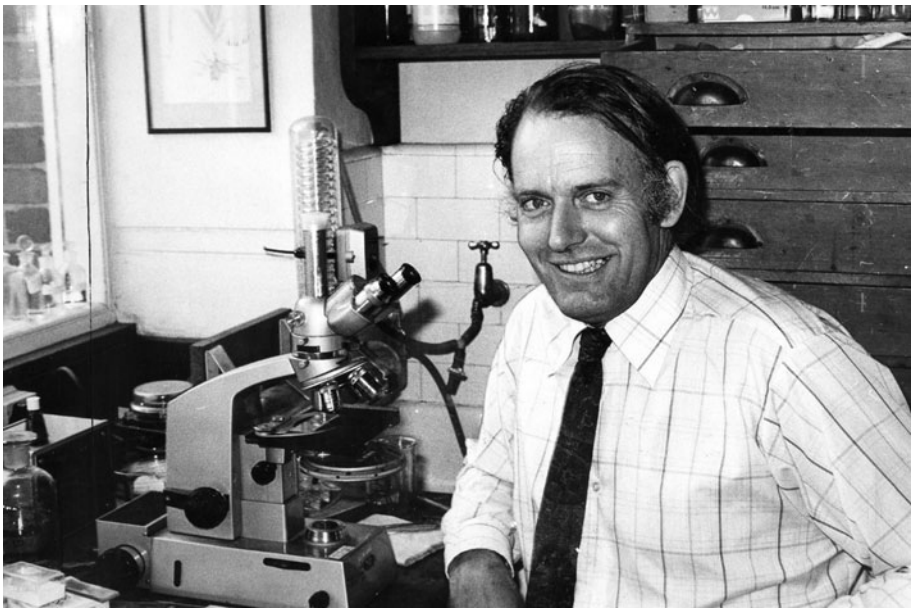


Fig. 1. Quentin Bone at work in his laboratory at the MBA.

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fractions, shedding new light on the roles of pelagic tunicates in ocean carbon fluxes (Bone *et al.*, 2003). His studies of gelatinous zooplankton also led to understanding of how electrical communication occurs between individuals in chains (Anderson & Bone, 1980).

He co-authored the classic textbook *Biology of Fishes* (Bone & Moore, 2008) and edited the similarly influential *Biology of Pelagic Tunicates* (Bone, 1998). While he generally worked independently at the MBA, he had a wide range of international collaborations and his work took him to many places for both field and laboratory studies. These included Stazione Zoologica, Naples; Laboratory of Oceanography, Villefranche; University of Washington's Friday Harbor Laboratory; Jamaica, Comores, Vancouver, Australia and Japan. He served on a number of high-level scientific advisory committees including those of the Stazione Zoologica, Naples and the Musee Oceanographique, Monaco and he was Editor of *Philosophical Transactions of the Royal Society B* from 1990–1994. In addition to his many research-related activities he also served for several years as a local Plymouth magistrate. Amongst his numerous honours, he was elected to the Royal Society in 1984 (celebrated in typical low-key fashion in the MBA Lecture Room with champagne served in small plastic beakers) and was awarded the Zoological Medal of the Linnaean Society in 1999 and the Frink Medal of the Zoological Society in 2003.

Despite being forced into retirement prematurely in 1991 at the age of 60 following the new rules on retirement age brought in at that time, Quentin continued his research at the MBA, publishing around 50 of his papers post-retirement. He continued as an active scientist well into his 80s until his reduced mobility prevented him making regular visits.

Quentin thoroughly enjoyed intellectual conversation, coupled with good humour and teasing. During coffee-time conversations he would invariably ask an opinion on an entirely obscure topic or introduce a previously unheard-of word into the conversation, apparently to observe your reaction. Another favourite ruse was to bring to coffee an item such as a tropical seed or other botanical item for identification. 'Oh, I thought you were a botanist' or 'I suppose there is no reason you should know this, you are only a botanist after all' were frequent good-humoured responses to my ignorance. Quentin accepted nothing less than perfection. On one occasion I asked him to comment on a manuscript that I had just completed. He returned less than an hour later to say 'You can't possibly submit this. You will have to re-write it. It contains split infinitives. Otherwise the science doesn't look too bad.'

As the son and grandson of famous artists, Quentin also displayed considerable artistic talent, as evidenced by his beautifully illustrated notebooks. He disliked formal management and management meetings and would often appear to draw idly in his notebook though he never took his eye off the proceedings. Quentin also had a keen interest in machinery of all kinds and was a fan of Formula 1 motor racing. However, he would normally cycle to the lab from his home in Plymstock. When this became more difficult in later years he acquired a recumbent bike. When advised that it may be dangerous to cycle so close to the ground in the busy Plymouth traffic his solution was to erect a flag at the back so that 'lorries might see me better'.

Quentin passed away peacefully at home on 6 July 2021 aged 89. He was a great mentor to his postgraduate and postdoctoral colleagues as well as to other researchers at the MBA. It was always a pleasure to be in his company and he always found time to discuss research ideas and to share his unique practical expertise. He will continue to be sorely missed.

References

Anderson PAV and Bone Q (1980) Communication between individuals in salp chains. II. Physiology. *Proceedings of the Royal Society London B* **210**, 559–574.

Bone Q (1960) The central nervous system in amphioxus. *Journal of Comparative Neurobiology* **115**, 27.

Bone Q (1966) On the function of two types of myotomal muscle fibre in elasmobranch fish. *Journal of the Marine Biological Association of the United Kingdom* **46**, 321–349.

Bone Q (1998) *Biology of Pelagic Tunicates*. New York, NY: Oxford University Press.

Bone Q, Brown ER and Usher M (1995) The structure and physiology of cephalopod muscle fibres. In Abbott NJ, Williamson R and Maddock L (eds), *Cephalopod Neurobiology: Neuroscience Studies in Squid, Octopus and Cuttlefish*. London: Oxford University Press, pp. 301–329.

Bone Q, Carre C and Chang P (2003) Tunicate feeding filters. *Journal of the Marine Biological Association of the United Kingdom* **83**, 907–919.

Bone Q and Moore RH (2008) *Biology of Fishes*, 3rd Edn. London: Taylor and Francis.

Bone Q and Pantin CFA (1960) The origin of the chordates. *Journal of the Linnean Society* (*Zoology*) **44**, 252269.

Bone Q and Roberts BL (1969) The density of elasmobranchs. *Journal of the Marine Biological Association of the United Kingdom* **49**, 913.

Inoue I, Tsutsui I and Bone Q (2002) Excitation-contraction coupling in isolated locomotor muscle fibres from the pelagic tunicate *Doliolum* which lack both sarcoplasmic reticulum and transverse tubular system. *Journal of Comparative Physiology B* **172**, 541–546.

Mackie GO and Bone Q (1978) Luminescence and associated effector activity in *Pyrosoma* (Tunicata: Pyrosomida). *Proceedings of the Royal Society London B* **202**, 483–495.

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