GEORGIA HISTORICAL SOCIETY

Featured Historical Figure Teaching Guide

Charles Holmes Herty (1867-1938)

Contents

Vocabulary

*definitions adapted primarily from vocabulary.com

chemist	*n*	a scientist who specializes in chemistry
chemistry	*n*	the science of matter; the science that tells us what things and people are made of; the branch of the natural sciences dealing with chemicals and elements, the building blocks of our world
consultant	*n*	an expert who gives advice
economy	*n*	the system of producing, distributing, and consuming goods and services
engineering	*n*	the discipline dealing with the art of applying scientific knowledge to practical problems; the field where science, math, and technology meet
experimental	*adj*	describes something that is at an early stage, being observed, tested out, and subjected to experiments as it's being developed
financing	*n*	the process of finding money for something you want
foreign	*adj*	relating to or coming from another place or part of the world
Great Depression	*n*	the economic crisis beginning with the stock market crash in 1929 and continuing through the 1930s and early 1940s
implement	*v*	follow to a conclusion or bring to a successful end
industry	*n*	used to refer to a group of similar businesses that make goods and services for sale
laboratory	*n*	a place where experiments happen, usually scientific experiments with chemicals
mill	*n*	a factory or plant with one or more buildings with facilities for manufacturing
munitions	*n*	materials used in war; especially weapons and ammunition
naval stores	*n*	products made from pine sap such as turpentine, pitch, and tar
newsprint	*n*	Inexpensive paper that's used to print newspapers
organic	*adj*	refers to living things or material that comes from living things
pharmaceuticals	*n*	any kind of drug used for medicinal purposes
production	*n*	the process of goods being made or manufactured
profitable	*adj*	describes something that makes money
pulp	*n*	a soft, squishy, or slightly wet mush; pulp made from trees is created with a chemical process and is used to make a variety of paper products
pulpwood	*n*	a softwood used to make paper
research	*n*	a search for knowledge
resin	*n*	a sticky substance that oozes out of fir and pine trees; resin is insoluble in water
sulfite	*n*	compounds that contain the sulfite ion
synthetic	*adj*	made of artificial materials; usually created by chemical synthesis
textiles	*n*	something made by knitting, weaving, or crocheting fibers together
turpentine	*n*	volatile liquid made from resin obtained from live trees, mainly pine

Charles Herty Bibliography

Print Resources

Germaine M. Reed, "Charles Holmes Herty and Promotion of Southern Economic Development," *South Atlantic Quarterly* 82 (1983): 424-36.

Germaine M. Reed, "Charles Holmes Herty and the Establishment of Organized Athletics at the University of Georgia," *Georgia Historical Quarterly* 77 (fall 1993): 525-40.

Germaine M. Reed, *Crusading for Chemistry: The Professional Career of Charles Holmes Herty* (Athens: University of Georgia Press, 1995). *free ebook available through the Digital Library of Georgia

Germaine M. Reed, "Saving the Naval Stores Industry: Charles Holmes Herty's Cup-and-Gutter Experiments, 1900-1905," *Journal of Forest History* 26 (1982): 168-75.

Online Resources

Charles Herty. Paper Industry International Hall of Fame, Inc.

Charles H. Herty Papers, 1860-1938 Finding Aid. Emory University Stuart A. Rose Manuscript, Archives, and Rare Book Library.

"Charles Herty and the Savannah Pulp and Paper Laboratory – Landmark – American Chemical Society." American Chemical Society. Accessed October 27, 2016.

Charles Herty and Turpentining Collection. Zach S. Henderson Library Special Collections at Georgia Southern University.

Georgia Historical Society Digital Image Catalog (search keywords "Herty" and "experimental lab").

Reed, Germaine M. "Charles Herty (1867-1938)." *New Georgia Encyclopedia*. 19 August 2013. Web. 27 October 2016.

Lesson Plan: Charles Herty the Innovator

Overview

In this lesson, students will explore what it means to be innovative by studying the example of Georgia native Dr. Charles Herty. In addition to understanding the concept of innovation, students will also get practice using primary and secondary sources and will learn about the historical context of Dr. Herty's innovations.

The lesson begins with a hands-on activity using Legos to introduce the concept of Henry Ford's assembly line. This concrete example of innovation will activate prior knowledge and start a conversation about what it means to be innovative and how innovators change history. Students will focus on the example of Charles Herty by working together to build a timeline that includes historical events and primary sources.

