

Obituary

Pere Alberch (1954–98)

Synthesizer of development and evolution

A bold and creative scientist has left us before he could fulfil his vast potential. Pere Alberch, who was inspired to attempt what had been an elusive goal for many, a synthesis of development and evolution, died in his sleep on 13 March from heart failure. He was only 43.

Dreams of that synthesis, which would explain how biological form evolves, have a long history. Pre-Darwinian French biologists, notably Geoffroy Saint-Hilaire, laid the early groundwork; Charles Darwin saw the potential; and Ernst Haeckel took on the task. But it was too soon for all of them. Other prominent scientists pursued the goal — William Bateson and Thomas Hunt Morgan in the early days of genetics, and later Gavin de Beer, C. H. Waddington and I. I. Schmalhausen.

The most recent era opened in 1977, with the appearance of S. J. Gould's *Ontogeny and Phylogeny*, published by Harvard University Press, which presented Gould's views on how development (ontogeny) and evolution (phylogeny) might be related. Reading this treatise, Alberch, George Oster and I saw how Gould's formulation could be extended in new directions if his model were to be clothed in mathematical form, so we invited him to join us in writing a paper. Published in *Paleobiology* (5, 296–317; 1979), the paper stimulated much research, became a citation classic, and provided a point of departure for Alberch's career.

Alberch was fascinated by morphogenesis and the evolution of body plans. Some criticized him for not being 'more genetic', but what interested him was the genesis of structure and form. He turned his attention to the mechanics of morphogenesis, for he felt that this was the black box between gene and phenotype that must be unlocked. He saw that an eclectic approach was required that combined concepts from engineering, mathematics, genetics and evolution. He mastered them all, and brought them together to forge a unique perspective on development and evolution. He blended comparative (phylogenetic) and experimental methodologies, and designed clever and direct experiments, focused sharply on specific questions such as factors controlling the numbers of digits in frogs versus salamanders.

Born into an old Catalonian family in 1954, Alberch had a passion for natural history which was fostered by his mother



and grandfather. Early on, he affiliated himself with the Museu de Zoologia and the zoo in Barcelona, and began research projects that led to his first two publications in 1973. He left Spain to pursue his interests in herpetology, first at the University of Kansas, and then at Berkeley, where he joined my group in 1976. He soon realized that he would need more grounding in mathematics and theory, and so he sought out and began working with George Oster. George and I served as co-supervisors for Alberch's doctoral dissertation. He worked fast, and by the time he was 25 he was assistant professor at Harvard University and assistant curator in the renowned Museum of Comparative Zoology.

At Harvard, Alberch quickly established a productive research programme and gained funding for his own research as well as for development of the magnificent collection of amphibians and reptiles under his care. He attracted promising students, and several have become prominent in the field now known as 'devo-evo' — Neil Shubin, Cliff Tabin, Annie Burke and Chris Rose among them. Always ready to challenge authority, Alberch followed his vision, both personal and professional, without regard to the consequences. He could be charming, but also outrageous, and he drew attention by both his personality and his innovative research.

By 1985 he had revised some of his own positions from earlier years, just as others were beginning to perceive their potential. In a series of research papers, and in a remarkable essay, "The logic of monsters" (*Geobios* mém. spéc. 12, 21–57; 1989), he showed more fully how development and evolution could be studied. He had faith in his view of evolution, and although he

could be sharply critical, he always maintained an open mind. Perhaps these are not traits that non-tenured faculty at Harvard should emulate, for Harvard did not know what to make of him. What was he? Herpetologist? Developmental biologist? Evolutionary biologist? In the end Harvard failed to recognize what it had, and Alberch departed for Spain to initiate a new phase in his career.

In 1989 he became the director of the Museo Nacional de Ciencias Naturales in Madrid, and a research professor in the Spanish research council (CSIC). There he established his laboratory and threw himself into the tasks of directorship. He reorganized research departments, encouraged modernization of the collections, and was the driving force behind new and stimulating exhibits. He worked closely with colleagues throughout Europe to modernize museum science, all the while carrying on his research on salamander biology as a case study in evolution and development.

In many ways Alberch was a renaissance figure. He was intensely interested in contemporary art, especially that of his native Catalonia (his personal favourite was Joan Miró). He developed a reputation as an art critic and collector, and displayed a remarkable ability to find and help develop new talent in photography and painting.

Pere became seriously ill in 1995 and left his directorship. Recently, he felt well enough to return to research and teaching, and was planning a move to Valencia when he died. For one so young he leaves an imposing intellectual legacy. His contributions were widely recognized by his peers and he was honoured with special appointments at Cambridge University, Uppsala University, at various institutions in Argentina, and at Berkeley. Students were attracted to him because of his dynamic and irreverent style — and his enjoyment of controversy. He believed strongly that science advances by establishing bold initiatives and by testing explicit hypotheses.

Although Pere Alberch's studies in evolution and development were highly influential and earned him an international reputation, those who knew him well believe that circumstances prevented the full realization of his talents. The best was yet to come, and Pere's early death has cost the scientific community dearly.

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