

Unveiling of Blue Plaque for Charles S. Elton, FRS 8 June 2024

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Throughout his scientific career, Charles Elton's shrewd judgement and independent thinking enabled him to be always a step ahead of the prevailing ethos, studying topics that others regarded as unfashionable or unimportant.

Born in Manchester in 1900 and educated in Liverpool, his older brother, Geoffrey introduced him to the natural history of the coast, moors and woodlands near their home. For the rest of his life, he was based in Oxford, first as a student 1919–22 when he was fortunate to have Julian Huxley, later Sir Julian and the first Director of UNESCO, as his tutor at New College. Huxley taught Elton bird-watching and, as the instigator and chief ornithologist for the 1921 Oxford University Expedition to Spitsbergen, now Svalbard, he invited his pupil to join.

Elton, appointed University Demonstrator in Zoology in 1923, also went on both the 1923 and 1924 Svalbard expeditions, the only one of the 39 Britons involved to do so. The explorers were talented and inspiring: several had served in the Great War, and many went on to varied and successful careers in sciences and exploration, with five later awarded FRS, five knighted, among many distinctions. The other zoologist on the 1921 expedition was war veteran, Alexander Carr-Saunders, who became an influential demographer, economist and government advisor. They discussed natural mechanisms that regulated the size of animal and human populations.

Elton also made several good friends from whose help he later benefited. For a fortnight in August 1924, he shared a tent on Mouette Island, NW Svalbard, 79°37' N with Howard, later Lord, Florey, Australian Rhodes Scholar and expedition doctor. Florey is best known for developing penicillin but was also very interested in the transmission of diseases between wildlife and humans. He went on to serve in several influential positions in British science and provided valuable advice to his friend.

Elton also noted what has **not** been investigated and was **not** understood. Ecology at the time meant Botany, the *Journal of Ecology* and the British Ecological Society were founded 1913 for plant ecology. Zoology was mostly comparative anatomy, palaeontology, embryology & taxonomy based in museums and labs, with little field work and poor understanding of the interactions between species. So within a couple of years of the last

expedition to Svalbard, he wrote *Animal Ecology* 1927, one of the first major books applying concepts derived from human population studies and from plant ecology to wild animals, followed by: *Animal Ecology and Evolution* 1930 and *The Ecology of Animals* 1933.

During the same period 1925–30, on the recommendation of the main organizer of the Svalbard expeditions, George Binney, the Hudson's Bay Company hired him to investigate the causes of large changes in the capture of fur-bearing animals in the Canadian Arctic. He analysed the Company's records, some going back to 1736, on the harvest of wild lynx and their main prey, snowshoe hares, and of arctic fox which eat lemmings. He implemented the annual questionnaire asking for numbers of each species captured that, for the next 25 years, was sent to company employees and to indigenous hunters, for whom the furs and meat were essential to subsistence. Such data documented 'population cycles', fluctuations in the abundance of predators and their prey that could be only partly explained by weather.

To investigate endogenous causes of animal abundance, Elton, John Baker & EB Ford set up '*Mausgesellschaft*' 1923–8, which combined fieldwork measuring population size in wild wood-mice and bank-voles with experimental studies of these species bred in captivity at various densities, using the very primitive facilities available.

By 1932, Elton had succeeded in persuading Professor Goodrich, the longest serving ever Linacre Professor of Zoology, to allow him to set up the Bureau of Animal Population as a research unit, to be a permanent memorial to his older brother who died suddenly in 1927 aged 33. He served as its Director until retirement in 1967, becoming expert in 'grantsmanship', obtaining funds to support his colleagues on a variety of projects. The BAP began with just three people in a couple of rooms in the old Zoology Department beside the University Museum. Their first projects were entitled *The Oxford Rodent Investigation*, studying field vole populations in Bagley Wood, long the main field site for Oxford botanists, and in the then new Forestry Commission plantations on the Scottish and Welsh hills. It was hard work. During 1933–34, they drove from Oxford to the Scottish borders once a month, 320 miles the first day, eight hours fieldwork on the second day, then drove home on the third day. Finances were also difficult: during the Depression of the early 1930s, funding from the Hudson's Bay Company and British Government stopped, but private donations from Canada, and The Royal Society kept them going. BAP researchers identified diseases, such as vole tuberculosis, and parasites as endogenous mechanisms of population regulation acting with predation, climate and food supply.

