

MILLWORK

THE NEWSLETTER OF HANFORD MILLS MUSEUM

Volume 23, Issue #1

Winter 2012

Upcoming Events



ICE HARVEST
Saturday, Feb. 4th, 2012
10:00 – 4:00

SAVE THE DATE!

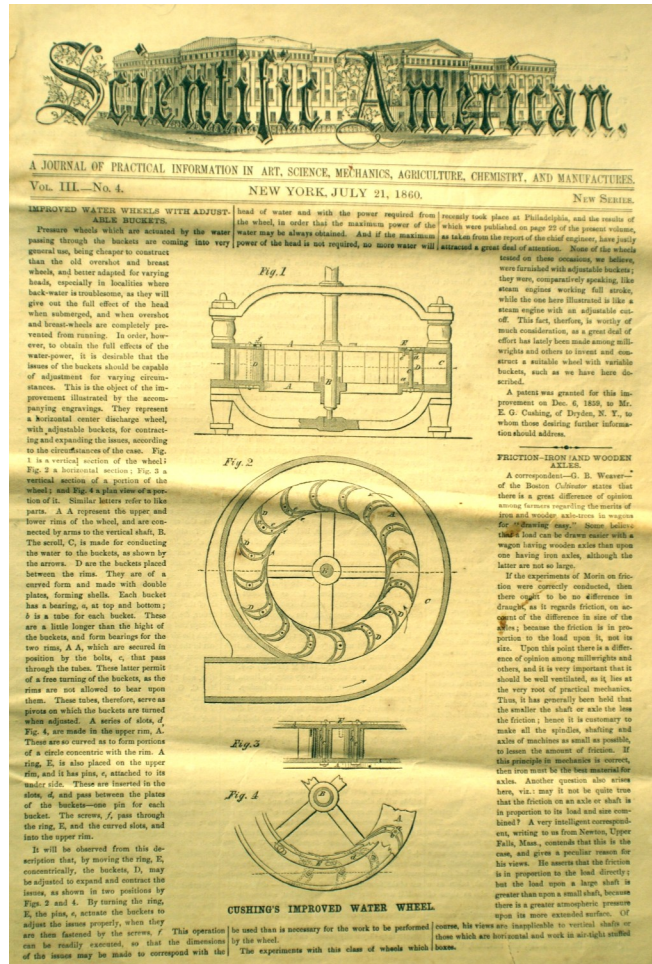
Scientific American and the Hanfords

By Kevin Gray,
Program Coordinator

It comes as little surprise that the Hanfords would be interested in news related to power generation, agricultural equipment, and the latest developments in engineering. With the 19th century Industrial Revolution forever changing the ways in which products were made and shipped it was crucial that entrepreneurs, particularly those in rural areas, had quick access to information on the latest innovations that could improve their businesses. One publication above all others fit this niche perfectly, and continues to be popular today: *Scientific American*.

Scientific American is the country's oldest continuously published monthly magazine. It began in 1845 as a weekly newspaper founded in New York City by painter, inventor, and publisher Rufus M. Porter. A mere ten months after starting it he sold the publication and focused on his vision to build a steam-powered airship (an ambitious plan that never succeeded). On the masthead of the very first issue was an explanation of the magazine's mission. It read, in part:

" [Scientific American] will contain, in addition to the most interesting news of passing events, general notices of progress of Mechanical and other Scientific Improvements; American and Foreign...[It] is particularly useful to farmers, as it will not only appraise them of improvements in agriculture implements, But instruct them in various mechanical trades, and



This cover of *Scientific American* from July 21, 1860 highlights an improved design for a water turbine, an article that D.J. Hanford would surely have been interested in.

guard them against impositions."

The cover of the first issue of *Scientific American* in 1845 included articles on improvements in railroad passenger cars, advancements in lithographic printing, an explanation for the cause of sound in thunder, a list of recent American patents, and a

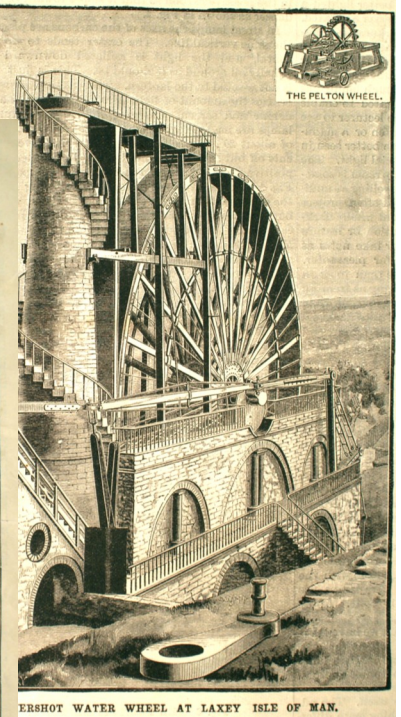
review of a book about the history of the mill town Lowell, MA (a snippet from the article: "... the Merrimack Company employs 1250 women, whose average earnings considerably exceed \$2 each per week..."). Throughout the 1800s the magazine was known for its wonderful illustrations and

Continued on next page →

Scientific American and the Hanfords (cont.)

schematics of new machinery. The popularity of *Scientific American* can be demonstrated by the extensive advertisement section of each issue, highlighting the latest models of automobile, turbines and engines, and many other products (including some nefarious ones, such as asbestos).

