

63. J. M. Swan and V. du Vigneaud, *ibid.* 76, 3110 (1954).
64. C. R. Harington and R. C. G. Moggridge, *J. Chem. Soc.* 1940, 706 (1940).
65. P. G. Katsoyannis and V. du Vigneaud, *J. Am. Chem. Soc.* 76, 3113 (1954).
66. C. W. Roberts and V. du Vigneaud, *J. Biol. Chem.* 204, 871 (1953).
67. C. R. Harington and R. V. Pitt Rivers, *Biochem. J. London* 38, 417 (1944).
68. J. H. Burn, *Quart. J. Pharm. Pharmacol.* 4, 517 (1931).
69. J. H. Burn, D. J. Finney, L. G. Goodwin, *Biological Standardization* (Oxford Univ. Press, New York, ed. 2, 1950), p. 180.
70. J. M. Coon, *Arch. intern. pharmacodynamie* 62, 79 (1939).
71. S. P. Taylor, Jr., *Proc. Soc. Exptl. Biol. Med.* 85, 226 (1954).
72. V. du Vigneaud, H. C. Lawler, E. A. Popenoe, *J. Am. Chem. Soc.* 75, 4880 (1953).
73. F. Sanger, L. F. Smith, R. Kitai, *Biochem. J. London* 58, vi (1954).

Charles C. Adams, Ecologist

Charles Christopher Adams was a pioneer in and one of the creators of ecological perspective. Through the kindness of his daughter, Harriet Adams, I have at hand his bibliography of some 154 titles, including six unpublished works. This list makes clear not only the gradual development of his personal interests, but also his service in broadening our concepts of ecology and its role. Although it is not a matter of record, much that he accomplished was done in the face of inertia and even opposition on the part of established and conventional influences.

Adams was born in 1873. He began publishing notes on natural history before his graduation from Illinois Wesleyan University in 1895. Several papers on invertebrates appeared after he did his master's work at Harvard University in 1899, but it was his fellowship at the University of Chicago (1900-1903) that appears to have been decisive. Here his contacts with Cowles, Salisbury, and Transeau resulted in notable papers on base leveling and on Pleistocene climatic change in relation to faunal problems. Together with Transeau's paper on forest centers, these marked a resumption of serious American biogeographical study, initiated long before by Asa Gray, but with the added advantage of new information on geomorphology and Pleistocene history.

From 1903 to 1907, Adams was in museum work, first at the University of Michigan, then at the University of Cincinnati. He quickly developed the idea that the museum is a vital teaching center that is linked to the community and its natural history. This idea was to remain a guiding motive for the rest of his life;

it expressed itself at this time in his ecological survey of central and northern Michigan. In 1904 he organized and directed the Isle Royale Ecological Survey. In 1908 he returned to Illinois as associate in animal ecology, where he prepared his *Guide to the Study of Animal Ecology* and a detailed report on the various communities of invertebrates in the prairies and forests of eastern Illinois.

In 1914 he became forest zoologist of the New York State College of Forestry at Syracuse. There he organized the Roosevelt Wildlife Experiment Station and directed its activities until he became director of the New York State Museum, a position he kept until his retirement in 1943. At these two posts, much of his most significant work was done, although it was often concealed behind the routine into which it was incorporated. He continued his idea of ecological surveys at the Palisades, Mount Marcy, Alleghany State Park, and in the Rochester region. He wrote much on wildlife and fisheries in relation to forestry, and after an initial paper on conservation in 1915, he gave that problem increasing emphasis.

Ecologists, notably in the Forest Service, had long appreciated the possibilities of their subject as an applied science. But it seems to me that Adams did more than any other individual in America to give this idea comprehensive form. In 1930 he turned his attention to the synthesis with human ecology, using the Shaker collection in the Albany Museum as a basis. In orderly fashion, he proceeded to enlarge the scope of his interest, through schools, water resources planning, and regional and urban planning.

He brought to the attention of ecologists the work of Mumford, Mackaye, Lindeman, Benedict, and Patrick Geddes, whose concepts of the living museum and of ecological planning and whose experience, in some respects, paralleled his own. Adams organized symposia on human ecology and insisted that ecology, with its tremendous possibilities for human good, ought to be underwritten on the same scale as geography, geology, and the physical sciences.

Keenly aware that ecology is a study of process, he saw the importance to it of records and archives, and of some central institute where these could be conserved and where workers could be housed with facilities fitting their value to society. He never ceased trying to rouse ecologists to appreciate their own importance, warning them that unless they could do so, their job would be taken over eventually by others.

One of the founders and a past president of the Ecological Society of America, he was also active in the Association of American Geographers. He maintained an extensive and lively correspondence, and he was unusually enterprising in hunting up those whose ideas interested him. Physically he was stout and vigorous. His tastes were simple, but his energy prodigious. His home was itself a museum and library combined, overflowing with books and pamphlets which he governed by his own mysterious kind of order.

At the time of his death in 1955, he was working on a *Guide to the Study of Human Ecology: The Dynamics and Processes of Orientation and Integration*. Like his earlier guide to animal ecology, this was to be an annotated bibliography, but so set up as to be immensely useful to any serious student.

His library, notes, and other material have been presented by his daughter to Western Michigan State College at Kalamazoo, where they will be kept available, as he wished that all important ecological materials might be, for future workers. There they will form a nucleus for the Charles C. Adams Center for Ecological Studies under the direction of Daniel Jackson.

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