

FROM FOSSIL MOLLUSCS TO SALMON

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Introduction

On 9 April 1897 Wilfrid Hudleston Hudleston, an eminent geologist, purchased the West Holme Estate, comprising some 1500 acres on the edge of the Isle of Purbeck in Dorset, where he could enjoy his sporting interest in shooting and fishing. In doing so he established a link between himself, The Malacological Society of London, which celebrated its Centenary last year, and the Freshwater Biological Association.

Wilfrid Hudleston

Hudleston was born in York in 1828 and later attended St Peter's School there. He went on to Uppingham School and then to St John's College, Cambridge. After taking his BA in 1850, he studied law and was called to the bar in 1853 but never practised. His original surname was Simpson but his mother was heiress of the Hudlestons of Cumberland and in 1867, on succeeding to the family estates, he assumed the name of Hudleston by which he is best known. He was clearly a man of considerable means who was able to finance his own scientific interests.

From 1850 to 1862 he was preoccupied with ornithology and made journeys to many parts of Europe and North Africa. In 1858 he was one of the three founders of the British Ornithological Society which later presented him with its gold medal. From 1862 he began to study natural science, first in Edinburgh and then at the Royal College of Chemistry in London. He appears to have been equally attracted to chemistry and

geology, but a chance meeting in Chamounix in 1866 led to his introduction to Professor John Morris whose influence swayed Hudleston to make geology his main interest.

He was elected a Fellow of the Geological Society in 1867 and served on its Council for several terms from 1877 up to his death. He was one of its Secretaries from 1886 to 1890 and its President during 1892-94. He acted as one of the editors of *Geological Magazine* from 1886 to 1901 and the Society awarded him its Wollaston Medal in 1897 for his contributions to chemical, mineralogical, palaeontological and stratigraphical geology. He also served as President of the Geologists' Association from 1881, as President of the Geology Section of the British Association for the Advancement of Science in 1898 and as a member of Council of the Royal Geographical Society. He was elected a Fellow of the Royal Society in 1884 and was also a Fellow of the Linnean Society.

Hudleston was also a member of various regional societies. On moving to West Holme he joined the Dorset Natural History and Antiquarian Field Club, soon being elected a Vice-President. He was an enthusiastic member and organised numerous field meetings of the Club. In July 1907 he hired a ship and invited the members to join him for an excursion from Swanage to Weymouth to observe the geological features of the coast.

As might be expected from his earlier travels, Hudleston was a keen field geologist. He evidently enjoyed organising and taking part in field trips with various organisations and he built up a personal collection of several thousand fossils. He published papers on various aspects of geology but his major work was *A Monograph of the British Jurassic Gasteropoda* which was published in nine parts from 1887 to 1896 in the volumes of the Palaeontographical Society. The whole work ran to 514 pages of text and 44 plates of fossils, based substantially on his own collection. He left his large collection of fossils to museums in Cambridge, Dorchester and London, where several of his specimens can be seen in the current display of Jurassic fossils in the Natural History Museum.

The Malacological Society of London

On 27 February 1893 Hudleston took the chair at a meeting, held at the Natural History Museum, which founded The Malacological Society of London for the purpose of encouraging the study of living and fossil Mollusca. The Society continues to flourish with an international membership and it has maintained a continuous record of publishing important scientific papers on molluscs in its *Proceedings* which evolved into the *Journal of Molluscan Studies* in 1976. It took a leading role in organising the First European Malacological Congress in London in 1962,

which established the *Unitas Malacologica*, an international association of malacologists which holds a Congress every three years.

Lake Tanganyika

The freshwater snails of Lake Tanganyika have aroused particular interest ever since the first shells were brought to this country by Speke. Many are endemic to the lake and unlike any other freshwater snails. In 1895 and 1899, J. E. S. Moore led expeditions to the lake on behalf of the Royal Society and he published several papers advocating a marine origin for elements of the fauna, indicating an earlier connection between the lake and the sea. He also gave an illustrated lecture to The Malacological Society on 13 February 1903 on *The Marine Forms of Life in Lake Tanganyika*. He considered that the endemic molluscs were similar to marine fossils from the Inferior Oolite formation in Western Europe.

The topic clearly attracted Hudleston's interest. Although he had not visited East Africa, he was an authority on Oolitic fossil molluscs. The following year, he published an extensive paper *On the Origin of the Marine (Halolimnic) Fauna of Lake Tanganyika*. In this he demonstrated that, although there was a superficial resemblance between the European fossils (many of which were in his own collection) and the Tanganyika snails, they were not related to each other. He pointed out that there were no similar fossils from any sites that had been explored outside Western Europe which could indicate a connection to Tanganyika. He also used existing information about the geology of East Africa to show that the hypothesised connection between the lake and the sea could not be justified. His views have been supported by subsequent research. Hudleston's interest in Lake Tanganyika forms a link to later studies of the lake by FBA scientists such as Beauchamp, Fryer, Tailing and Worthington.