Our Museum collections contain a great number of single issues and full annual volumes of *Scientific American* that span many years. The earliest issues are from 1859 and the latest are from 1914, although there are quite a few gaps in between. A near complete collection of issues from 1901 to 1910 exists (except for the year 1903 – an unfortunate omission as this was the year the Wright brothers made their famous flight), and much of the 1890s is available also. It is unclear which Hanford(s) subscribed to the magazine, but it was clearly popular with the family since there is so many years' worth of them in our collections. *Scientific American* is still published today, its focus now on subjects such as astrophysics and renewable energy. Hanford Mills Museum continues to subscribe to the magazine, both as a nod to the Hanford family's interests and also to keep ourselves informed as to the pertinent technological issues of the day.



ERSHOT WATER WHEEL AT LAXEY ISLE OF MAN.

Scientific American often covered advancements in the use of waterpower during the 19th century, including the electric generators at Niagara Falls (left), and unique waterwheels such as the largest overshot waterwheel in the world—72 feet in diameter—at Laxey, Isle of Man (above).

H.W. JOHNS' ASBESTOS STEAM PACKING
 Boiler Coverings, Millboard, Roofing, Building Felt, Liquid Paints, Etc.

THE EDISON INCANDESCENT LAMP
 IS THE ONLY INCANDESCENT LAMP LAWFULLY MADE.
 All others infringe the Edison Patents, and are counterfeits.
 THE RIGHT OF THE EDISON COMPANY TO AN INJUNCTION AGAINST INFRINGERS HAS BEEN DETERMINED BY THE U. S. CIRCUIT COURT OF APPEALS. COPIES OF DECISIONS SENT ON APPLICATION.
GENERAL ELECTRIC COMPANY.
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 41 Broad Street, New York
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By the late 1800s advertisements covered at least the last two pages of each issue of *Scientific American*. Automobiles, engine parts, musical instruments, and a multitude of other products could be found in these pages. Asbestos products (top) were regularly featured, and in the Edison ad above, Thomas Edison markets his light bulb design while shrewdly protecting his patent from infringers.

PANAMA OR NICARAGUA—WHICH?
SCIENTIFIC AMERICAN
 NEW YORK, JANUARY 18, 1902.

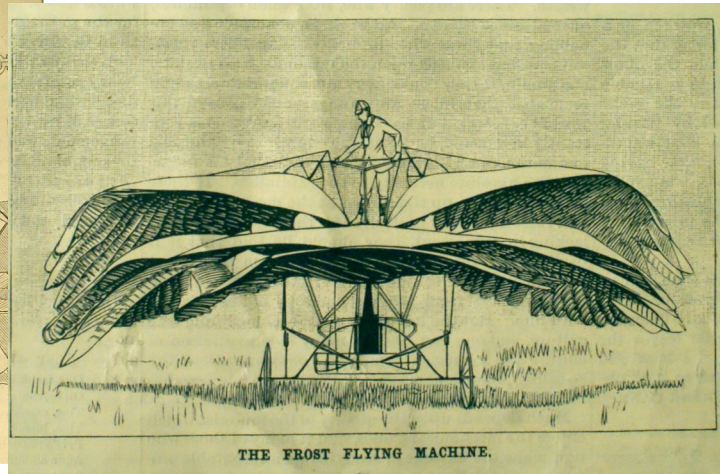
The diagram compares the Panama Canal and the Nicaragua route. It shows the Panama Canal route with a length of 49 miles and a transit time of 11 hours and 14 minutes. The Nicaragua route is shown with a length of 163 miles and a transit time of 10 days. The diagram also shows the locks for the Panama Canal, with a summit level of 107 feet above mean sea level. The diagram includes a cross-section of the canal and a comparison of the two routes.

