

## McClung, Clarence Erwin

(05 April 1870–17 January 1946)

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**McClung, Clarence Erwin** (05 April 1870–17 January 1946), biologist, was born in Clayton, California, the son of Charles Livingston McClung, a civil and mining engineer, and Annie Howard Mackey. McClung's family moved about a great deal because of his father's profession. Only for his high school years did they settle in Columbus, Kansas, where McClung became interested in science, surveying, and pharmacy. In 1890 he enrolled in the University of Kansas School of Pharmacy, receiving a Ph.G. in 1892. He enrolled in the College of Liberal Arts there in 1893, receiving his B.A. in 1896, an M.A. in 1898, and a Ph.D. in 1902. As a graduate student, he was appointed as assistant professor of zoology in 1898, and in 1901 he was promoted to associate professor and head of the Department of Zoology. While at Kansas he married Anna Adelia Drake in 1899, with whom he had two children.

Further appointments at Kansas included curator of the paleontological collections (1902–1912), acting dean of the medical school (1902–1906), and professor of zoology (1906–1912). In 1912 he moved to the University of Pennsylvania, remaining there until he retired in 1940. Then followed an acting chairmanship at the University of Illinois in 1940–1941 and another in 1943–1944 at Swarthmore College. He also served as a trustee at the Marine Biological Laboratory at Woods Hole, Massachusetts, beginning in 1913; as chair of the Zoology Committee of the National Research Council in 1917; and as chair of the new Division of Biology and Agriculture of the National Research Council in 1919. In addition, he held a full complement of memberships in professional societies, serving as president of the American Society of Zoologists in 1914 and of the American Society of Naturalists in 1927 and as managing editor of the *Journal of Morphology* (1920–1946).

McClung spent the summer of 1898 visiting William Morton Wheeler's lab at the University of Chicago, where he studied spermatogenesis in *Xiphidium fasciatum*, a grasshopper, to complement Wheeler's own work on oogenesis. McClung identified what he called an "accessory chromosome" in the male, one which the female did not have. With cytological studies of chromosomal behavior, McClung suggested that the accessory chromosome determines sex—a topic of much debate at the time. McClung thought that it might do so in insects, though he felt that environmental factors may play a determining role as well, especially for humans. He also spent a semester visiting Edmund Beecher Wilson's lab at Columbia University, thus extending his discussions of chromosomal importance and sex determination.

In fact, McClung had miscounted the number of chromosomes; further studies revealed that females, not males, have the accessory chromosome that determines sex. However, by identifying the accessory chromosome and adding his voice to that of German cytologist Hermann Henking to suggest that chromosomes determine sex, he also provided evidence that chromosomes at least help to determine characteristics and thus to effect heredity from parent to offspring.

Sex determination, and particularly the role of chromosomes, became the focus of Wilson's research at Columbia as well as that of American cytologist Nettie Stevens. By 1905 they had each independently shown that, for most animals they had studied, the female has two accessory, or sex-determining, chromosomes and the male one. This varied in some species, but it demonstrated the importance of the accessory chromosome and raised the possibility of studying that chromosome in more detail to discover what other characteristics it might determine. McClung's work, with its suggestive hypotheses and imperfect data, helped to stimulate a research program that became one of the most productive in the next few decades. McClung continued his own work on chromosomes, on the respective importance of heredity and development, and on microscopic techniques. He worked carefully and was recalled by one student as "an artist in everything he does." He died in Swarthmore, Pennsylvania.

## Bibliography

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McClung's most important published works are "Notes on the Accessory Chromosome," *Anatomischer Anzeiger* 20 (1901): 220–26; "The Accessory Chromosome: Sex Determinant?" *Biological Bulletin* 2 (1902): 43–84; "A Comparative Study of Chromosomes in Orthopteran Spermatogenesis," *Journal of Morphology* 25 (1914): 651–749; and "The Cell Theory—What of the Future?" *American Naturalist* 74 (1939): 47–53. The most complete biographies of McClung are Garland E. Allen, "Clarence Erwin McClung," in *Dictionary of Scientific Biography* (1970), and D. H. Wenrich, "Clarence Erwin McClung," *Journal of Morphology* 66 (1940): 635–88, the latter written for McClung's seventieth birthday. Articles written about him during his lifetime are in *Bios* 11 (1940): 141–55.

### See also

Wheeler, William Morton (1865-1937), entomologist

Wilson, Edmund Beecher (1856-1939), cytologist, embryologist, and geneticist

Stevens, Nettie Maria (1861-1912), cytologist