

Innovation in Connecticut

Overview

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Provided by:

Department of Education

Overview

This topic can be integrated into unit on industrialization/innovation in late 19th century for Grade 8 or Grade 10.

Lesson plan contents:

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Compelling Question:

How did innovation affect workers and consumers living in Connecticut in the late 19th and early 20th century?

Introduction

Around the turn of the 20th century, Colonel Albert Pope manufactured his popular and profitable Columbia bicycles in Hartford

at the Columbia factory of the Pope Manufacturing Company. This company, in 1895, was the largest employer in New England and made Hartford the “bicycle capital of the world”. Pope’s use of patents, investments in the supply chain and his efforts to improve road conditions and bicycle safety made him a top leader in the manufacturing and transportation industry.

Supporting Questions

Eco 9-12.4 and Eco 9-12.5 refer to the [Connecticut Social Studies Frameworks](#) .

- What impact did new technologies have on the production of goods and services in Connecticut? (Eco 9-12.4)
- What groups of people were helped or hurt by new technologies and other innovations in the production of goods and services? (Eco 9-12.5)

Purpose

Students will understand the importance of innovation in manufacturing in Hartford and analyze the impact of the bicycle on consumers as well as public policy.

Historical Context

By 1895, Albert Augustus Pope’s Columbia bicycles were a national phenomenon and his Hartford-based Pope Manufacturing Company was the largest employer in New England. Not only had Pope used what one employee called his “master showman’s mind” to popularize his products and turn Hartford into the bicycle capital of the world, he also proved able to predict trends in the transportation industry.

Pope placed himself among the leaders in adapting to these changes. For example, in an effort to expand the market for his products, he became an advocate for improving the nation’s roadways. Later, anticipating the popularity of motorized transportation, Pope built plants capable of producing more than 2,000 automobiles per year, making him America’s leading automaker at the turn of the 20th century. The obstacles he faced in his efforts to bring quiet and clean-running electric cars to market presaged the challenges later

automakers would encounter.

Early Life

Albert Pope, born on May 20, 1843, was the fourth of eight children born to Charles and Elizabeth Pope of Boston, Massachusetts. Charles was born into a 200-year-old family legacy of success in the lumber industry. Rather than join the family business, Charles opted to go out on his own and began a career in real estate speculation. Initial prosperity quickly turned to despair when his business collapsed in 1852. During this time, nine-year-old Albert went to work plowing fields on a neighbor's farm. At age 12, he began selling fruits and vegetables, and by age 15 he had dropped out of school and taken a job working at Quincy Market.

In 1871, Pope married Abby Linder, with whom he had six children. By then he was a Civil War veteran, having joined the 1st Company, 35th Massachusetts Volunteer regiment at 19 and gone into battle under the command of such notable generals as Ulysses S. Grant and Ambrose Burnside. He was named a lieutenant colonel for battlefield bravery and was referred to as "Colonel Pope" for the rest of his life. After the war, he started a shoe-supply business with \$900 he had saved while in the Union army. In less than a year his business was the largest of its kind in the country.

Pope Sees Future in the Bicycle

The 1876 Centennial Exposition in Philadelphia was the turning point in Albert Pope's professional life. There he saw his first bicycle and became so enamored of it that he sped off to Europe to study how bicycles were made. After acquiring the American rights to the patents, Pope approached the Weed Sewing Machine Company about using the empty wings of its Hartford plant to produce 50 "test" velocipedes (a catchall term for early foot-powered vehicles with one or more wheels). Pope's two-wheeled models proved such a success that the plant was soon producing more bicycles than sewing machines. By the end of the 1880s, the Weed factory was producing 5,000 bicycles a year, and Pope, who was by then selling his product nationally, bought the plant outright.

A knack for advertising to the masses contributed to Pope's success,

as did controlling the supply chain for his products—an approach to innovation that lowered costs and broadened his customer base. For example, in 1892 Pope brought much of the material production in-house, buying the Hartford Rubber Works, a steel company, and the largest nickel-plating factory in the world. Now in control of the production of his raw materials, he sought new ways to lighten the weight of his 70-pound bicycles.