Route	Length	Transit Time
Panama Canal	49 Miles	11 Hours 14 Minutes
Nicaragua	163 Miles	10 Days

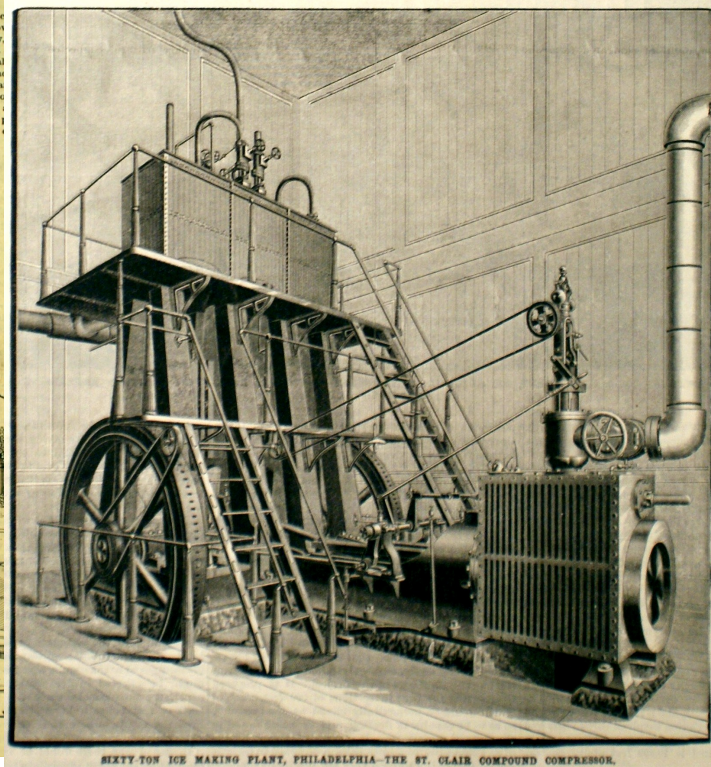
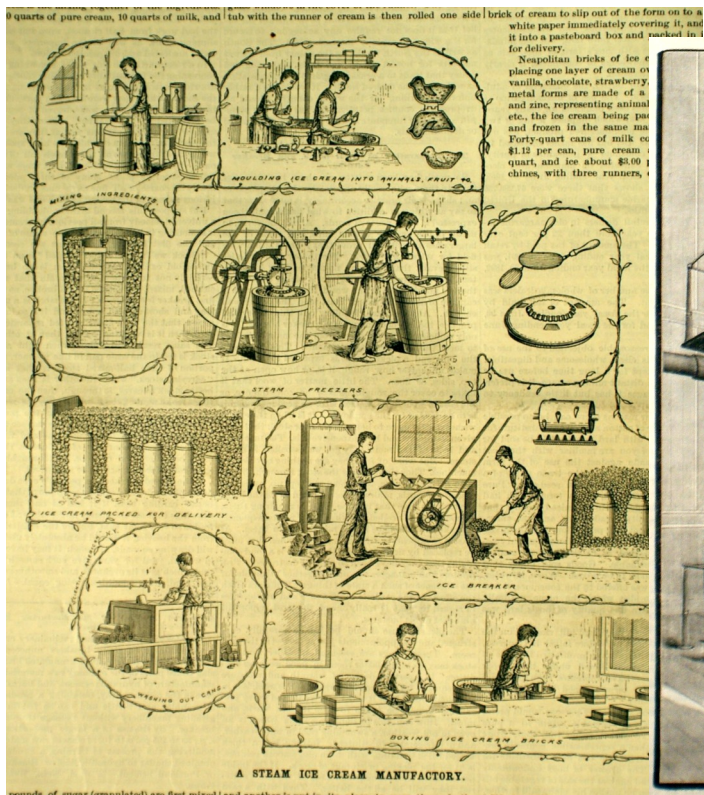
Diagram showing Superior Advantages of Panama Canal.

A very interesting cover article from 1902 weighs the benefits of building a canal through Panama or Nicaragua. The magazine, and the U.S. government, ultimately decided Panama was the best choice.

Scientific American and the Hanfords (cont.)



New transportation devices were regular features in the pages of *Scientific American* during the 1800s, particularly flying machines. The two contraptions shown above were not particularly successful, for rather apparent reasons.



Ice making was a new, burgeoning technology during the latter stages of the 19th century. The demand for ice in rapidly growing American cities put a strain on companies which harvested ice from lakes and rivers, and mild winters meant a significant ice shortage. Steam-powered, air-compressing ice makers were developed that could produce tons of ice all year long, including this sixty-ton ice making plant built in 1894 by the Knickerbocker Ice Company in Philadelphia (above right). A more stable supply of ice allowed for new businesses to flourish, such as ice cream companies. This diagram (above left) illustrates the steps taken to make delicious treats in a steam-powered ice cream factory.

