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## Resolution of Respect

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Charles Birch

1918–2009



On 19 December 2009, ecology lost the last of its great pioneers—Charles Birch died in a Sydney Hospital almost two months after suffering a bad fall. Louis Charles Birch, who was known by everyone as Charles, was born in Sydney on 8 February 1918. He went into biology because his mother encouraged his interest in nature, and in particular, because she gave him *Possible Worlds*, a wonderful book by J. B. S. Haldane (Haldane 1927),<sup>1</sup> and because of an early fascination with the diversity and beauty of insects. Many influences in his childhood, including an evangelical religion, gave him a life goal of trying to help people. An early experience on a farm in the course of studying agriculture convinced Charles that he was not cut out to be a farmer. But he did go to the Waite Institute in Adelaide and investigated the dynamics of locust plagues, which started him in the direction of his life's work in ecology, and which he followed up with sojourns with leading ecologists and statisticians at the University of Chicago and Oxford (where he worked with Charles Elton), before settling at Sydney University in 1948.

Charles was one of the great figures in the development of modern ecology, known to all ecologists for his pioneering research in population biology, in which he sought to understand the dynamics of populations (i.e., how populations changed through time in terms of numbers, age structure, and for other reasons), and what factors controlled or “regulated” the sizes of populations (Birch 1948). He is especially well known for the classic 1954 book on population ecology, *The Distribution and Abundance of Animals* (Andrewartha and Birch 1954), written with his mentor Herbert G. (Andy) Andrewartha. He first came to the attention of the discipline in the mid-1940s when, inspired by A. J. Lotka and P. H. Leslie, he published a series of path-breaking papers on the exponential dynamics of the grain beetles *Calandra oryzae* and *Rhizopertha dominica* under controlled conditions (Birch 1944, 1945a, b, c, d, e, 1946a, b, 1947; Birch and Snowball 1945). But it was the heated debate with Alexander Nicholson on the significance of density-dependent vs. density-independent population “regulation” that brought him to the forefront of ecology—especially after they both participated in the prestigious 1957 Cold Spring Harbor symposium on Population Studies: Animal Ecology and Demography (Birch 1957b, Nicholson 1957). No doubt influenced by their observations of “boom” and “bust” for populations of invertebrates, such as the grain beetles that live in stored wheat/flour and plague locusts, Birch and Andrewartha concluded that the most important factors controlling population size were “density independent” in that they were not influenced by the size or density of a population. It should be pointed out, however, that Charles was well aware that “density dependent” factors such as resource availability could sometimes

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be important and that “competition” for resources (though he did not like the ways in which this word was often used [Birch 1957a]) could influence population size and even lead to the exclusion of one species by another (Birch et al. 1951, Andrewartha and Birch 1953, Birch 1979). For them, it was an issue of the relative importance of the two kinds of factor, not whether one kind was important to the exclusion of the other. Of course, the general consensus now would similarly be that both kinds of factors are important, with the relative importance of the two kinds of factors depending on the situation.

Charles also believed that, in order to properly understand population biology, it is necessary to explore the connections between ecology, which he saw as the study of distribution and abundance, and genetics (Birch 1960). This led him to carry out a number of population genetics studies, and, along with Richard Lewontin, he pointed out the potentially important role that hybridization could play in the generation of genetic variability and hence in evolution (Lewontin and Birch 1966).

Charles believed that mathematics could be an important tool in understanding population biology. Though clearly not a mathematician per se, he used mathematical equations on a number of occasions (Birch 1948, Andrewartha and Birch 1953) and subsequently encouraged Graham (Pyke) to pursue his interest in mathematics along with his biological interests (see below). He was, however, well aware of the risks associated with mathematical models (e.g., invalid assumptions, over-simplification) and recommended a cautious, skeptical approach in this regard.

Charles was also committed to teaching, loved the idea of being able to impart knowledge or understanding to an audience, and was thrilled by the process of giving his presentation or performance, especially if the audience was large. He wrote course “hand-outs” and textbooks to help students learn about biology. He was an active member of the teaching program at the University of Sydney and well-known among students for his interesting and inspiring lectures. Charles was a pioneer in using televised teaching to reach students in huge classes. He believed that research and teaching went hand-in-hand and sought to be excellent at both.

Besides research and teaching, Charles also had a deep and long-term interest in issues relating to philosophy and religion. It seemed to us, to put it simply, that he sought to find meaning and purpose in life in general and human life in particular. This interest led him, roughly half-way through his career, to shift his focus away from research and teaching and onto philosophy and religion. Most of his scientific articles and books were published between 1940 and 1970, with only a few in the 1970s. However, beginning in the 1950s and increasing greatly during the 1970s, he published many articles and books within the general area of philosophy and religion. He slowed down a little through the 1990s, but still published two books after 2000, the most recent of them in 2008 (Birch and Paul 2003, Birch 2008). During 2008, on the occasion of his 90th birthday, he said that he “had run out of ideas for books,” but we doubt that he really had.

In all, Charles authored or co-authored 18 books, about 60 scientific articles (including reviews), and about another 85 articles related to issues of philosophy/ religion.

When Paul (Ehrlich) was a graduate student in the 1950s he was interested in both evolution and ecology, but one of the standard jokes of the day was that an ecologist was someone who called a spade a

“geotome.” Books like *Principles of Animal Ecology* (Allee et al. 1949) were loaded with discussions of anabiosis, biocoenoses, biotopes, bonitation, cenospecies, climaxes, chronoclines, ecophenes, edaphons, epicoles, geotypes, priseres, subseres, and xerocoles. Much of ecology then was focused on giving complex names to relatively simple ideas, and principles were few. As a result, Paul always called himself an “evolutionist” rather than an ecologist. *The Distribution and Abundance of Animals* changed that. For the first time, a fine framework was put together that dealt with the key issues of population ecology, and along with early contributions to community ecology by Cowles, Gleason, Grinnell, Elton and others, set ecology on the road to its present status as the most important science.