Design Improvements Expand Market

By hollowing out the bike's steel tubes and limiting wheel friction, he was able to make his bicycles lighter and easier to pedal, allowing him to expand the market for his bikes to women and children. Women in the late 19th century were quick to embrace the new-found sense of freedom and mobility that came with bicycling. So closely associated were bicycles to the concept of independence and liberation, that civil rights activist and suffragist Susan B. Anthony declared, "The bicycle has done more for the emancipation of women than anything in the world."

Pope and the Good Roads Movement

Closely tied to the opportunity to expand the market for bicycles was the need for higher-quality roads on which to ride them. In the late-19th century, roads outside of major cities were largely comprised of rutted dirt paths. Pope recognized just how essential good road conditions were for increasing his sales and improving the ability to move supplies and products in and out of his Hartford facilities. In 1880, he founded the Good Roads Movement and the League of American Wheelmen, an organization meant to promote greater government participation in building America's roads. Pope encouraged teachers to begin instructing students on road building as early as kindergarten, and he lobbied the United States Congress to create a government department in charge of roads. In "A Memorial to Congress on the Subject of a Road Department" in February of 1893, he stated his case very clearly:

"The people everywhere throughout the country are awakening to the vast importance of better highways. They more fully realize not only the great commercial advantages of good roads but they see more clearly that the material highways of the

country are highways in a spiritual sense as well; that the growth of society, education, and Christianity depend largely upon good means of communication between home, school, and church, and that no nation can advance in civilization which does not make a corresponding advance in the betterment of its highways.”

—From *Albert Augustus Pope, Transportation Pioneer*, by Gregg Mangan

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How To

Classroom Setup

Students will need computers with access to the internet, poster paper for brainstorming questions, and journals to write reflections on this lesson.

Part 1: Have students in small groups brainstorm the role of innovation and technology in the Industrial Era (1870-1900). What were some of the innovations that changed life in America? Who benefitted from these changes?

Consider the examples from your textbook. Identify the innovation and implications for economic and societal changes. Students can chart their answers on poster paper.

Possible answers include:

1. Interchangeable parts
2. Taylorism
3. Technology: machine tools, steel, electric light, combustion engine, electricity

Part 2: Have students, in groups, review [documents 1-4](#). Have students record their answers on [anchor charts](#) to share with the

class.

1. What innovations are illustrated in Colonel Pope's bicycle factory?
2. Now have students review the posters from Pope's Bicycle Factories in [document 5](#).
 - Who is targeted in this advertising?
 - What are the advantages for consumers who buy this product?
 - How will this product impact consumers? Be specific here.
3. Finally, have students review [document 6](#) and [document 7](#). Albert Pope organized the American Wheelman Association to advocate for the bike riding public. The Association published a book called the *Cyclists Road Book of CT*. [Document 6](#) is the intro from this book. Pope also testified before the Connecticut State legislature to support better infrastructure for the bike riding public. [Document 7 pages 11-14](#) describe Pope's suggestions for public policy on improving roads for the bike riding public.
 - What is the date of the *Cyclists Road Book*? What is the purpose of this book?
 - What does Pope argue for in his appeal to the Connecticut Legislature? Why is this appeal important for the bicycle industry?

Part 3: Have students record in their journals:

- How did Albert Pope's bicycle help to shape life in Hartford Connecticut?
- How did the bicycle impact mobility and independence for consumers?
- How did the bicycle help to change public policy?

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What's Next

Informed Action

1. Consider the importance of bicycling today. What are the advantages of bicycles as modes of transportation in America today? Create a poster or a [six word memoir](#) to advocate the use of bikes as a mode of transportation. Who is your target audience?
2. How would you advocate for the improvement of bicycle friendly roads in your community? Prepare an address to your local town or city council to suggest ways the community can improve and promote bicycle-use as a mode of transportation. [Check this reference site to see examples of cycling advocacy.](#)

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Related Resources

[Albert Augustus Pope, Transportation Pioneer](#) , Gregg Mangan, Connecticut History.org

[Albert Pope Pioneered Bicycles for Women](#)

[An Interview with Albert A. Pope](#) , Eric S Hintz, Lemelson Center for the Study of Invention and Innovation

[Colonel Albert Pope, Profiles of Economic Decision Makers](#)

[Cyclists Road Book of Connecticut](#), Compiled for the CT League of American Wheelmen, Charles G. Huntington, 1888.