Patents, Pulleys, and Power

By Alan Rowe,
Research & Preservation Coordinator

In a previous issue of *Millwork* (see: "Power Transmission—An Intro. To Pulleys," Jan.-May, 2008) we learned about the use of split pulleys, specifically wooden split pulleys, and how they made the business of milling a much more pleasant prospect. Unlike a solid cast iron pulley, a split pulley can be unbolted at the hub, split into two halves, and easily removed from the shaft. Another virtue of the wooden split pulley is the use of an interchangeable wooden bushing. By using wooden bushings of various inside diameters, a pulley may be applied to shafts of many different sizes. It is obvious to see why the mechanics of a rapidly industrializing nation would enthusiastically embrace a pulley that was both easy to remove from fixed line-shafting and interchangeable between line-shafts of various dimensions.

Given the advantages of the wooden split pulley and the growing market for power transmission devices in America's shops, factories, and mills in the late nineteenth century, several contenders arose to supply their needs. It should come as no surprise that legal battles broke out between the various pulley manufacturers as they jockeyed for dominance in their field. In our previous article, the patent claims of the Dodge Manufacturing Company of Mishawaka, Indiana were put forward without enough consideration of the complexity of the issue as it existed at the time. To put it simply, Dodge claimed that they originated the idea of the split wooden pulley with the interchangeable bushing, and pointed to their patent, issued July 4, 1882, as irrefutable proof. Eventually, Dodge went to war against their competitors in the courts and on October 23rd, 1896 they scored a sweeping victory against several rival firms. That decision, rendered by Judge George R. Sage of the circuit court for the Southern District of Ohio, was so pleasing to Dodge that

they printed the decision in its entirety in their 1897 price list, a copy of which is in the Hanford Mills Museum collection. Although Dodge continued to tout their legal victory as the final word on the subject, in reality several of their competitors successfully fought this ruling in subsequent court battles. The conclusions of the "Sage decision," as Dodge's 1896 victory came to be called, were invalidated in court cases in 1898 and 1899 against the Ohio Valley Pulley Works of Maysville, Kentucky, and the Fulton Pulley Company of Fulton, New

York. In each case, the courts determined that the Dodge patent failed for "want of novelty" and thus the defendant's pulleys, even if similar in construction, did not infringe upon Dodge's designs. And so it was that Dodge failed to discourage its competitors with legal slings and arrows, and instead focused on winning customers to its favor by virtue of sound pulley designs and superior workmanship. The latter strategy proved to be successful, as long after most of its competitors vanished from the field the Dodge →

**THE GILBERT
WOOD SPLIT PULLEY.**

Made in Sizes From 3 Inches to 24 Feet.

SALES AGENCIES IN ALL PRINCIPAL CITIES.

EVERY PULLEY WARRANTED.

SAGINAW MFG. COMPANY.

Cable Address: Saginaw, New York, A. B. C. Code.

General Offices and Works: Saginaw, Mich., U. S. A.

New York Branch: 44 Dey Street, Telephone No. 173 Costland.

Gilbert Wood Split Pulleys

Made in sizes from 8 in. to 24 in. in diameter.

EVERY PULLEY WARRANTED.

SAGINAW MANUFACTURING COMPANY,
General Offices and Works, Saginaw, Mich.

Cable Address: SAGINAW, N. Y. A. B. C. Code, 4th Edition.

NEW YORK BRANCH: 44 DEY STREET.
Agencies in All Principal Cities.

Advertisements for the Gilbert Wood Split Pulley. Manufactured by the Saginaw Manufacturing Company, Gilbert pulleys may be found in several locations throughout the Mill.

Pulleys, cont.

The use of many Dodge pulleys throughout the mill is a testament to the quality and durability of their product, but it is important to note the common use of several competing pulley designs throughout the mill. A 40-inch diameter pulley made by the Ohio Valley Pulley Works occupies a prominent place on the shaft that powers woodworking machinery in the Mill's box room. Several examples of the Gilbert wood split pulley, named for its inventor, Henry J. Gilbert, may be found in prominent positions on the mill's main shaft. The Gilbert pulley was the product of the Saginaw Manufacturing Company, of Saginaw, Michigan. Dodge took Saginaw to court in 1897, and failed to convince the court that the Gilbert pulley infringed in any way on the principles of the Dodge design. One [blank-inch] Gilbert pulley has the honor of driving the sawmill, and several others are held in the Museum's extensive pulley collection.

The great variety of pulley types and pulley manufacturers represented in the Mill preserves in solid form the state of the art of power transmission in the late 19th and early 20th centuries. This visual record, when studied in concert with the written record as found in the court cases, trade journal articles, and manufacturer's catalogs helps us to understand the often shifting and complicated world of patents, pulleys, and power.



A 40-inch diameter pulley manufactured by the Ohio Valley Pulley Works, Maysville, Kentucky. This pulley drives the C.B. Rogers & Co. 16-inch jointer located in the box room.



A Gilbert pulley (background next to wall) as installed on the Mill's main shaft. This 40-inch diameter pulley drives the Mill's circular saw.

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