Paul’s favorite memories of Charles include him “swinging the Billy” to make tea on an island in Sydney Harbour in 1966, and that same year mailing a large box of rotten guavas from a small town in Queensland to Sydney. Charles was studying evolution and competition in the fruit flies of the genus *Dacus* (Birch 1961). He knew the fruit would be infected. The postmaster asked “is there any fruit in the package, Sir?” Despite the cloud of *Drosophila* swarming over the package and the fruit juice dripping on the counter, Charles replied “I am Professor Birch; there is no fruit in the box.” “Yes Sir” was the reply. In those days being a professor meant something, especially in Australia.

Graham (Pyke) first met Charles in that same year as a first-year undergraduate student at Sydney University. At the time he thought he wanted to become an Engineer, because he liked math and physics, and was enrolled in Engineering. But Graham also had a love of nature, took biology as an optional subject, and so had a number of televised lectures from Charles and other faculty members of the University. Charles began to play a major role in his life, steering him into wanting to be a Scientist rather than an Engineer. Soon the TV lectures were over and Graham had lectures from Charles in person. During 1967 he had a number of conversations with Charles, one of which was quite pivotal in establishing his career path. Graham liked both mathematics and biology, and was having trouble deciding between these two directions which, at the time, seemed to be in conflict. Charles gave him wise advice: do the math first and then come back to biology when he was ready, as that would be easier than trying to do it the other way around. Graham followed this advice, and in 1969 sought Charles’ counsel on doing graduate work in both math and biology, and following his advice entered a Ph.D. program in Mathematical Biology. After Graham completed his degree and three years at the University of Utah, Charles sponsored him for a 3-year Postdoctoral Fellowship at Sydney University and he was once more under Charles’ wing. Like Paul a dozen years earlier, he especially enjoyed many conversations with Charles during the legendary weekly morning teas that he held in a room near his office. At the end of 1980 Graham left Sydney University and went to the Australian Museum, from where he had little contact with Charles for some years, but the contact was renewed about 15 years ago when Paul and Graham began to collaborate during Paul and Anne Ehrlich’s annual trips to Oz to see Charles and other old friends.

What we both shared with Charles was a deep concern for the state of the world and the growth of environmental deterioration. Charles and Paul had discussed that intensively when they were together at Sydney in 1965–1966, and Charles in the 1970s became involved in the Club of Rome and the World Council of Churches, which led eventually to his 1976 book *Confronting the Future* (Birch 1976), putting the Club of Rome’s agenda into an Australian context (Birch 1976). On many occasions he has encouraged us all to better look after the environment (Birch 1970, 1971, 1982). Charles put his concern for other people always at the forefront, were they friends, students, or strangers. He was a leader in Australian opposition to the Vietnam War, speaking at rallies and providing advice regarding conscientious objection

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to the war. He was involved for a decade with the Wayside Chapel, which was a venue, close to the centre of Sydney, where people were encouraged to walk in off the street to participate in discussions about life and religion. He had every intelligent person's view of Bush administration policies, and received many awards and honors.

One of the highlights of these relatively recent times with Charles was his 90th birthday celebrations. Surrounded by friends and colleagues, Charles was at his best. He was sharply dressed (as always), quick of mind and wit (also as always), and very much alive and part of the scene. He had just completed one of his many books, *Science of Soul*.

Rather early on during the acquaintance each of us had with Charles, he introduced us to some of the thoughts and ideas of Alfred North Whitehead, well-known for his "process philosophy," and approach to the metaphysical understanding of reality. It was a response to the particulate view of the universe, emphasizing processes and relationships, and in some ways anticipating quantum "weirdness." Whitehead had had an enormous impact on Charles as a young man, through his book *Science and the Modern World* (Whitehead 1938), which led Charles to read all of Whitehead and look into the work of philosopher Charles Hartshorne (who later became a close friend). All of that dragged Charles away from his then-conventional Christian views. Though neither of us came to agree with his philosophy, we both enjoyed the many good-humored conversations and debates we had with Charles over it. Paul recalls Charles giving him a copy of his first philosophical book, *Nature and God*. There was an electron micrograph on the front cover and a picture of Charles on the back. Paul commented that the micrograph represented nature very well, but he wasn't so sure about the picture of God. Charles thought that very funny; he had been, in the old Australian system, a "God Professor," but he had recently hired another Professor in the University of Sydney Zoology Department, as a step toward breaking down those antediluvian arrangements.

So Charles, a shy superstar whom a junior could tease, had major roles in our lives as teacher, mentor, supporter, colleague, and friend. He was a great man and we shall always remember him with love and admiration. We know that he played similar roles in the lives of many others, and in his last days, his hospital room was a rallying point for old friends, students, and colleagues. He leaves behind a profound legacy. He is survived by his close friends and constant companions David Paul and Barbara Sanders, and a twin brother Sidney and sister-in-law Jenny.<sup>2</sup>

Paul R. Ehrlich  
Graham H. Pyke

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#### Endnotes

<sup>1</sup> Recently reprinted and still worth a read despite some antique views on topics such as race. Much information on Birch's life and motivations is drawn from his long interview for the Australian Biography Project, November–December 1995.

<sup>2</sup> We thank Peter Farleigh of the University of Sydney for help with Charles' bibliography. We also appreciate the helpful comments and suggestions regarding earlier versions of this article that were provided by Andy Beattie, David Inouye, and Dan Lunney.

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