[Movement for Better Roads](#), An Address by Albert Pope ,1892

[Mr. Columbia Pope Manufacturing in 1881](#)

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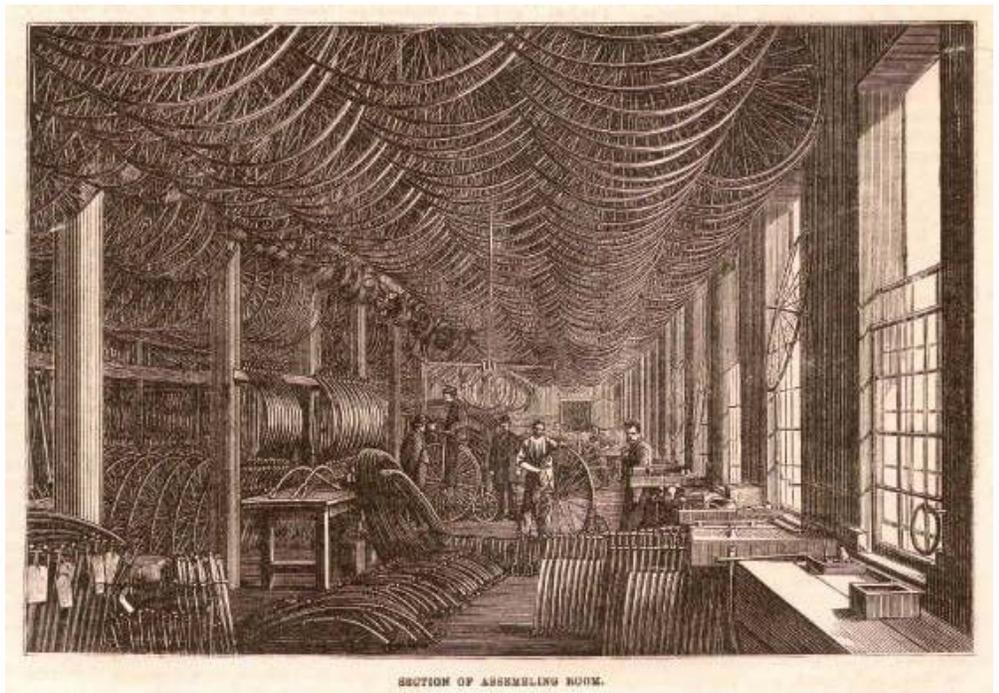
Documents/Forms

Document 1



*Machining rear hubs for Pope's Columbia brand bicycles, inside the Weed Sewing Machine Factory, 1881. Source: "A Great American Manufacture," *The Bicycling World and Archery Field* 2 (1 April 1881): 326. Courtesy of Smithsonian Institution Libraries*

Document 2



From: Mr. Columbia Pope Manufacturing in 1881

Document 3

Hartford-based inventor [Albert Pope](#) saw his first bicycle at the 1876 Centennial Exposition in Philadelphia and was so impressed that he went to Europe to study how bicycles were made. He acquired the American patent rights, manufactured 50 test models in the empty wings of a [Hartford](#) sewing machine plant and in little more than a decade was making bicycles for the nation. An innovator both in terms of his products and the ways he marketed them, Pope continually looked for design modifications that would make his bicycles easier to use. By hollowing out the bike's steel tubes and limiting wheel friction, he was able to make his bicycles lighter and easier to pedal, and thus expand the market for his bikes to women and children—and he was not slow to advertise that fact. Women in the late 19th century were quick to embrace the freedom and mobility that came with bicycling. So closely associated were bicycles to the concept of independence for women, that civil rights activist and suffragist Susan B. Anthony declared, “The bicycle has done more for the emancipation of women than anything in the world.”

—From [Albert Pope Pioneered Bicycles for Women](#)

Document 4

Hearing that Colonel Pope was in London, I sought him out in order to discover what he intended doing in England. I found him at the Savoy Hotel seated amidst a throng of business callers, but quite willing to give an interview. "What am I going to do in England?" repeated the Colonel, as I put the question to him. "Well, I'm afraid that's just about the one thing I can't tell you. I can tell you one piece of news, though—I shan't set up a factory in England, for the very good reason that I fancy I can make the machines at my present factory and send them over here for less than it would cost to manufacture them in England."

Q: "Colonel, will you tell me something about the Columbia machines?"