Essential Questions

- What does it mean to be innovative?
- What are the common characteristics of innovators?
- How do innovators change history?

Georgia Standards of Excellence

**originally presented to a 5th grade class; easily adapted for 5th, 8th, and High School U.S. History*

Historical Understandings

Fifth Grade

- SS8H2 Describe U.S. involvement in World War I and post-World War I America
- SS5H3 Explain how the Great Depression and New Deal affected the lives of millions of Americans.
- SS5G2 Explain the reasons for the spatial patterns of economic activities.
- SS5E1 Use the basic economic concepts of trade, opportunity cost, specialization, productivity, and price incentives to illustrate historical events
- SS5E3 Describe how consumers and producers interact in the U.S. economy.

Eighth Grade

- SS8H8 Analyze Georgia's participation in important events that occurred from World War I through the Great Depression.
- SS8H2 Evaluate the influence of Georgia-based businesses on the State's economic growth and development.

United States History

- SSUSH16 Investigate how political, economic, and cultural developments after WWI led to a shared national identity.
- SSUSH17 Analyze the causes and consequences of the Great Depression.

Information Processing Skills

- Organize items chronologically
- Identify and use primary and secondary sources
- Interpret timelines
- Draw conclusions and make generalizations

Reading Standards for Literacy in History/Social Studies (RHSS) Grades 6-8

- L6-8RHSS1: Cite specific textual evidence to support analysis of primary and secondary sources.
- L6-8RHSS2: Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.
- L6-8RHSS4: Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.
- L6-8RHSS7: Integrate Visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.
- L6-8RHSS8: Distinguish among fact, opinion, and reasoned judgement in a text.
- L6-8RHSS9: Analyze the relationship between a primary and secondary source on the same topic.

Reading Standards for Literacy in History/Social Studies (RHSS) Grades 9-12

- LI1-12RHSS1: Cite specific textual evidence to support analysis of primary and secondary sources, connecting insights gained from specific details to an understanding of the texts as a whole.
- LI1-12RHSS2: Determine the central ideas or information of a primary or secondary source; provide an accurate summary that makes clear the relationships among the key details and ideas.
- LI1-12RHSS4: Determine the meaning of words and phrases as they are used in a text, including analyzing how an author uses and refines the meaning of a key term over the course of a text (e.g. how Madison defines *faction* in *Federalist* No. 10).
- LI1-12RHSS7: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.
- LI1-12RHSS8: Evaluate an author's premises, claims, and evidence by corroborating or challenging them with other information.
- LI1-12RHSS9: Integrate information from diverse sources, both primary and secondary, into a coherent understanding of an idea or event, noting discrepancies among sources.

Materials

- Legos
- Timer or phone with timer
- Charles Herty primary and secondary source print outs
- Herty Timeline print outs
- Dictionaries or web-connected devices with access to vocabulary.com or other online dictionaries

Procedures

Discussion: What is Innovation?

- Start by asking students what they think the word innovation means. After taking a few guesses and discussing as a class, use a dictionary or the internet to look up definitions of the word innovation. Here is a

nice simple definition from vocabulary.com: *An innovation is the introduction of something new.*

- Next, ask if students can think of some examples of innovation. For example, can they think of an innovative technology or a person who they consider innovative? Next, ask what the students think is the difference between innovation and invention. After discussing student ideas, explain that the next activity will help them better understand the word innovation and how it is different from pure invention.

Activity: Assembly Line

Before the lesson, use Legos to make a pattern that your students will replicate. You will call this a widget. The widget should be a fairly simply design made by putting blocks of varying size and shapes together. You will need to have the exact Legos needed to make four exact duplicates of your widget.

