

## WALTER GARSTANG, 1868–1949

The death of Professor Walter Garstang, at the age of 81, on 23 February 1949, broke the last living link with the foundation of our Plymouth Laboratory. It is fitting that some record of his life should be found in the pages of our *Journal*; not only because he was one of the pioneers of marine biology in this country and one of the founders of fisheries research, but particularly by reason of his having taken such a prominent part in the early history of our Association. He was on the staff of our laboratory the day it opened, and in 1895 he initiated the first of the Easter Classes which ever since have made such an important contribution to the education of British zoologists. He continued to conduct these classes until 1901 when he became director of the fishery investigations undertaken by the M.B.A. on behalf of the government, as England's share in the then new International Investigations. Apart from his marine work, Garstang made fundamental contributions to biological theory, as in his paedomorphosis conception, and for more than half a century was one of the outstanding personalities of British Zoology.

In 1938, Garstang began to write an account of his experiences in fifty years of marine biology, but with other occupations in research and the coming of the war he abandoned it. Of what he wrote, however, he left some eighty pages of typescript describing the early days at Plymouth from 1888 to 1900; these have been deposited in the library of the Plymouth Laboratory for the benefit of those interested in our early history. I feel I cannot do better than begin this brief account of his life than by quoting the opening paragraphs of this fragment of his autobiography; here we have a vivid impression of the opening not only of his career but of that of our precious laboratory. It will serve, too, as some indication of what is in store for those who delve further into this very personal account of marine zoology in the nineties.

Fifty years ago, on June 21, 1888, having taken my degree at Oxford in the morning, I journeyed to Plymouth, picking up the old broad-gauge express at Swindon, to begin duty as Secretary and Assistant to the Director of the newly founded laboratory of the Marine Biological Association. It was to be only a temporary engagement,—to me a year or so for recuperation after a serious breakdown, to the Director some biological help at the outset, which otherwise he could not expect to get at the salary of clerk-assistant sanctioned by the Council (£80). The new Director was G. C. Bourne, then and long afterwards well known as a rowing Blue and coach, eventually (1906–1921) as Linacre Professor at Oxford, who, on returning from an expedition to the coral island of Diego Garcia, had been our demonstrator in the morphological laboratory. He had suggested this arrangement upon his appointment in April, and, after consultation with my people, I had gratefully accepted it. Bourne left Oxford early in June, and I was to follow immediately after my examinations and the taking of my degree. Our joint immediate task was to get the laboratory, which was still in the hands of contractors, ready for a ceremonial opening on June 30th. We took our coats off to it. My diary

records that on the 26th both of us were in shirt sleeves cleaning a heap of dirty collecting jars,—Bourne, the great 'Beejar' of the towing path! It's a man's valet who knows him best. Next day Bourne had to break off to attend a Council meeting in London. On his return he was delighted to find the laboratory washed down, in fair order, and with a red carpet on the stairs ready for the opening.

The ceremony went off without a hitch, or, as Lankester put it in a letter to Bourne, 'Everything went off splendidly on Saturday'. The weather was superb, the speeches were cheerful, the Fishmongers' Company gave a lunch in the Grand Hotel with wine from their own cellars, the Port Admiral lent his yacht for a trip, and everyone was in high spirits. All this, however, is on permanent record in the chronicles of the Association (*Journ. Mar. Biol. Soc.*, O.S., pp. 125–141). What is not recorded is that at Bourne's request I had put out an exhibit of living things under microscopes and otherwise in the main laboratory, and that after spending some minutes in expounding the life-history of *Obelia* to a portly and insistent visitor, whom I took to be a Fishmonger, the latter interrupted me to say, 'Very interesting! I suppose you don't know who I am?' 'I'm sorry, sir, No,' I said. 'I am Professor Lankester!' Thus I met the man who was largely to rule my destinies, and those of most other young zoologists, for the next 20 years.