A: "Well, as an Englishman accustomed to English-made bicycles, I suppose you will be interested to hear that the weight of our machines is only 25 lbs. 'all on.' We are enabled to make a good bicycle of this weight because of the exceptionally fine materials that we use. A great deal of the tubing is nickel-steel, which is fifty per cent stronger than any other tubing, inasmuch as it contains fifty percent of the carbon. So far as we know we are the only manufacturers in the world who can draw any quantity of nickel steel tubing."

Q: "By the way, Colonel, what do you think of the boom? Is it going to last?"

A: "Yes, it is. I don't think it has reached its height yet. Of course, after a time, the craze may subside a little, but I think there'll be a steady increase in the demand for cycles."

Author's Note: In fact, 1896 was the peak of the bicycle boom, which was over by about 1900. Pope, in fact, had already begun to diversify, initiating experiments with automobiles starting in 1895.

Q: "I should like to have a few particulars concerning the

construction of your machines, if I may?"

A: "Certainly. In the first place let me tell you that we show our works to anybody who likes to see them, and we have a man who does nothing else but attend to visitors. Of course we should be careful about showing everything to a rival manufacturer, and we don't allow anyone to see certain parts of the works. No other manufacturer can have such machinery. I can't give you any particulars, but I may tell you that one of those machines, with two men to look after it, will do the work of eighteen men. But to come to the cycles. Every bicycle we make is subjected to the closest inspection before it is allowed to leave the works. You may not know that a bicycle contains over 800 separate pieces, and each one is examined thoroughly before it is put into the machine. This vigilance system is expensive, but I am confident that it is a good one. Another special feature of our business is our employment of expert cyclists whose work simply consists in riding about on machines of almost every make. These men test the machines in every conceivable way, their one idea being to think out a perfect bicycle."

Q: "One more question, Colonel." Would you mind satisfying the public curiosity by letting me have a few facts and figures about the cycle works?"

A: "You can get some idea of the extent of the place when I tell you that we have 17 acres of floorage. Then we employ 200 clerks who are stationed in a large building all to themselves, and over 2,000 workmen. We have our own rubber works, steel-tube works, printing works, telegraph office, &c, &c. In fact, we make quite a little town by ourselves."

—From: "An Interview with Albert A. Pope," *Cycling World* (London), 22 July 1896. As reproduced in David Herlihy, *Bicycle: The History*. New Haven: Yale University Press, 2006, pp. 276-277.

Document 5

Posters for Columbia Bicycles

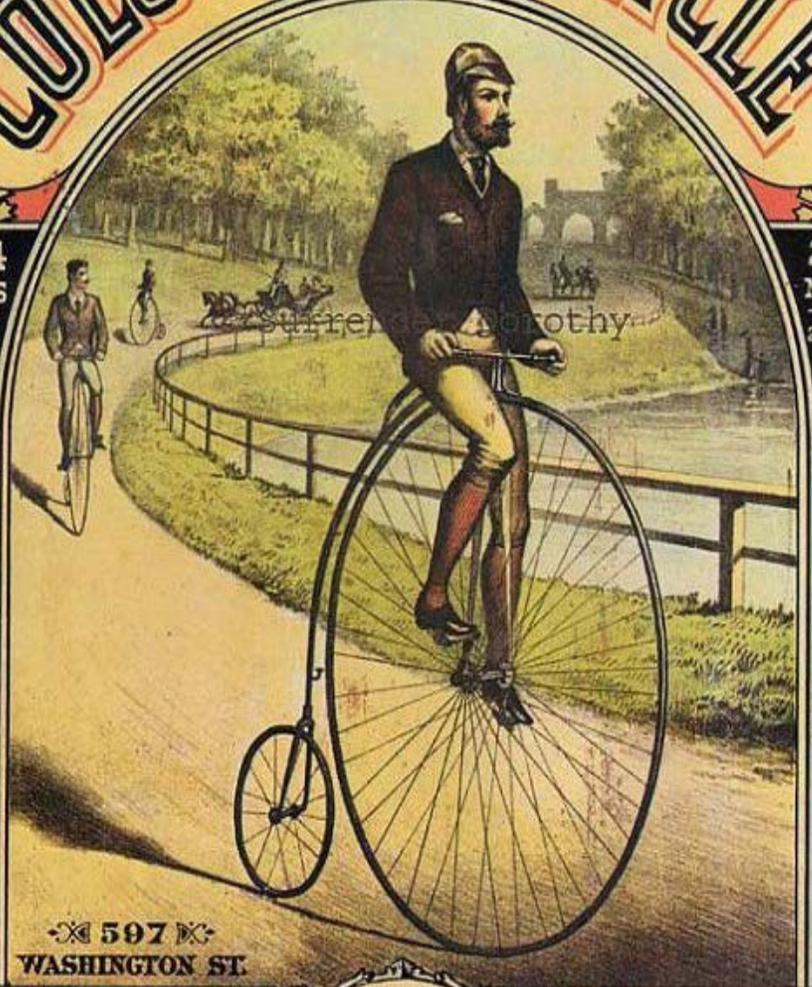
1 Mile
-IN-
2 MINUTES
43 SECONDS
-BY-
JOHN KEEN