- Begin by telling students that you are opening a widget factory. Next show them your widget made from Legos. Select four students to work in your widget factory.
- *Round 1*: Place the pieces needed to make duplicate widgets around the classroom. Then explain that each of the workers will need to gather the materials needed and make an exact duplicate of your widget. Make it clear to them that time is money and the faster they make widget the more money everyone will make. Let them know you will be timing their work and putting the times on the board. Record the time of round 1 on the board.
- *Round 2*: Have your first group of workers sit down. Next, either ask students for ideas on making the process faster or simply suggest that you might be able to make widgets more quickly if you put all the materials the workers need in one place where it is easy to access. Hire four new workers and move all the materials in one place near them. Record the time of round 2 on the board. It should take less time.
- *Round 3*: Explain to the students that you have heard of a new way of making widgets using something called an assembly line and you want to see if it is faster. Hire four new workers for your factory and set up an

assembly line. Give each worker one task in building the widget then get them to pass the widget down the line for the next person to complete their step. Instead of each worker making one complete widget, the four workers will use the assembly line to put four widgets together.

- Finish the activity by discussing the impact of Henry Ford's innovative assembly line on American history. Explain that Henry Ford did not invent the assembly line. He had seen similar processes at work in other industries. He took what he learned and made the assembly line to work in the automobile industry. The result of this innovation was a dramatic decrease in time it took to make a car, which led to dramatically lowering the price and selling more cars. You can brush up on your Henry Ford history with this concise article on History.com (http://www.history.com/this-day-in-history/fords-assembly-line-starts-rolling)
- Tie everything back to the word innovation and explain that they will be learning about an innovator from Georgia next.

Discussion: Primary vs. Secondary Sources

- Explain that students will be working with primary and secondary sources in their next activity. Ask students if they know the difference between primary and secondary sources. A fun and simple way to remind students about primary sources is to ask students if the word primary has the letter "i" in it. Then, have them point to their eye as they say, "primary sources are eyewitnesses to history."
- You may want to go over a few examples of primary and secondary sources to help with student understanding. The Ithaca College Library has a good subject guide on the topic (https://library.ithaca.edu/sp/subjects/primary).

Activity: Who was Dr. Charles Herty?

In this activity, students will read and discuss a secondary source on Charles Herty before the teacher models the inquiry process using a primary source related to Charles Herty. These two activities will help students complete the Herty Timeline.

- Give each student a copy of the attached Charles Herty secondary source. Ask students to read the secondary source quietly on their own. Check student understanding with these follow-up questions:
  - What did Charles Herty study in college?
  - Why do you think Charles Herty is important to Georgia history?
  - What is chemistry?
  - What kind of work did Charles Herty do?
  - What industries did his work impact?
- Give each student a copy of the attached primary source. Lead the students through an analysis of the photograph using the Library of Congress Primary Source Analysis Tool as a guide. Start by asking students to observe the image. What do they see, what sticks out at them the most, what details do they notice? Next, ask students to reflect on the photograph by coming up with hypotheses about the primary source. For example, students may guess that the photograph is old or that they think the man in it must be Charles Herty. They may guess that he is in his office. Finally, get students come up with additional who, what, when, where, and why questions that lead to more observation and reflection.
- You can download a teacher's guide to analyzing photographs and prints on the Library of Congress website (http://www.loc.gov/teachers/usingprimarysources/resources/Analyzing_Photographs_and_Prints.pdf)

Activity: Dr. Herty Timeline

Before the lesson: Print and cut out the timeline dates, activities, primary sources, and innovation labels. Laminating is suggested for multiple uses.

In this activity, students will be tasked with putting together a Charles Herty timeline using the provided dates and events. Students will then be asked to label innovations in the timeline and finally match primary sources with the timeline events.

- Tell students that your Charles Herty timeline has gotten all jumbled up and you need their help putting it back together. Present the jumbled events and dates to the students and ask them to work together to place the

dates in order and match the correct event with each date. You may need to line up desks, use the floor, or use a removable adhesive to build the timeline on a wall or white board. You can provide more structure for your lesson by placing students into groups of four and giving them each four dates and events to put in order. You can use the same groups for placing the primary sources as well.

- Next, show students the innovation labels. Let students know that you are going to read the timeline together. Tell students to raise their hand if they think one of the events deserves the innovation label. You can read the timeline yourself or ask for student volunteers. Ask students to explain why an event deserves the innovation label when they raise their hand.
- Finally, explain that the last step in completing the timeline is adding primary sources. Make sure that students understand there is not a primary source for each date. Students should also know that no date has multiple primary sources. Present the jumbled mix of primary sources and tell students to work together to place them with the right date and event. For more structure, split students into groups and have them work with specific primary sources.