He was born on 9 February 1868, the eldest son of Dr Walter Garstang of Blackburn, and was educated at Blackburn Grammar School and Jesus College, Oxford. He came up to the University with a scholarship in 1884, when only 16½, intending to read medicine. At heart he was a poet and a lover of nature. A new world opened before him as he came under the influence of that great Challenger naturalist, H. N. Moseley, who was then the Linacre Professor. He very soon decided to join the honours school of Zoology. He was only 20 when he took his degree and, as just recorded, joined Bourne at Plymouth a week before the laboratory opened in 1888. He had not then finally decided to give up a medical career, but the fascination of marine life at Plymouth was soon to cause him to do so. In 1891, he left the Plymouth staff for a year to go to Manchester as Berkley Research Fellow with Professor Milnes Marshall at Owens College, returning again as Assistant Naturalist. In 1893, he was elected a Fellow of Lincoln College and to a Lectureship in 1894; so for a time returned to Oxford and was there when Ray Lankester was in the Linacre Chair. But in vacations he continued to work at Plymouth, and in these early years he wrote many papers on the morphology, bionomics and distribution of marine invertebrates. He was particularly attracted to the nudibranch molluscs and did pioneer experiments to test and confirm the hypothesis of their warning coloration. He began his researches on the Tunicata, the group to which he was to return in later life; and it was in this period too that he published his delightful studies on the habits and respiratory mechanisms of the sand-burrowing crabs. It was from Oxford in 1895 that he brought a batch of undergraduates to Plymouth to inaugurate the first of the series of Easter classes. In the pages of reminiscences I have referred to he gives the names of some of the students in these classes who later distinguished themselves in zoology; it is an interesting list.

His life's work may be divided into three periods: the first occupied with these many and various researches in pure marine biology; the second devoted to fishery investigations; and the third, when a university professor and in retirement, occupied with more fundamental problems in zoology and his poetic interpretations of bird song.

The second period began in 1897 when he went back once more to the staff at Plymouth; this time as Naturalist in charge of Fishery Investigations. He became the moving spirit in the development of fishery science in England. He was clearly much impressed by Johan Hjort's pioneering research in Norway, and his first paper in this period was an extensive account of Hjort's methods. Like Hjort he planned his work on a wide front and soon he was publishing papers on such different aspects of fisheries work as 'The Surface Drift of the English Channel and Neighbouring Seas during 1897', 'On Variation, Races and Migration of the Mackerel' (1898), 'On the Plankton and Physical Conditions of the English Channel' (1899) and on 'The Impoverishment of the Sea' (1900). Great things were astir in oceanography at the turn of the century; in 1899 the King of Sweden invited all the countries interested in the fisheries of the North Sea and adjacent waters to send representatives to Stockholm to a conference to discuss the possibilities of collaboration in a programme of marine research. A second conference was held, this time in Christiania (Oslo), in 1901, and Garstang went as a delegate of His Majesty's Government; this was the conference which set up the International Council for the Exploration of the Sea. Each country participating undertook to investigate a particular region of sea and different problems in fishery research so that, as time went on and their results came in, the whole area would be covered and all the bits of research fit together as part of one great plan. The different nations equipped their separate research vessels and marine laboratories.

The English and Scottish fishery departments were then, as still they are to-day, separate institutions; and the Fishery Board for Scotland had already begun its investigations well before the beginning of the century. The English department, a small branch of the Board of Trade as it was then, commissioned the Marine Biological Association to start its research for it as part of the international scheme; so it was that Garstang became Director of these investigations and established a laboratory at Lowestoft. With his assistants, William Wallace, R. A. Todd and George Atkinson, and the famous old research trawler *Huxley*, he carried out from Lowestoft those classical investigations into the natural history of the North Sea plaice which have laid the foundations of English fishery research. By extensive age determinations and measurements, and particularly by liberating vast numbers of marked fish at different points (to be returned when recaptured by fishermen), he studied the natural growth-rates and migrations of the fish in different areas. He realized how overcrowded the young plaice were on the nursery grounds off the Dutch

coast and how much more food there would be available for their growth on the Dogger Bank; so he tried the experiment of transplantation. He caught and marked large numbers of young fish on the coastal banks; half of these he returned to the sea where he caught them and the rest he carried in tanks of sea water to be released on the Dogger Bank. When in time the marked fish were recaptured it was found that those taken to the richer feeding grounds had in two years grown twice as big as those left behind. Garstang had pointed the way to a farming of the sea, but he was before his time. In his Buckland Lectures in 1929 he returned to the subject and showed how such a transplantation on a large commercial scale could be made to pay, the increased yield of fish giving an ample margin of profit over the estimated cost of transport; but no nation was likely to undertake the cost of this, for all other nations would be free to reap the reward. While the nations work together in the science of the sea, the days of their co-operation in its exploitation are still far in the future; but one day surely the North Sea will be farmed in the way that Garstang showed—let us hope that his name will then be remembered.

In all these early years he played a prominent part in the development of the International Council; from 1902 to 1908 he was scientific adviser to the British Delegates and convenor of the International Committee on Trawling Investigations. In 1906 he was awarded his Oxford D.Sc.