363 Miles
-IN-
26 CONSECUTIVE
HOURS BY
C. TERRONT
-AT-
AGRICULTURAL HILL

COLUMBIA BICYCLE

1404
MILES
-IN-
6 DAYS
-BY-
C. WALLER

205
MILES
-IN-
22 Hours
TURNPIKE
ROAD
BY
E. COSTEN
AND
E. SMYTH.



AN
EVER
SADDLED
HORSE
WHICH
EATS
NOTHING

212
MILES
-IN-
22 Hours
55 Min.
ON THE ROAD
FROM
LONDON
TO BATH
AND RETURN
-BY-
W. BRITTON

1/4
MILE
-IN-
35 3/8
SEC.
Chestnut
Hill Boston
-BY-
G. I. FRANCIS

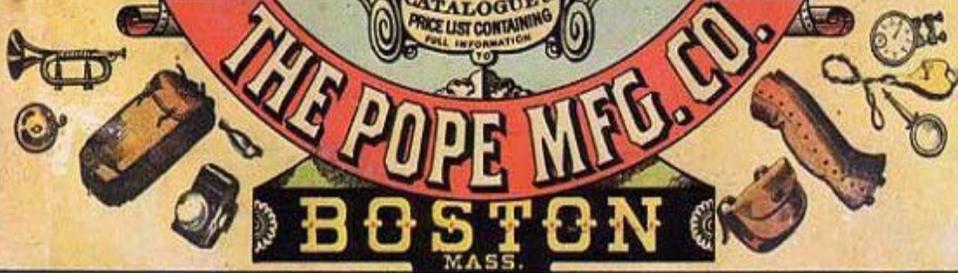
10
MILES
-IN-
2 Hours
18 Min.
From F. A. T. H.
To LONDON
-BY-
E. A. B. B. B. B. B.

597
WASHINGTON ST

SEND 3 CENT STAMP
FOR
CATALOGUE &
PRICE LIST CONTAINING
FULL INFORMATION

THE POPE MFG. CO.

BOSTON MASS.



You have a perfect means of
recreation and exercise

IF YOU OWN A

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BEVEL GEAR
CHAINLESS BICYCLE



THERE is no vehicle so useful and no means of exercise so enjoyable, so healthful, so thoroughly within reach of all, as the Bicycle. Riders of the COLUMBIA BEVEL-GEAR CHAINLESS BICYCLE will tell you that no other is so easy to propel, so perfectly adapted to all conditions of riding. Models for 1901, \$75. Columbia Chain Models for 1901, \$50.

Columbia Cushion Frame, \$5 additional

Columbia Hub or Tire Coaster Brake, \$5 additional

Catalogue of dealers or by mail from us.

