

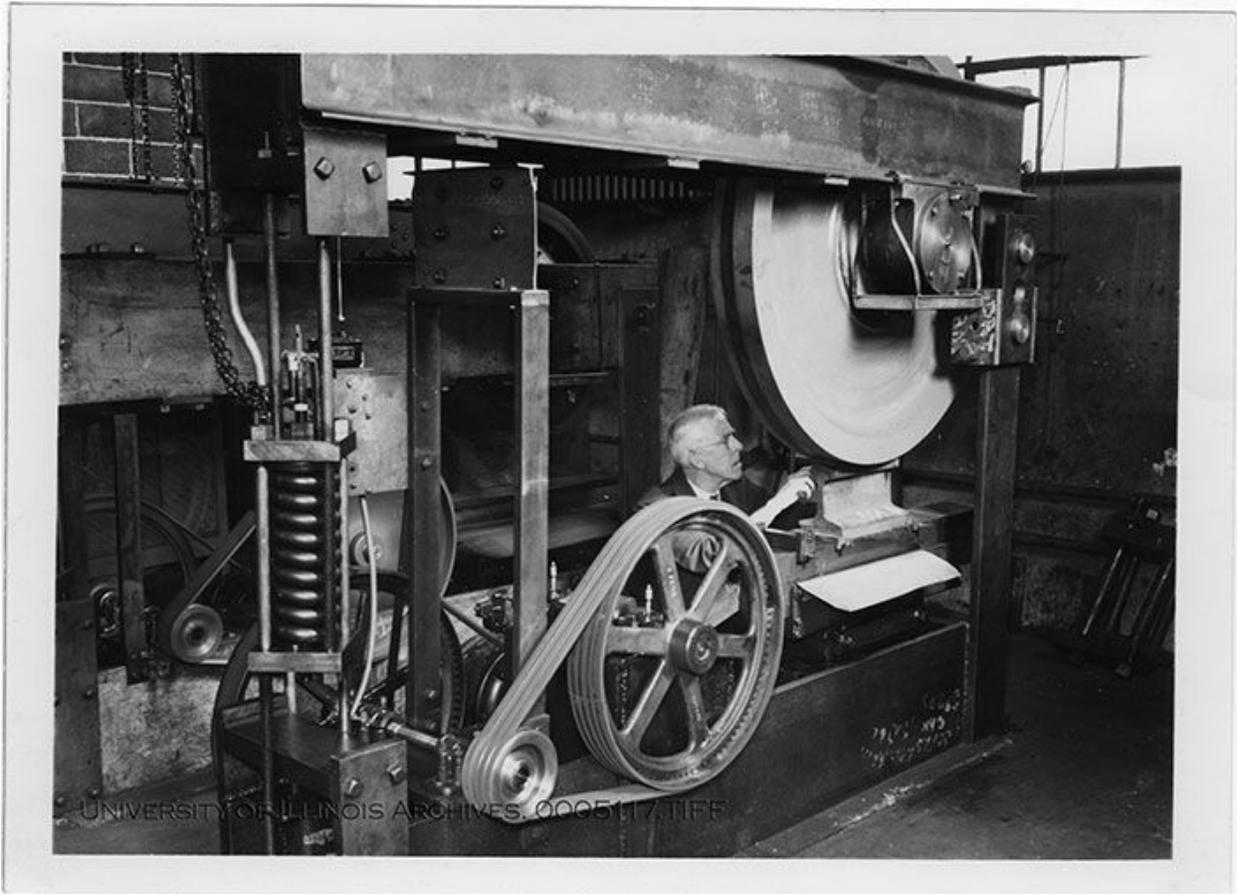
# The News-Gazette

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Kristen Wilson: Inside Out — Illinois Distributed Museum

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## Inside Out | Railroad ties to the University of Illinois



Herbert Moore studying metal fatigue in the 1940s.

Did you know in 1916, there were over 250,000 miles of railroads in the United States? The University of Illinois has had a long history of railroad-related research.

Today, we would like to highlight three scholars from early university history that have had a major impact on railroads.

**Arthur N. Talbot** was an assistant professor in engineering and mathematics from 1885 to 1890 and professor of municipal and sanitary engineering from 1890 to 1926. His childhood interest with railroads and trains never left him, and he pursued a career where he could work to help make railroads more efficient.

One of his most well-known solutions was the creation of the railroad transition spiral. While we in Champaign may not be as used to problems of large changes in elevation, there was a great problem of ensuring that trains could transition to a higher elevation without derailing.

During the 1890s, there were spirals where a straight path curved to help a train in this endeavor, but the transition from the strait to curve track was not smooth.

Talbot used theoretical mathematics to solve how the curves were constructed. His new method not only saved trains the risk of derailment but also created a smoother ride for passengers.

It also helped companies save on costs, since there was less wear and damage on the outside tracks with this smoother transition.

The University of Illinois offered more than engineering classes that focused on railroads, they also offered business classes through the College of Commerce.

In 1924, **Gennette Killbury** was the first woman to receive a degree in railroad administration. In a Daily Illini article three months after she had graduated, it states that she was an instructor for the Monroe calculating machine of Chicago, which sold calculators. It is currently not known if she worked with railroads later in life.

Our last innovator we will highlight today is **Herbert Moore**, whose discoveries helped save the American railroads. A professor of theoretical and applied mechanics (1907 to 1914) and engineering materials (1914 to 1944), Moore began researching metal fatigue in 1919.

In 1930, he was asked to help solve the problem of rails shattering from fissures in the steel. His first hypothesis was that these rails were failing from stress. He tested this hypothesis with repeated bending and impact testing and even having a full-sized locomotive running on a treadmill system to wear down the rails.

He found that the railroads that had been failing did not fail under these stress tests. His new hypothesis was that it had to do with the metal. A paper from a metallurgist suggested too much hydrogen may be the problem.

Moore and his team were able to prove that if the rails cooled too quickly, the steel absorbed hydrogen that would gather around impurities and cause the rails to fail.

Moore and his team were able to create a new method to slowly cool the rails, and in 1939, the rails were ready to be used.

The University of Illinois continues to teach and research using trains and railroads. The research often extends beyond just the mechanics and engineering behind the trains, but also how people and goods can more efficiently use them.

The University of Illinois has long had ties to the railroads since the beginning of the university.

The Illinois Distributed Museum has online content about the innovations that have come from the University of Illinois as well as self-guided tours of campus, where you can view objects and buildings related to these innovations.

The Illinois Distributed Museum is a project under the direction of the University of Illinois Archives.

See more at [distributedmuseum.illinois.edu/](http://distributedmuseum.illinois.edu/).

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