



# Heartland Science

Ohio's Legacy of Discovery & Innovation



## Agriculture & Food

From Aquaculture to Hot Dogs

### Fast Ditcher

The Buckeye Steam Ditcher Company, founded by James B. Hill in Bowling Green, Ohio, in 1894, developed the world's first successful machine for digging drainage trenches. It grew into the largest tile ditching and construction trenching company in the world and held that position for more than a half century. Modern ditching machines still use the elements of the original Buckeye design.



### A "Ditching Machine?"

Stifle those 21st Century giggles. This ditch-digging machine solved tremendous problems that existed in the United States in the past, and still cause concerns here and in other countries. The steam ditcher filled a definite societal need at the time and had great beneficial impact. It transformed what people then regarded as wasteland into some of the nation's most productive farmland, stopped the spread of serious diseases, and made travel a lot easier.

People often invent new devices or technologies to solve problems. Swamps were a huge problem for early settlers in some parts of the United States. Few had it tougher than people living around the Great Black Swamp in the northwestern part of Ohio. It consisted of forest so thick that direct sunlight never reached the understory. The land was flooded for most of the year, and disease-carrying mosquitoes thrived there. So did biting flies, gnats, water rats, snakes, wildcats, wolves, and other animals. Even Native Americans were afraid to enter the forbidding region. Travel through the area was fine in winter, with ground frozen concrete-hard.



However, much of the rest of the year, it was horrible, with knee-deep mud covering the roads. Travelers were lucky to go a mile or two in an entire day.

Settlers around such regions dug drainage ditches to carry the excess water away. Some were open ditches. Others were dug to lay drainage "tiles," or pipe, and then filled in. It was backbreaking work. A crew of 50 strong men might be able to dig 300 feet of drainage ditch in a 12-hour workday. It took about 15,000 miles of ditches to drain that swampy area of northwest Ohio.

James B. Hill's machine was revolutionary. The original steam-powered machine had a big digging wheel that workers slowly lowered into the ground. View the American Society of Mechanical Engineers brochure, "Buckeye Steam Traction Ditcher" as a PDF for more information at [www.asme.org/history/brochures/h133.pdf](http://www.asme.org/history/brochures/h133.pdf). As the wheel turned, it scooped out dirt, and dumped it onto a conveyor belt that deposited it alongside the ditch. The machine used traction to move forward constantly, and some models could dig 3 feet per

minute. The machines worked in either soft mucky ground of swamps or hard-packed soil. In soft soil, they could dig 3 lineal feet per minute, up to depths of 12 feet, completing 1,800 feet of ditch in one working day. Many of the machines battled the Great Black Swamp, which was eventually drained and became some of the most productive farmland in the United States.

The earliest remaining Buckeye Steam Ditcher is on display at the Hancock County Museum in Findlay, where Hill moved his production plant in 1902. He later changed the company's name to Buckeye Steam Traction Company. The Findlay plant churned out ditching machines until 1973, and they were used as far away as Africa.

### **From Badlands to Goodlands: Wetlands**

Early settlers regarded swamps as their enemy, and did what came naturally. They attacked and destroyed – millions of acres of what we now term "wetlands." That would be unthinkable today because society recognizes the great ecological value of marshlands in nurturing biodiversity, protecting wildlife and protecting endangered species, and even shielding communities from hurricane storm surges. Until the 1970s, the U. S. Government encouraged the draining and filling of swamps to expand agriculture and make more land available for urban development. Now the government and other organizations such as the Sierra Club are working to protect wetlands.



According to The Ohio Department of Natural Resources, from the 1780's to the 1980's, Ohio wetland areas declined from about 5,000,000 acres to about 483,000 acres. Ohio's original wetlands were very large. Examples include:

The Great Black Swamp, which was once 120 miles in length and an average of 40 miles in width (about the size of Connecticut).

The Scioto and Hog Creek marshes of Hardin County, which once covered 25,000 acres or 39 square miles.

For research and educational purposes, the Olentangy River Wetland Research Park at The Ohio State University is one of the most comprehensive wetland research and educational facilities in the nation at a major university.