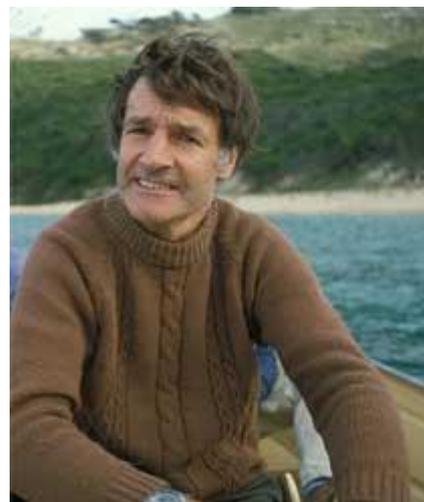


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Reflections on science, philosophy and mythology

Today I will paint the brief history of underwater science in southern Australia, as I have experienced it, on the canvas of the history of the philosophy of science from Aristotle to the present. I adopt the G-string approach (which touches the subject without covering it) rather than the hoop-skirt approach (which covers the subject without touching it).

Although Aristotle founded the scientific method on deduction and synthesis, it was Bacon who is credited with the first systematic, modern description of the scientific method i.e. the inductive process. The scientist gathers data and records his findings. General principles emerge and he formulates general laws. The frontier of ignorance recedes. Then came Popper. He pointed to the logical asymmetry of verification and falsification, and established the basis of experimental science. Popperian science has been fondly believed by many of its practitioners to be an objective description of external reality. But since then Kuhn, Latour, Mulkay and a host of others have shown that our science is an evolving synthesis of science, history, philosophy and sociology, and that our descriptions of the natural world are social constructions - rather than objective statements about nature.



Underwater science, i.e. doing science in the sea, began in the 1950s and my own involvement was precipitated by a memorable event in 1955, - the day that I first fastened an aqualung to my back and wallowed sensuously among seagrasses and fish for an hour and then emerged "with a sense sublime... of something far more deeply infused..". So began the Baconian era of my career, as I and similarly enthused underwater naturalists collected, catalogued and photographed the fauna and flora of southern coastal waters for over 20 years, - and provided fuel for such splendid systematists as Patricia Mather, Bryan Womersley, Jan Watson, Jerry Barnard and others too numerous to mention, and finally for the Invertebrate Handbook Series for Southern Australia (of which volume 3 is now in press). But during the 1970s as exploitation of coastal resources increased, fishery institutions responded by directing research to the biology of the species and later the dynamics of their populations. We fishery biologists, prodded by our intertidal colleagues, started thinking about and then doing underwater experiments. This was the Popperian phase, which is still going on.

And then, in the 1980s other far-reaching changes in fisheries management began to shake our complacency. Catch quotas, designed to control fishing effort, arrived and were soon followed by co-management of fisheries with the fishers themselves. Biologists now for the first time found themselves sitting around the table to debate questions of policy, control and management. Larkin (1974) had described fishery management as "non-science guided by the vaguely stated wisdom of witchcraft", more, I suppose for its irrationality than for any secret rituals. Gradually this changed as sound principles of management began to develop, but then edicts from Canberra decreeing 'ecosystem management' and its sub-tenets 'ecologically sustainable development' and 'biodiversity conservation' further muddied the waters. Initially these edicts seemed to be rhetorical devices with little content, but operational criteria were soon proposed (see, for example, the excellent review by Larkin 1996).

Finally, in the last decade fishery writers such as Walters, Pauly and others have strongly advocated the use of fishery refugia to stem the decline of fisheries world-wide. Thus fisheries science has gone from simple single-species management to a science that embraces ecosystem concepts and fishery refugia, and that must balance the competing interests of commercial and recreational fishers, mariculturists, and other societal interests. All of this is only amenable to sociological analysis and so it is fitting that a sociology of science itself should emerge to lay the ground rules of debate. In the constructivist analysis of the conflicts that often arise in management of resources truth is ultimately a question of power, hence the dictum "Truth is not discovered, it is negotiated".

This brings me to the question: what is the best training for a fishery biologist? My own first degree was in classics and I cannot imagine a better one for a sound basis in science, philosophy and mythology! - the basic tools in fishery science. In science, recall that it was Pliny (c.74), the Roman natural historian, who first described the cost of sex, in his studies of the sparrow, when he wrote: "Propter nimium coitum vix elabuntur tertium annum" (On account of too much sex they scarcely survive three years). And it was the pre-Socratic philosopher Xenophanes who anticipated the social constructivists in writing: "But as for certain truth no man has known it, Nor ever shall. And even if he were by chance to utter the final truth, he would himself not know it. For all is but a woven web of guesses."

We even find pragmatic advice for aspiring fishery biologists in the works of Diogenes, who exhorted his followers to inure body and mind to hardship. He advocated begging alms from statues - to get practice at being refused (good advice for hopeful grant applicants), and urged his followers to visit brothels and wrangle with the inmates, and so become habituated to their abuse (training par excellence for conflicts with fishers).

But there is a serious aspect. Facility with other languages vastly enhances one's proficiency with one's own, especially in verbal expression. Recently Kesteven (1996) in reviews of fishery documents wrote scathingly that "intent and meaning were obscured by bad writing". He referred to barbarisms, repetition, prolixity and misuse of words to the point of misrepresentation, and last to a "commisar mentality". Journal editors talk of declining standards of writing. So we may not be communicating well with each other or with fishers!

Bray, former chance llor of Adelaide University, referred to a deep malaise in our education system - what T.S. Eliot called the error of pure contemporaneity - that is the obsession with the present and ignorance of the past. Bray wrote " Only an acquaintance with the achievements and philosophies of the past can equip us for the present. It is just as blinkered to be provincial in time as in space, - to despise our history, as to despise our neighbours". So I suggest a fishery biologist needs to be multi-faceted - a lawyer, linguist, psychologist, negotiator, diplomat, inquisitor and snake-charmer as well as a scientist. He/she needs breadth as well as depth.

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