Attachments

A) Charles Herty Secondary Source

B) Charles Herty Primary Source

C) Charles Herty Timeline

D) Innovation Labels

E) Charles Herty Timeline Primary Sources

Attachment A

Charles Herty Secondary Source

Name: Charles Holmes Herty

Born: December 4, 1867 in Milledgeville, Georgia

Died: July 27, 1938

Education: Herty studied chemistry at the University of Georgia (UGA) and Johns Hopkins University. After graduating, he taught chemistry at UGA. He was very involved in athletics at UGA. He was responsible for organizing UGA's first real football team.

Career: Herty became a chemist. He held many important jobs during his lifetime:

- Professor of chemistry at the University of Georgia and the University of North Carolina at Chapel Hill
- Expert at the U.S. Bureau of Forestry
- President of the American Chemical Society and the Synthetic Organic Chemical Manufacturers Association
- Editor of the *Journal of Industrial and Engineering Chemistry*
- Consultant for industry and government

Innovations: Charles Herty is most famous for his work with pine trees:

- In 1901, he introduced an innovative cup and gutter system for collecting resin from pine trees. The resin was used in the naval stores industry.
- In the 1930s, he found a way to make paper pulp from young pine trees. People thought the pine trees had too much resin, but Herty used an acidic sulfite solution to digest the wood.

Vocabulary

chemist	*n*	a scientist who specializes in chemistry
chemistry	*n*	the science of matter; the science that tells us what things and people are made of; the branch of the natural sciences dealing with chemicals and elements, the building blocks of our world
consultant	*n*	an expert who gives advice
engineering	*n*	the discipline dealing with the art of applying scientific knowledge to practical problems; the field where science, math, and technology meet
industry	*n*	used to refer to a group of similar businesses that make goods and services for sale
naval stores	*n*	products made from pine sap such as turpentine, pitch, and tar
pulp	*n*	a soft, squishy, or slightly wet mush; pulp made from trees is created with a chemical process and is used to make a variety of paper products
resin	*n*	a sticky substance that oozes out of fir and pine trees; resin is insoluble in water
sulfite	*n*	compounds that contain the sulfite ion

Attachment B

Charles Herty Primary Source

Attachment C

Charles Herty Timeline

1867

1886

1890

1901

1902

1905

1915

1917

1918

1921

1926

1928

1932

1933

1938

21st Century

Today, the paper and pulp industry is very important to Georgia and the entire southern region. There are 12 pulp mills in Georgia. The paper and pulp industry contributes billions of dollars to the economy and employs thousands of Georgians.

Charles Herty died on July 27, 1938. A few weeks before he learned that plans were being finished to start the very first southern newsprint mill in Texas. The newsprint mill would use the research Charles Herty did at his laboratory to make paper pulp from pine trees.

On March 31, 1933, the *Soperton News* printed its weekly newspaper on experimental paper made at the Savannah Pulp and Paper Laboratory. Other newspapers around Georgia did the same thing over the next few years.

In 1932, Charles Herty opened the Savannah Pulp and Paper Laboratory. His goal was to start newsprint businesses in the South using pine trees.

Herty believed that paper could be made from fast-growing young pine trees. Most people thought he was wrong. They believed the trees were too soft and gummy. At the Savannah Pulp and Paper Laboratory, Herty proved that you could make paper from young pine trees using an acidic sulfite solution to digest the wood.

In 1928, Charles Herty started working full-time as a consultant. Herty was most interested in promoting the use of chemistry to improve the southern economy and improve the standard of living for American citizens.

As a consultant, Herty gave a lot of speeches and wrote a lot of papers about the importance of chemistry to our everyday lives. His speeches focused on the role of chemistry in industry, medicine, and warfare.

Herty became an advisor to Chemical Foundation Inc. in 1926. He was assigned the job of working with Senator Eugene Ransdell to pass legislation created the National Institute of Health. Passed in 1930, the Ransdell Act reorganized and expanded the Hygenic Laboratory and gave it the new name National Institute of Health.

In 1921, Charles Herty became the first president of the Synthetic Organic Chemical Manufacturers Association. He was president until 1926.

Charles Herty wrote a short article titled “War Chemistry in the Alleviation of Suffering” in the September 1918 issue of the *Journal of Industrial and Engineering Chemistry.* Herty argued that America needed a research institution that would make it easier for chemists and medical professionals to work together testing new medicines. Herty’s influence helped establish the modern National Institutes of Health.

