

RETROSPECTIVE

Sidney Holt (1926–2019)

Influential fisheries scientist and savior of whales

By Daniel Pauly

Sidney Holt, who reshaped fisheries science and helped reverse the decline of marine mammal populations, died on 22 December 2019. He was 93 years old. Sidney was a leader of numerous nongovernmental marine conservation organizations and a former senior staff member at the Food and Agriculture Organization (FAO) and other United Nations (UN) organizations. *On the Dynamics of Exploited Fish Populations*, the book he wrote in 1957 in collaboration with fellow biologist Raymond Beverton, remains integral to the work of fisheries scientists today.

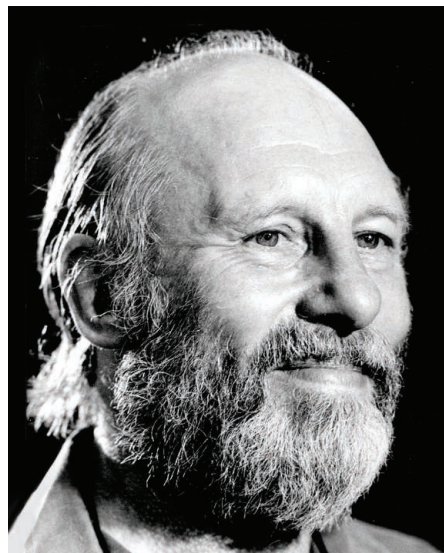
Sidney was born in London to what he called “a poor Cockney family.” His study at the University of Reading, where he earned a first-class honors degree in zoology, was funded by scholarships. Lack of funds precluded further studies, and in 1946, he joined the Lowestoft Laboratory of the UK Ministry of Agriculture, Fisheries, and Food.

A productive scientific collaboration with Raymond Beverton ensued. They had both been recruited to Lowestoft to develop a theory of fishing based on concepts from operations research, which had proved its utility during World War II. Together, they established equations with parameters that enabled the computation of optimal catches of any fish species for the different mesh sizes of fishing gear and different levels of “recruitment”—that is, the number of young fish entering the exploited part of a fish population.

Behind the forbidding mathematics was a simple yet ingenious idea: Because the vagaries of environmental fluctuations cannot be predicted, and hence the survival of the eggs and larvae of fish cannot be predicted, fisheries should be optimized to make the best of every young fish that happens to survive past the egg and larval stages and is “recruited” into the part of the population that can be exploited by the fishery. Thus, whether 1 thousand or 10 million young fish are recruited, the fishery could optimize its catch, or “yield,” by allowing the recruits to grow. This concept of yield per recruit is still used today.

Because these concepts and the equations behind them were new, the Lowestoft

Laboratory and later the FAO, where Sidney joined the senior staff in the early 1950s, organized courses in fish population dynamics throughout the world. After various simplifications of the equations, these courses established yield per recruit as one of the standard approaches of fisheries research, known as the “British School.” Meanwhile, the “U.S. School” of thought, pioneered by American biologist Milner Baily Schaefer, was structured around the estimation of “maximum sustainable yield” (MSY). Sidney fiercely opposed the U.S. School throughout his scientific life, even though, it must be said, the ap-



proaches are two facets of the same dynamic processes and can be straightforwardly reconciled. Unfortunately, neither approach was able to rein in fisheries in many parts of the world, which continue to take newly recruited fish before they have a chance to grow and reproduce and thus continue to reduce fish populations below a level that generates MSY.

Many people know Sidney only as the fierce conservationist who saved the whales, a reputation that is entirely deserved. His first dealings with whales were as a member of a “Committee of Three” who, from 1960 to 1965, scientifically analyzed the catch records of the International Whaling Commission (IWC) for the first time. They found that under the then-current “quotas”—that is, killing rates—the exploited whale populations were headed straight

toward extinction. They came to this conclusion without accounting for the huge off-the-books kills by the Soviet Union, which were still unknown at the time.

Sidney subsequently focused on the conservation and protection of the great whales, lending his mathematical skill to a cause that had until then relied mainly on appeals to emotions. After he left the UN system in 1979, Sidney deepened his involvement with the IWC—including as a delegate of countries such as Chile, France, and the Seychelles—while providing scientific support to various nongovernmental organizations such as Greenpeace, the International Fund for Animal Welfare, and the Sea Shepherd Conservation Society in their effort to reduce the kills of great whales. He became a much-admired icon of conservation in the process, known and respected for his informal and direct style. The movement of which he was the intellectual leader succeeded in slowing down and then turning around the machinery that had been grinding down one whale population after another, forcing Japan and its few allies to hunt whales solely in their own Exclusive Economic Zones and suppressing the trade of whale-derived products.

My first encounter with Sidney was in 1984 at a conference in Berlin. We corresponded from that time, with him heaping praise when I had done something he liked and criticizing me mercilessly when I had written something he didn’t like, such as that MSY was not a fraudulent concept. I discovered that Sidney was wildly protective of his whales, sometimes at the expense of the unwitting humans in his orbit. When a colleague sent him a draft of her thesis that overestimated the recovery rates of one species, Sidney realized that she shared a name with the inventor of the explosive harpoon that had killed thousands of whales. In his fervor, he responded with an irate email. Upon learning that the student was not a descendant of his perceived nemesis, he transformed into a supportive adviser, corresponding with her and providing tips to improve her paper. This was Sidney in microcosm: irascible and unpredictable one minute and constructive and insightful the next.

Sidney was talented and pugnacious. Both his work on the dynamics of fish and his efforts on behalf of whale conservation were done against vociferous opposition, but he put his trust in his friends and colleagues and relied on his love of marine animals to carry him through. Many whale species are still endangered, but that they are still alive is, in large part, due to the intellect, defiance, and heart of Sidney Holt. ■

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