Marine Biology

Hudleston also showed a considerable interest in marine biology and in living molluscs. In 1886 and 1887 he and some colleagues hired trawlers from Brixham and Grimsby to carry out dredgings in the English Channel and along the French coast in order to study marine molluscs and observe their living habits. He also provided the site and advanced capital for erecting a Marine Biological Laboratory at Cullercoats, Northumberland for Armstrong College, Newcastle. This was named the Dove Laboratory after one of Hudleston's ancestors and still flourishes as part of the University of Newcastle.

The Freshwater Biological Association

Hudleston died at West Holme on 29 January 1909 and the estate passed to his wife and, subsequently, to his son. Interestingly, Hudleston requested that his son should adopt the name Simpson which he duly did. After his son's death, the West Holme Estate was put up for auction as 32 lots in December 1939. This resulted in its fragmentation, a process which continued as the result of subsequent sales. The site on which the River Laboratory now stands was formerly part of the West Holme Estate but the Association acquired the land by purchasing plots from three separate owners. Our fishing rights are particularly interesting. In 1957 the Association purchased the rights to East Stoke Mill Stream prior to building the Laboratory. In 1971 we were able to buy the rights to the East Stoke section of the River Frome and in 1978 we added the rights to the West Holme section of the river. This reunited the full extent of the fishing which had belonged to the West Holme Estate before its sale: about 2 km of double bank and 2.5 km of single bank.

Owning the fishing rights has provided good research sites within walking distance of the River Laboratory (Figs 1-5). Concentrations of chemical nutrients have been recorded regularly since 1965, making the Frome one of the best-known rivers in this respect. The data continue to contribute to our understanding of river chemistry and its relationship to activities in the catchment. The uptake and release of phosphorus by suspended sediments and benthic deposits is currently being investigated.

Long-term records are also being used to develop a model of the relationship between sunlight, precipitation, discharge and water temperature. Discharge in the Mill Stream can be controlled so that particular conditions are created there. In recent years it has been in continuous use for studies on the impact of low flows which are causing so much concern in many rivers around the country. The Institute of Freshwater Ecology has collaborated with the Institute of Hydrology on multidisciplinary studies funded by the Department of the Environment, the National Rivers Authority and the Natural Environment Research Council.

Fish studies include continued monitoring of the dominant dace population. Radio-tagging has recently been introduced to investigate the movements of dace in the river. In the last few years thin-lipped mullet have been moving further up the river. They are now quite common at East Stoke and the relationship of their migrations to physico-chemical conditions in the river are now being analyzed.