Charles Herty was editor of the *Journal of Industrial and Engineering Chemistry* from 1917 until 1921. It was a popular journal read by people all over the country.

Herty used his position to encourage chemists to help America during World War I. He believed it was important for businesses, government, and universities to work together so that the military had all the materials it needed to win the war. For example, Herty did not think it was a good idea to purchase items like munitions, pharmaceuticals, and textiles from foreign countries. He also supported creating the Chemical Warfare Service.

In 1915, Charles Herty was elected president of the American Chemical Society.

In 1905, Charles Herty became a professor of Chemistry at the University of North Carolina at Chapel Hill. He taught there until 1916. He did a lot of research about how to use pine trees to make different products.

In 1902, Charles Herty started working for the U.S. Bureau of Forestry. His job was to make the cup and gutter system perfect and to show others how to use it. Soon, most turpentine gatherers in America used the Herty cups.

Charles Herty introduced a cup and gutter system for collecting resin from pine trees in 1901. The resin was used to make turpentine and other products in the naval stores industry. Herty experimented with the new system in Statesboro, Georgia. His cup and gutter system did not hurt the trees as much as the old boxing system. It also helped get more resin from the trees and did not cost a lot of money. The cups used to collect resin are called Herty Cups.

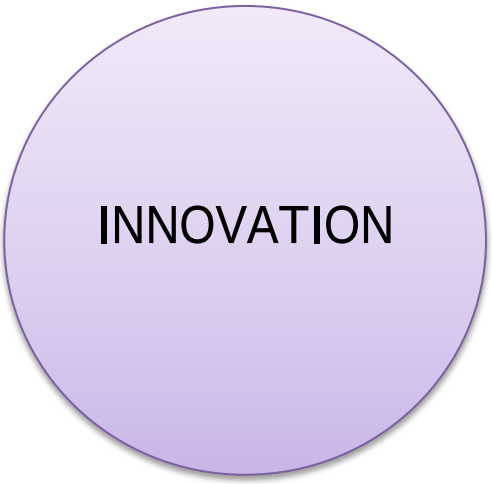
Charles Herty graduated from Johns Hopkins University in 1890. He earned a Doctorate in Chemistry. Herty became a chemistry professor at the University of Georgia.

In the Fall of 1890, Charles Herty introduced football to UGA. He learned about the game while studying at Johns Hopkins. Herty also helped organize the Athletic Association and raise money for organized sports at UGA. He worked at UGA until 1902.

Charles Herty graduated from the University of Georgia in 1886. He earned a Bachelor's Degree in Chemistry.

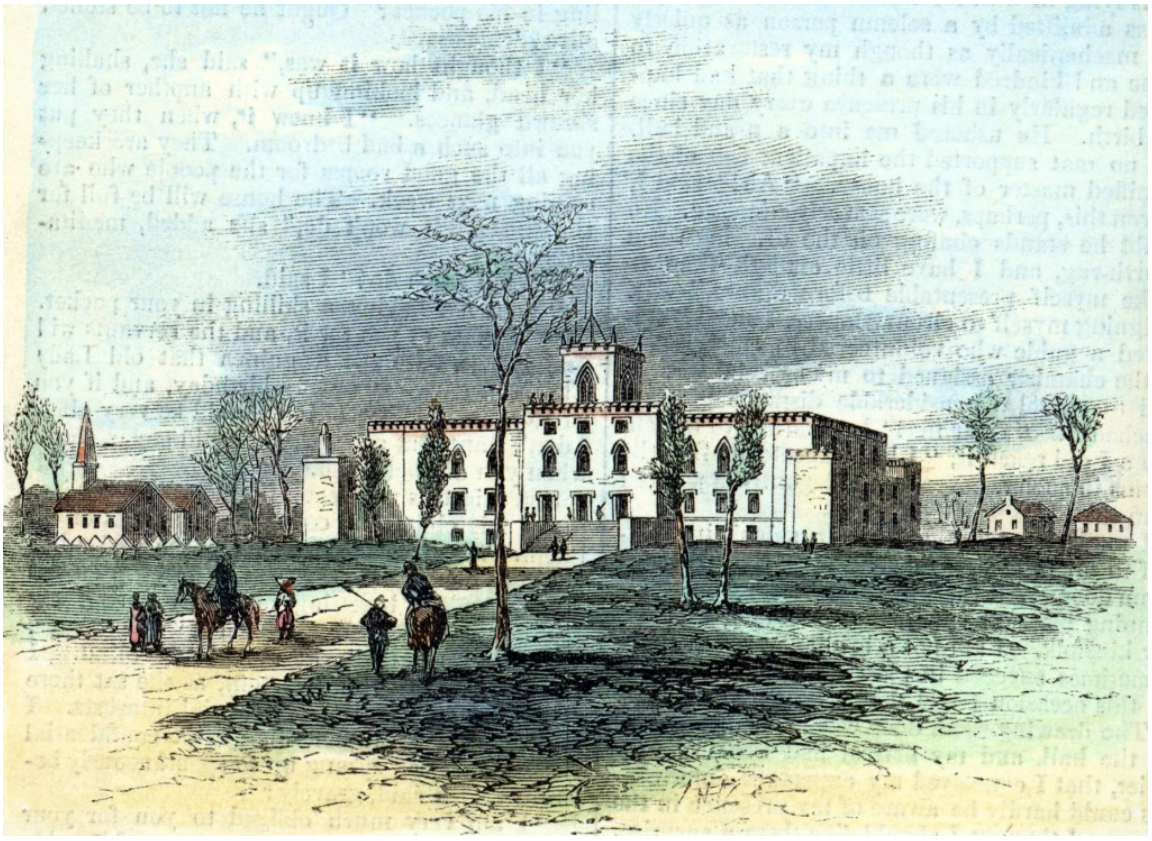
Charles Herty was born in Milledgeville, Georgia, on December 4, 1867.