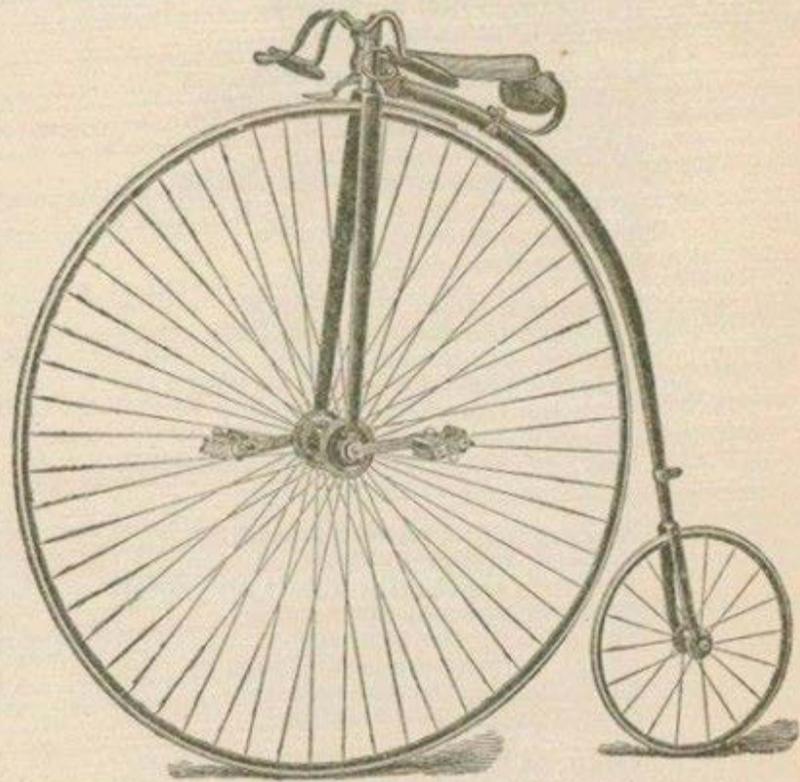
COLUMBIA SALES DEPARTMENT, HARTFORD, CONN.

COLUMBIA BICYCLES
INSURE CYCLING DELIGHT



Standard of the World
Pope Manufacturing Co. Hartford, Conn.

A COLUMBIA for \$90.00.



THE VOLUNTEER COLUMBIA.

BOYS! High wheels have not gone out of style, and more fun can be spun out of these than out of low wheels. Now is your chance to secure a high-grade Columbia for \$90, and fully warranted.

POPE MFG. CO., 12 Warren St., NEW YORK.
77 Franklin St., BOSTON. 291 Wabash Ave., CHICAGO.

BRANCH HOUSES :

YOU HAVE SOMETHING

to live for if you have not seen our new



CENTURY COLUMBIA,

*with Pneumatic Tires. Light, Strong,
Durable, and fully guaranteed.*

POPE MFG. CO., 221 Columbus Ave., Boston.

12 Warren St., N. Y.

291 Wabash Ave., Chicago.

Factory, Hartford, Conn.



There is no exercise known that is better for the fair sex than Cycling, which brings the flush of health to the cheek and vigor to the frame.

There is no bicycle made that is better for this purpose than the **COLUMBIA LADIES' SAFETY.**

ILLUSTRATED CATALOGUE FREE.

POPE MFG. CO., BRANCH HOUSES:
12 Warren St., NEW YORK
77 Franklin St., BOSTON. 291 Wabash Ave., CHICAGO

Factory . HARTFORD, CONN.



**A
DREAM
OF
SPRING**




**A
WOMAN IS AS
MUCH ENTITLED
TO THE BEST
BICYCLE AS IS
A MAN**

COLUMBIA BEVEL GEAR CHAINLESS BICYCLES, **\$75, \$60**

Are Built upon Lines which Contribute to
the Graceful Appearance of the Rider

THE COLUMBIA LOOP FRAME is original with us, and has the endorsement of being
widely copied by other makers

To-day women devote as much care and thought to their cycling costumes as they give to
their gowns for other occasions. Select a bicycle which is in keeping with this idea.

Columbia Bevel Gear Chainless Bicycles for women insure advantages which are at once
apparent - There is nothing to entangle the skirt, nothing to interfere with the quickest possi-
ble mount or dismount from either side. High rigidity of frame has been secured without
depriving the rider of necessary room for the skirt.

COLUMBIA COASTER BRAKE, applicable to both Chainless and Chain models, enables
the woman rider to enjoy the pleasure of coasting without fear of accident. It reduces the
fatigue of long distance rides. It does not wear or strain the running parts of the machine.
Price, \$5.00. Fitted to bicycles of former years of almost any make, at reasonable prices.