But what of the salmon? A resistivity counter has been recording the

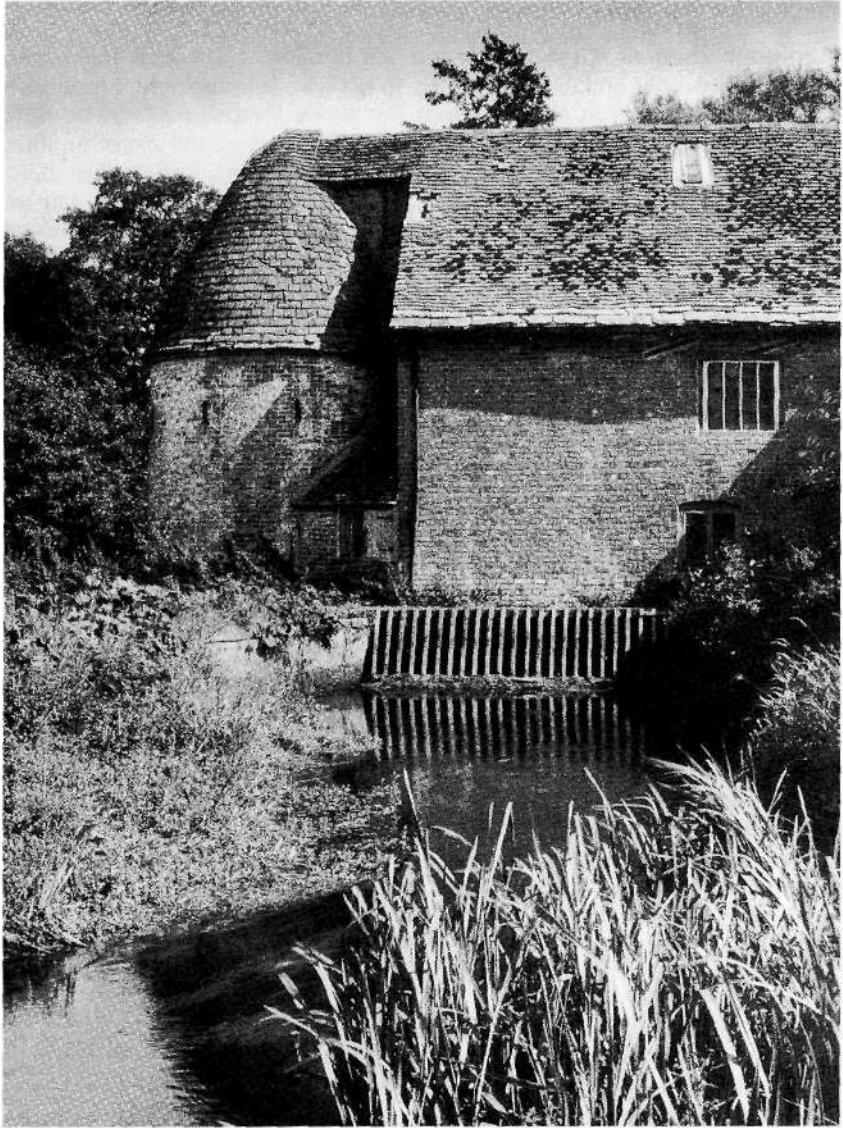


FIG. 1. East Stoke Mill, from a photograph originally taken early this century. Little of the original building remained when it was purchased by the FBA; it was replaced by the fluvarium (see Fig. 2 opposite)

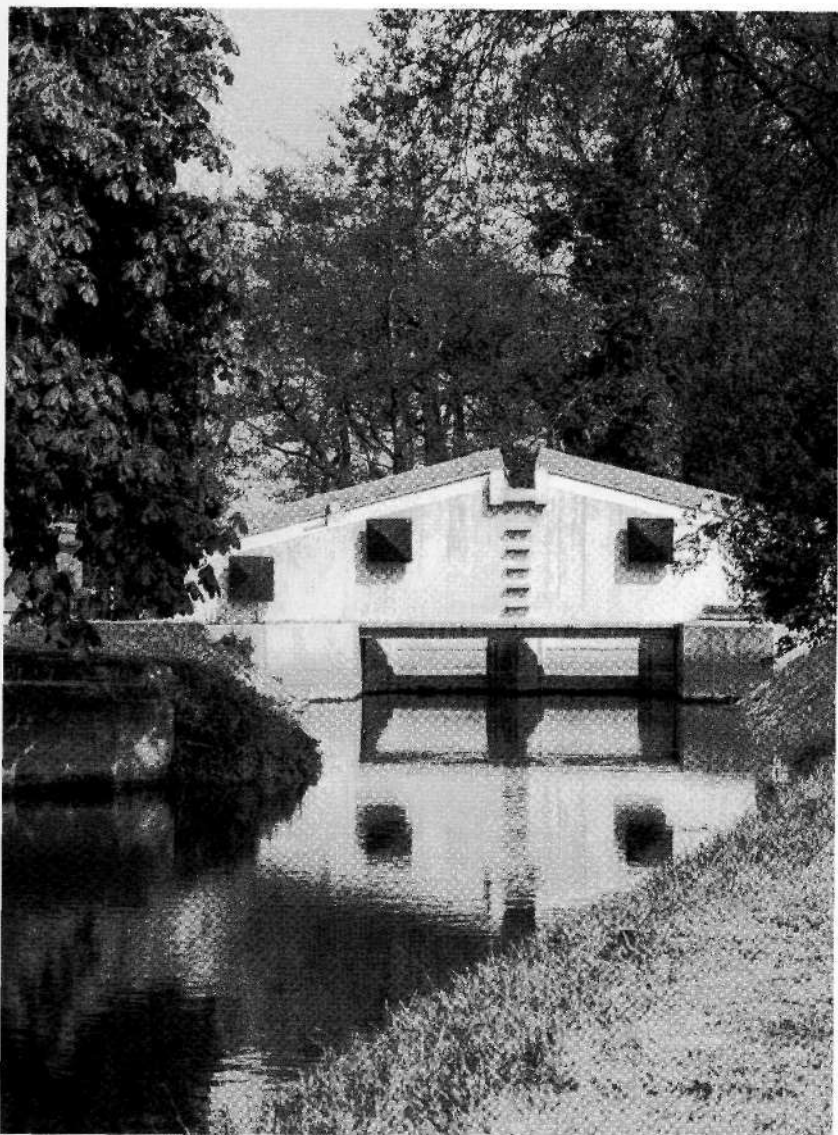


FIG. 2. The fluvarium, built across the mill stream and occupying the site of the former mill. Figs 1 and 2 were taken from the same vantage point upstream. A series of experimental channels, and the River Laboratory, lie to the right of the picture.