Attachment D
Innovation Labels

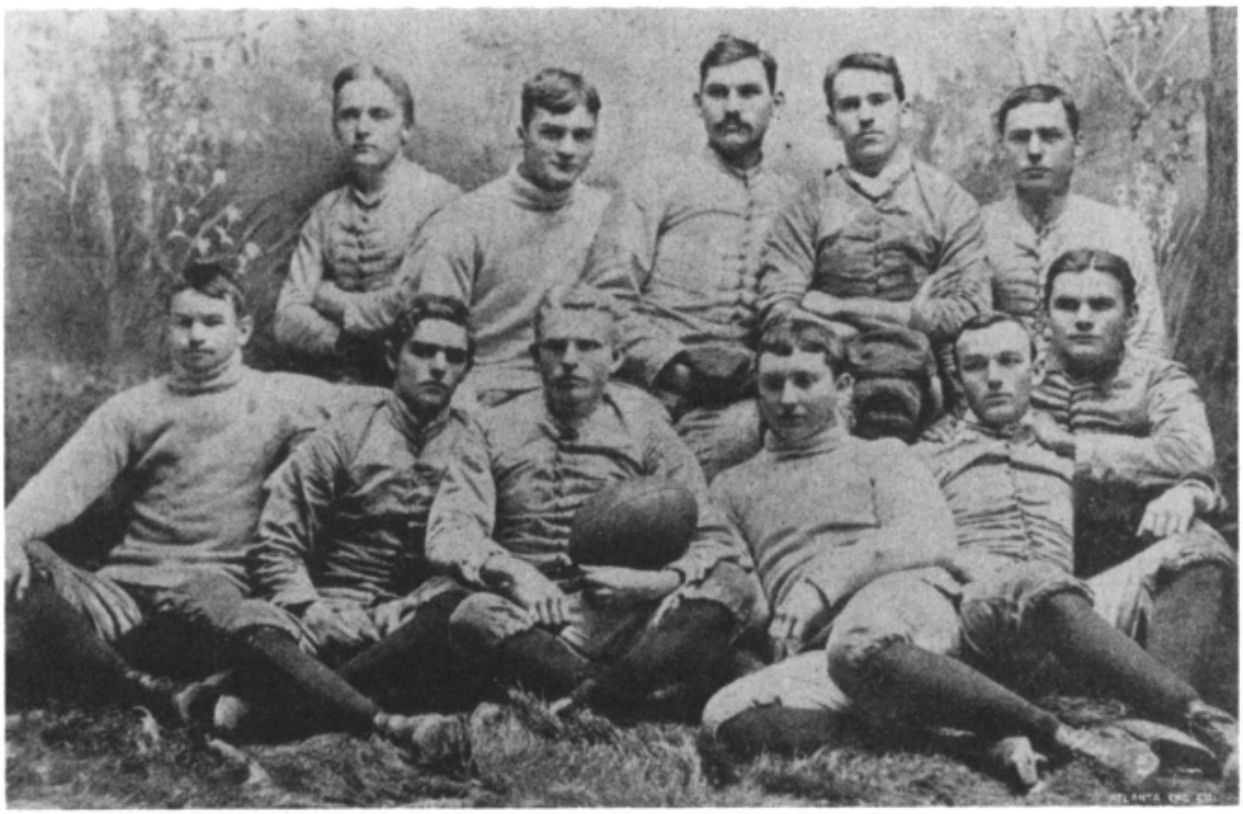


Attachment E
Charles Herty Timeline Primary Sources

Year	Primary Source
1867	Capitol at Milledgeville, Georgia, in 1865. From the GHS Collection of Etchings, Silhouettes, and Prints, MS1361PR.
1890	The 1891-1892 Football Team at the University of Georgia. Courtesy of Sports Information Office, University of Georgia.
1901	Ceramic Herty Cup. From the Georgia Historical Society Collection of Objects, A-1361-374.
1902	"A New Method of Turpentine Orcharding," 1903. Washington, D.C.: U.S. Dept. of Agriculture, Bureau of Forestry.
1905	Charles H. Herty "Industrial and Scientific Aspects of the Pine and its Products," *Journal of the Elisha Mitchell Scientific Society* (University of Chapel Hill, NC), Vol. 23, 1907. Retrieved from the Internet Archive (archive.org).
1917	The Journal of Industrial and Engineering Chemistry, July 1, 1917,vol. IX, no. 7. Retrieved from HathiTrust (hathitrust.org).
1918	Charles H. Herty. "War Chemistry in the Alleviation of Suffering," *The Journal of Industrial and Engineering Chemistry*, September, 1918, vol. X, no. 9. Retrieved from HathiTrust (hathitrust.org).
1926	The Ransdell Act of 1930.