Elton realized that this research on rodent populations put the BAP in pole position to make essential contributions to protecting food supplies. In early 1939, before war was declared, he wrote to the Agricultural Research Council explaining that the BAP's staff had the expertise needed to control rat/mice/rabbit pests at ports, ships, warehouses and farms. As soon as war broke out, Elton was appointed Chief Rodent Officer and the BAP was able to recruit several more staff to undertake government-commissioned work. An example, whom you may remember, was James Fisher. Previously a zoo-keeper, later well known as a radio & TV broadcaster on natural history, especially birds, and author of popular books, Fisher spent the war organising rodent control at the Port of London under Elton's supervision. Such opportunities brought a variety of people into the BAP and enabled its research to continue when most other academic research stopped for the war effort.

Oxford University acquired the Wytham estate from Colonel Raymond ffennell in stages from 1942, starting with Wytham Wood, donated in memory of Hazel, his only offspring, who died tragically young in 1939. Elton had a clearer vision than Oxford University of how this bequest, the largest since Medieval times, could further biological research. They put the estate in the care of what was then known as the Commonwealth Forestry Institute. It was led by Professor, later Sir, Henry Champion, who, like his predecessor, had spent most of his career as a forest officer in India. During the next 15 years or so, with the cunning and persistence of rats, rabbits, sycamore or any other invasive species, Elton and the BAP, plus the other zoologists, ornithologist David Lack and entomologist George Varley, gradually achieved at least parity with the foresters in decision-making about Wytham.

From April 1942, Elton was sneaking up there on Sundays to have a look round and collect specimens. Thus started the Wytham Survey, a long-term project that extended the concepts of habitat and niche proposed in his earlier books and tested the proposition that fluctuations in an animal's population depended as much upon the species assemblage in which it lived as upon abiotic factors such as weather. The thousands of specimens and records thus assembled are now much valued for use in studies of climate change and habitat destruction.

Thanks to newly appointed Professor Alistair Hardy, the BAP plus the Edward Grey Institute for Field Ornithology became the Department of Zoological Field Studies in 1947, with a proper University salary for Elton as Reader, more secure funding for other staff and

their own quarters in disused war-time hospital huts in the grounds of St. Hugh's College. The BAP moved to the Botanic Gardens in 1952 and Elton was elected FRS the following year.

The new status involved more teaching, not his strong point. He hated lecturing to undergraduates, I remember his lectures as unusually bad even for the 1960s, when teaching quality was 'uneven' to put it mildly. He much preferred talking those already committed to Ecology. More than 60 students, mostly from outside Oxford, some from overseas, attended BAP summer Field Courses between 1948–56. Elton and other BAP staff taught ecological methods and techniques to the small groups of students in Wytham.

At least a quarter went on to take higher degrees or to work at the BAP. One of Elton's strengths was the diversity of graduate students and researchers he attracted. As well as those on Oxford-based and UK funding, researchers at the BAP for at least a year came from USA, Canada, Australia, New Zealand, Malaysia, Zimbabwe, South Africa, Denmark, Netherlands, Japan, Serbia, and included seven Rhodes scholars, 5 Fulbright and other US scholarships, and many other sources of funding. Senior overseas academics visited for shorter periods during the 1950s and 60s. Many, indeed most, of these students and visitors went on to senior positions in Universities, biological institutions and the media, thus spreading Elton's concepts and methods around the world to the lasting benefit of Ecology.