FIG. 3. The old farmhouse (left) and outbuildings at East Stoke before they were renovated in 1978–1979; the buildings in the centre foreground were demolished.

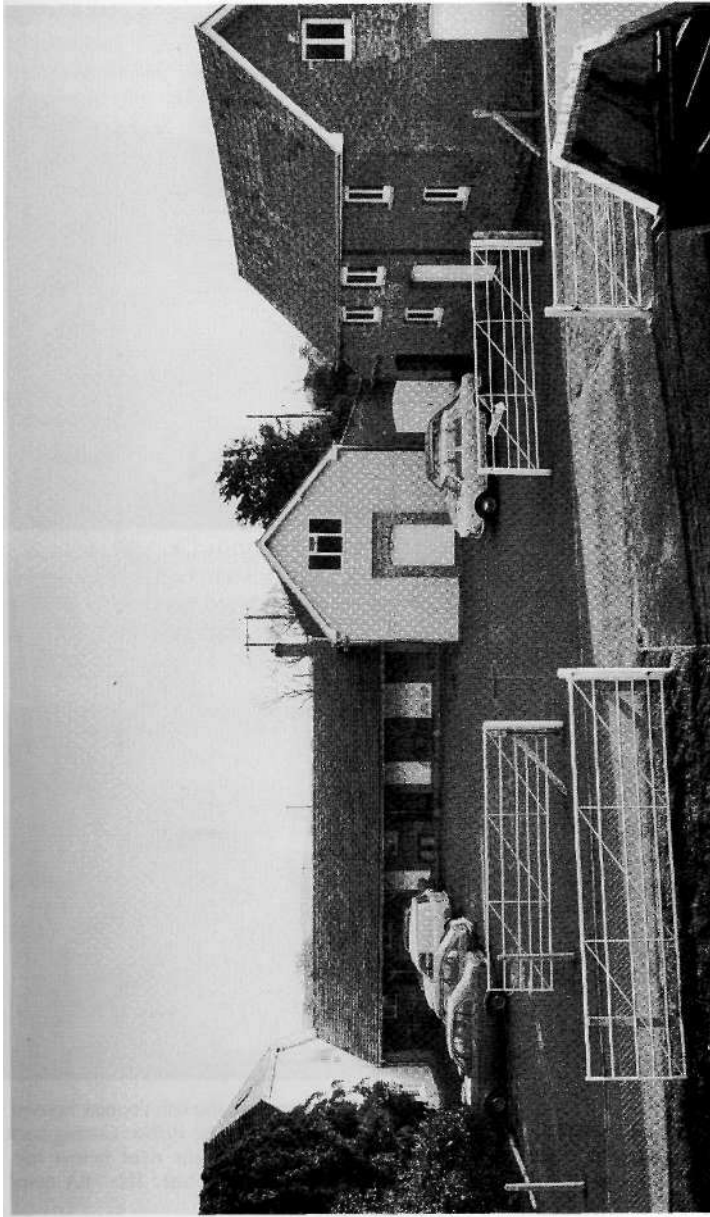


FIG. 4. The renovated farmhouse and buildings at East Stoke, taken from the same vantage point as in Fig. 3.



FIG. 5. The River Frome. *Above*: Looking downstream towards the fish counter housed in a hut above a gauging weir (left); the mill stream diverges to the right. *Below*: Cutting back the luxuriant growths of aquatic macrophytes ("weeds") in the main river below the fish counter. This is done each summer to keep the river channel clear. The FBA owns the fishing rights on the right-hand bank.

numbers passing over the gauging weir at East Soke since 1970. Various improvements have been incorporated in the counting equipment over the years and the accuracy of the records is now very high. Regular observations on catches provide information about the length, weight, age and period of life at sea of the salmon returning to the Frome. The relationships between salmon and environmental variables are also being examined and are pertinent to the effects of low flows and abstraction.

Meantime fishermen continue to patrol the banks intent on their sport. Catches have been unusually low for three years but are now showing signs of improvement. I like to think that Wilfrid Hudleston would be pleased if he knew that the fishing which he once enjoyed was now being used for scientific research while still providing pleasure for his fellow sportsmen.

Acknowledgements

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