1928	"Southern Agricultural Workers Acclaim Dr. Charles H. Herty," *The Cass County Sun* (Linden, Tex.), Vol. 60, No. 15, Ed. 1 Thursday, April 11, 1935. University of North Texas Libraries, The Portal to Texas History, texashistory.unt.edu; crediting Atlanta Public Library.
1932	Photos of Dr. Herty's Experimental Paper Lab, 1932-1935. From the Foltz Photography Studio Photographs, MS 1360.
1933	Papers Printed on Georgia Pine Paper, 1936. From the Foltz Photography Studio Photographs, MS1360.
21st Century	Georgia Forestry Commission, "Georgia Wood-Using Industries – 2015 Pulp and Paper. Created by Michael Torbett, December 2015.



Capitol at Milledgeville, Georgia, in 1865. From the GHS Collection of Etchings, Silhouettes, and Prints, MS1361PR.



The 1891-1892 Football Team at the University of Georgia.
Courtesy of Sports Information Office, University of Georgia.

Ceramic Herty Cup. From the Georgia Historical Society Collection of Objects, A-1361-374.

CUP AND GUTTERS USED IN COLLECTING CRUDE TURPENTINE.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF FORESTRY—BULLETIN No. 40.
GIFFORD PINCHOT, Forester.

A NEW METHOD

OF

TURPENTINE ORCHARDING.

BY

Dr. CHARLES H. HERTY,
EXPERT.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1903.

"A New Method of Turpentine Orcharding," 1903. Washington, D.C.: U.S. Dept. of Agriculture, Bureau of Forestry.

RESULTS.