**Columbia, Hartford, Stormer and Pennant
Chain Wheels, \$50, \$35, \$30, \$25.**

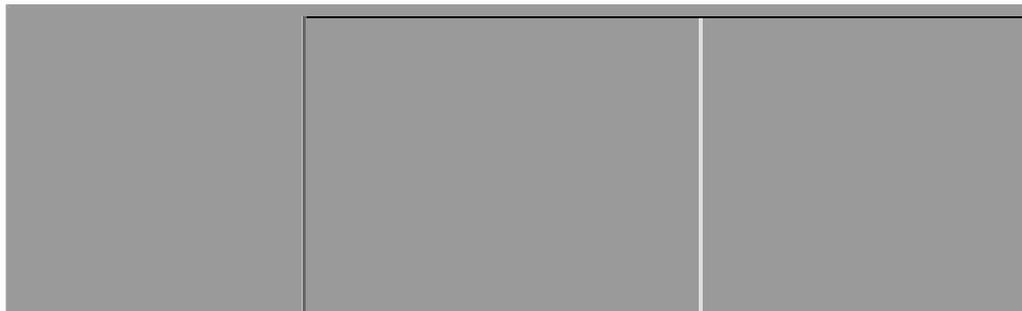
Columbia and Stormer Catalogues free from any Columbia or Stormer dealer, or by mail for 2c. stamp each.

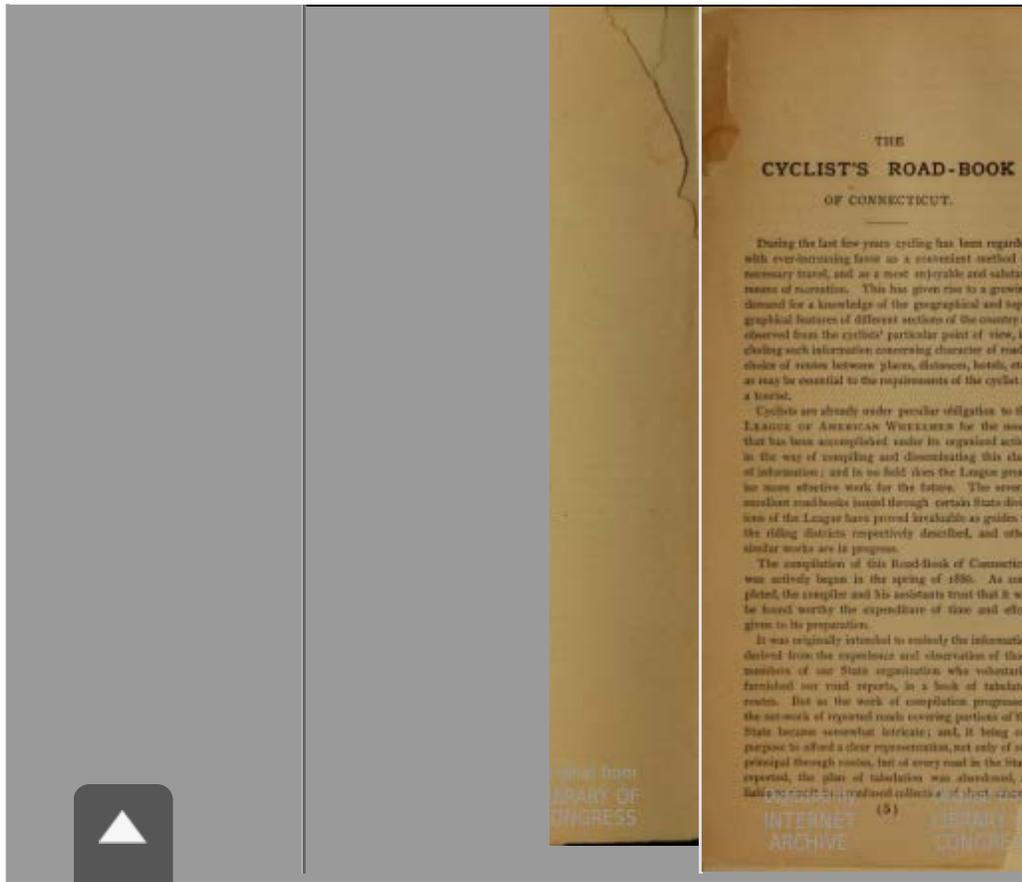
AMERICAN BICYCLE COMPANY POPE SALES DEPARTMENT HARTFORD CONN.

