Name:_____ Date: _____

SKILL and PRACTICE 11.1

# Walter Sutton

*Walter Sutton discovered the connection between inheritance and chromosomes, a concept we take for granted today. This connection set the stage for the development of modern molecular biology.*

## Beginnings of innovation

Walter Sutton was born in Utica, New York on April 5, 1877. When Walter was ten, his father, William Bell Sutton, a successful county judge, decided to move west with his family and open a ranch in Russell, Kansas.

Walter Sutton and his four brothers slowly became accustomed to ranch life. About half of their ranch was grazing land for cattle, and the other half planted with rye, barley, oats and potatoes. Walter especially enjoyed figuring out how to operate and maintain the many pieces of farm equipment on the Kansas ranch.

Sutton's interest in farm machines and obvious mechanical skills made the study of **engineering** a natural choice for him. After graduating high school, he enrolled in the University of Kansas School of Engineering in 1896.

## Trying times prompt a shift in interest

The summer of 1897 was tough for Sutton. He spent the months between school semesters caring for his family, all of whom had come down with typhoid fever. His younger brother John died from the illness.

When he returned to school in the fall of 1897, Sutton switched from engineering to biology and premedical studies. One of the first professors he encountered in the program was Clarence McClung. Sutton volunteered to help McClung with some last minute work he needed to complete, and they soon became friends.

## A close relationship with a mentor

In 1898 Sutton went back to the ranch to help with the harvest. He had become familiar with grasshopper reproductive cells while working with McClung, and he decided to dissect various species he was finding mixed into the grain during harvesting.

One particular grasshopper species was bigger than the others. When Sutton examined dissected tissue of the grasshopper, he observed very large cells under his microscope. He prepared some samples and sent then back to McClung, with the recommendation they begin using this species (Brachystola magna, the "Lubber" grasshopper) for future experiments.

Even though Sutton was only a second year student, McClung and several other faculty members quickly agreed with Sutton, and considered his findings important to the study of reproductive **cytology** and **morphology**. Soon, cells from the Lubber grasshopper were used by labs all over the world. With these cells, McClung was able to identify the chromosome responsible for sex determination in sexual reproduction.

## Building upon past success

Sutton received his undergraduate degree from the University of Kansas in 1899, and his masters degree in 1900. In 1901 he left Kansas for Columbia University in New York City. There Sutton received a graduate fellowship in **zoology**.

In 1902, Sutton wrote a paper after hearing about the work of Gregor Mendel involving heredity with pea plants. In this paper, Sutton provided evidence that chromosomes carried the cell's units of inheritance. While studying his grasshopper cells, Sutton observed that chromosomes occurred in distinct pairs, and that during meiosis, the chromosome pairs split, and each chromosome goes to its own cell.

In 1903 he published a paper announcing his discovery that chromosomes contain genes, and their behavior during meiosis was random. Despite these ground breaking discoveries in **genetics**, Sutton remained committed to his goal of becoming a practicing physician. Upon receiving his doctorate of medicine from Columbia, he moved to Kansas City, Kansas and practiced general surgery until his death in 1916.

## Reading reflection

1. Look up the definition of each boldface word in the article. Write down the definitions and be sure to credit your source.
2. Imagine that you knew Walter Sutton when he was growing up. Write a brief description of him as a young person taking care of his family during the summer of 1897.
3. How did Sutton's two graduate school papers help to expand our understanding of genetics?
4. **Research:** How is the X chromosome involved with sex determination?
5. **Research:** Who was Gregor Mendel and how was his work related to Walter Sutton?