

CARPENTER, KATHLEEN EDITHE (1891 - 1970), ecologist

Name: Kathleen Edythe Carpenter
Date of birth: 1891
Date of death: 1970
Parent: Victoria Zimmerman (née Boor)
Parent: Francis Frederick Zimmerman
Gender: Female
Occupation: ecologist
Area of activity: Science and Mathematics; Nature and Agriculture; Education
Authors: Catherine Duigan, Warren Kovach

Kathleen Zimmerman was born in Gainsborough, Lincolnshire, on 24 March 1891, the daughter of German immigrant Francis Frederick Zimmerman and his English wife, Victoria (née Boor). She was educated at Lealholme School in Gainsborough. As an undergraduate student at The University College of Wales Aberystwyth, she lived in Alexandra Hall and was awarded a BSc degree in 1910 (by University of London). She stayed on at Aberystwyth to conduct post-graduate research.

The outbreak of the First World War had a huge impact on Aberystwyth, with large numbers of troops and refugees in and around the town. Public opinion was vulnerable to rumour and tales of spying that unfortunately led to Carl Hermann Ethé, a German language lecturer, being hounded out of town by a large mob in August 1914. Three months later Kathleen and her sister Bessey, who had also studied at Aberystwyth, changed their names by deed poll from Zimmerman to Carpenter.

Kathleen researched the impact of acid mine waters on the ecology of local rivers, some of which were described as devoid of life, for an MSc (1923) and a PhD (1925). Due to changes in the economic viability of local mines and their ores, she was able to study the impact of the commencement of mining and the ecological recovery after closure. Her study area around Aberystwyth encompassed approximately 390km², from sea level to headwater streams on the Cambrian Mountains. She compared the mine-polluted rivers around Aberystwyth with the relatively unpolluted waters of the Teifi to the south and the Dyfi to the north.

Kathleen produced some of the first detailed assessments of British running water fauna, assembling species lists and subdividing them into ecological groups. A hand drawn 'food relations' diagram included in her Ph.D. thesis is one of the first representations of a freshwater food web in Britain. She also demonstrated experimentally the toxic effects of metallic salts on minnows, trout and sticklebacks, proving that the cause of death was the formation of a colloidal precipitate of heavy metal on the gills, causing death by suffocation.

At the end of her classic paper on the freshwater invertebrate fauna of some Cardiganshire Streams, she expresses her most sincere gratitude to her Aberystwyth mentors: Prof. R. D. Laurie for his continued interest and encouragement, and Prof. H. J. Fleure for the geographical background to the study. Her participation in the Science Society, the Literature and Debating Society and as a tennis player is recorded in photographs in the Aberystwyth University Archives.

In 1928 her textbook *Life in Inland Waters*, the first freshwater ecology textbook in English, was published, dedicated to her father. It is illustrated with photographs, data and inferences made from Welsh fresh waters, supplemented by the available European and American scientific literature. This achievement provided the foundation for an international career in North America, starting at the University of Illinois, where she carried out further toxicity studies on fish. At Radcliffe College (a women's institution affiliated with the all-male Harvard College) she was recognised as one of growing international cohort of graduate students. In 1930 she moved to McGill University (Montreal, Canada) to lecture on animal ecology.

Carpenter subsequently became head of the Department of Biology (1931-36) at Washington College on Chesapeake Bay (Maryland, USA), where she founded the College's Biological Society and developed the natural history collections. Ill health caused her retirement from teaching and return to Britain in advance of the Second World War. However, at Liverpool University she produced one of the first detailed studies of the diet of young salmon from the River Dee. In 1944 Professor Lily Newton at Aberystwyth produced a review of the pollution of the rivers of West Wales by lead and zinc mine effluent but there is no evidence of Carpenter contributing to this work.

Kathleen Carpenter, the mother of freshwater ecology, died in Cheltenham, Gloucestershire on 29 May 1970, where she was living close to her sister Bessey.

Authors

Catherine Duigan

Warren Kovach

Sources

C. Duigan, 'Who was...Kathleen Carpenter?', *The Biologist*, 65.3 (2018), 22-5

C. Duigan, 'Carpenter's "Food relations" 1925: the first British diagrammatic representation of a freshwater food web?', *Archives of natural history*, 46.1 (2019),160-63

Further reading

NLW Archives: Kathleen Edythe Carpenter, 'The freshwater fauna of the Aberystwyth district of Cardiganshire and its relations to lead-pollution', University of Wales [Aberystwyth] M.Sc. thesis, 1923 (MMS ID: 99252231802419)

NLW Archives: Kathleen Edythe Carpenter, 'Ph.D. papers of Kathleen Edythe Carpenter', University of Wales [Aberystwyth] Ph.D. thesis, 1925 (MMS ID: 99253901002419)

Wikipedia Article: [Kathleen E. Carpenter](#)

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