From the Connecticut Historical Society and the Library of Congress

Document 6

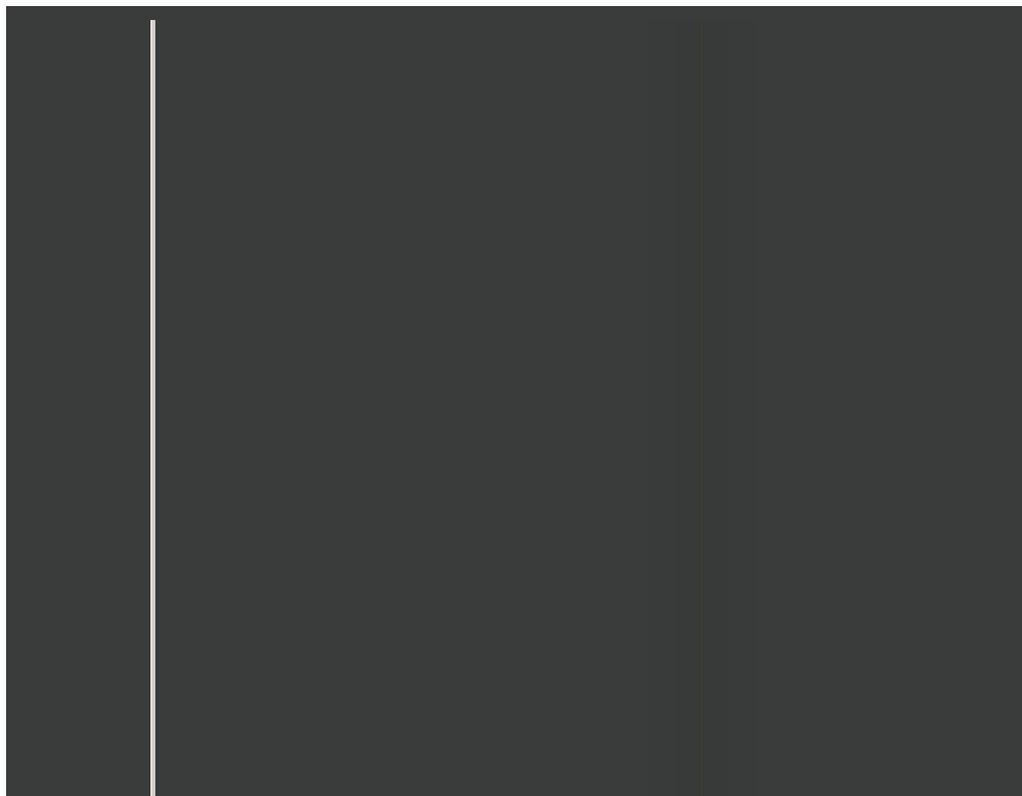
Pages 5-6 from *The Cyclists Book of Connecticut*, the CT Division of the League of American Wheelman, 1888. [Go to the text-only version.](#)





Document 7

Pages 11-14 from *The Movement for Better Roads* by Col. Albert Pope, 1902.



to the construction and improvement of the roads and public highways of the commonwealth, and to consider the advisability and practicability of the State assisting in the construction of the same, with power to prepare and present a bill providing for the construction and maintenance of high-class roads.

The commission was appointed, composed of men of high standing in the State and noted for their practical ideas, and many of them for the broadest possible experience in just such works and matters as their special duties will bring before them, and they are now in session at Harrisburg in the prosecution of their work.

RHODE ISLAND, MARYLAND, AND OHIO.

In Maryland, and Ohio as well, measures are already being entered upon, and your small neighbor on the east is making most commendable efforts in the proper direction, under the impetus and guidance of some of the most prominent men in the State.

Not only such movements as this are being pressed, but the educators of the country are doing no small amount for the furtherance of the movement.

In Vanderbilt University, Nashville, Tenn., for instance, a course has lately been established for the instruction, without charge, of a class in road engineering, to which is admitted one highway official

M 7011

from every county in the State. It consists of lectures and work upon the science of the proper location, construction, and maintenance of roads and study of systems of highway administration.

A valuable lecture delivered at the Lowell Institute, and a course of twelve lectures delivered in the Lowell Institute are among the notable efforts being made by educators to do their share in the education of the public up to an appreciation of their rights and necessities are in this

CONNECTICUT'S NEEDS

Surely it is time for the good State to wheel into line in this great movement. From personal experience, we all know that it is not so good as to remove from her "mending her ways."

To quote again from your good colleague, who has already referred, for he seems pretty close to the gist of the matter, we expect civil service reform in his country with outrageously false pretences we are taking the people's money in these days. It was settled at Springfield, last summer, I think, that future probat

[The movement for better roads : an address](#)