Garstang was an individualist, a lover of freedom and independence, who resented what appeared to him to be interference in his scientific programme when official government policy did not coincide with his own plans. At the same time as the newly constituted government Fishery Department decided in 1907 to take over the investigations from the Marine Biological Association he received a letter inviting him to accept the Chair of Zoology at the University of Leeds. It was a difficult decision for him to make; on the one hand he loved his marine work, on the other he felt he would never be happy if he was not entirely free to shape his own policy. Very reluctantly he resigned from his Directorship at Lowestoft, and on becoming Professor Garstang the third phase of his life began. In passing, it may be said that he regained a connexion with this work in 1919 when he was appointed a member of the Development Commission Advisory Committee on Fishery Research, on which he served till the end of the recent war.

For a time his output of research was much reduced. He had all his lectures to prepare; he was building an honours school of zoology where none had existed before; and he was making himself a terrestrial naturalist instead of a marine one. Insects and birds became the objects of his field studies. It was at this time that his love of nature and his strong poetic feeling led him to delight in the study of bird song which he later interpreted in verse and musical notation in a little book *Songs of the Birds* which went through several editions.

After nearly twenty years of marine work he came back to more academic zoology, and took up again the study of those problems which had fascinated him when he was an undergraduate at Oxford in the heyday of speculation as to the evolutionary origin of the different groups of animals. The main trends of zoological interest had in the meantime flowed into the fields of more experimental and genetical work; by the time he came to publish his morphological and embryological speculations, now into the 1920's, they were considered by many as out of date. Nevertheless in this, for the time being unfashionable field, he made contributions to his science of outstanding and lasting value. In his essay on 'The Theory of Recapitulation' which he read before the Linnean Society in 1921 (published in the Society's *Journal* the following year) and in his presidential address to Section D of the British Association in 1928 he put forward his revolutionary views on the influence of modifications in ontogeny upon the course of evolution. With them he helped to overthrow the influence of Haeckel's so-called 'Biogenetic Law' which had dominated zoological thought for so long. Garstang coined the term *paedomorphosis* to apply to the evolutionary influence of larval characters upon adult organization. In two large papers, 'The Morphology of the Tunicata, and its bearings on the Phylogeny of the Chordata' (*Quart. Journ. Micr. Sci.*, Vol. LXXII, pp. 51-187, 1928) and 'The Morphology and Relations of the Siphonophora' (*Ibid.*, Vol. LXXXVII, pp. 103-93, 1946), he showed how paedomorphosis, by a process of neoteny, appeared to have played a leading role in the evolution of both chordates and the siphonophores. The theoretical importance of these ideas is more fully dealt with in an obituary written for the *Proceedings of the Linnean Society*.

He was a great teacher, who by his infectious enthusiasm, filled his pupils with a love of zoology; he was also their friend. I cannot do better than quote from the obituary notice written in *Nature* by Professor L. Eastham, one of his former pupils:

Few who go from us will leave behind so much affection and such a sense of gratitude. It is inevitable that his students will remember Garstang for his perpetual youth and his genial kindness. They will think of their visits with him to the marine station which he established at Robin Hood's Bay; of teas in the laboratory at which he and Mrs Garstang were generous hosts and at which the week's problems were discussed; and of their open house at Meanwood where all students were welcome.

There was yet that other important side of his personality; his strong poetic feeling which partly found expression, as already stated, in his studies of bird song, but in addition provided a large number of poems of which only a few were published. Among the latter I may mention: 'The Song of the Tree Pipit' (*The Times*, 8 May 1919); 'The Return to Oxford: a Memorial Lay' (a long poem published by Blackwell of Oxford in 1919) describing his thoughts on visiting Oxford just after the war, seeing the young men returning, and mourning the death of his zoologist friends and former companions at Oxford:

Geoffrey Smith, Wilfred Jenkinson, Arthur Darbishire, Edward Minchin and George Grosvenor; 'To a Herring Gull' (*The Oxford Magazine*, 6 February 1920) and 'Friendship' (*Nature* 7 July 1921). Then there were his essays 'Wordsworth's Interpretation of Nature' which was published as a special supplement to *Nature* (16 January 1926) and 'Wordsworth's Green Linnet' (*Nineteenth Century*, September 1929).

After his retirement, Oxford became the home of the Garstang family, and here he continued his researches and writing up to the very end. On his 81st birthday, and less than a fortnight before he died, he went up to London to take part in the special symposium on Bird Song at the Linnean Society. His very happy life and biological interests were shared by Miss Lucy Ackroyd, of Newnham College, whom he met at the Plymouth Laboratory and married in 1895; she died in 1942 and they are survived by a son and five daughters.

A. C. HARDY





Walter Ganslang