TABLE 1.—*Season's record of spirits of turpentine from eight half crops.*

Half crop.	From dip.	From scrape.	Total	Excess from cupped trees.	Per cent of excess from cupped trees.
	Gallons.	*Gallons.*	*Gallons.*	*Gallons.*	
First year:					
Cups	1,385.3	205	1,590.3	301.9	23.43
Boxes	1,184.7	103.7	1,288.4		
Second year:					
Cups	1,087.2	188.2	1,275.4	66.6	5.51
Boxes	941.8	267	1,208.8		
Third year:					
Cups	726.5	113	839.5	310.1	58.58
Boxes	381.9	147.5	529.4		
Fourth year:					
Cups	687.2	101	788.2	314.2	66.29
Boxes	349.5	124.5	474		

TABLE 2.—*Season's record of net rosin sales.*

Half crop.	From dip.	From scrape.	Total.	Excess net sales.	Per cent excess net sales, cupped trees.
First year:					
Cups	$401.72	$47.72	$449.44	$85.51	23.50
Boxes	328.40	35.53	363.93		
Second year:					
Cups	266.34	49.25	315.59	144.13	84.64
Boxes	104.51	66.95	171.46		
Third year:					
Cups	171.27	27.44	198.71	132.65	200.80
Boxes	39.49	26.57	66.06		
Fourth year:					
Cups	167.33	29.23	196.56	132.56	207.13
Boxes	36.09	27.91	64.00		

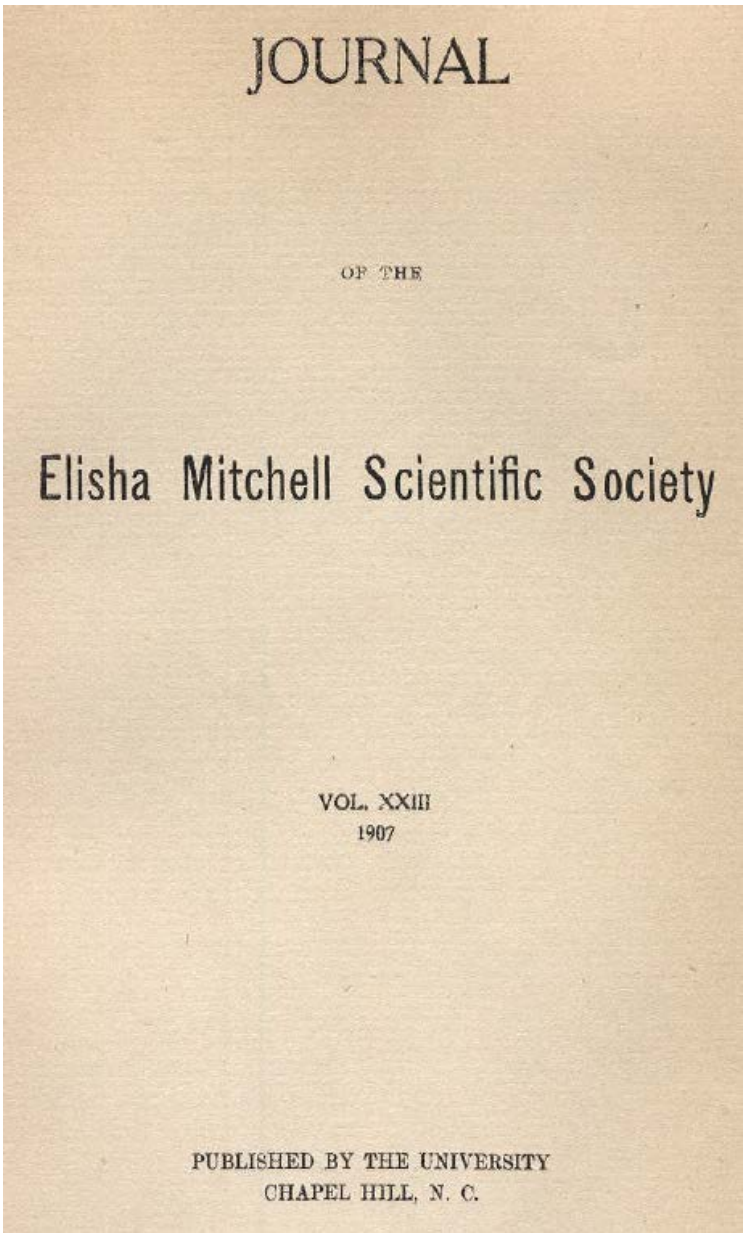
TABLE 3.—*Summary of net sales of spirits of turpentine and rosin for season.*

Half crop.	Spirits of turpentine.	Net value of spirits at 40 cents per gallon.	Net sales of rosin.	Total value of spirits and rosin from half crops.	Net excess values from cupped half crops.	Net excess values from cups on a basis of one crop.
	Gallons.					
First year:						
Cups	1,590.3	$636.12	$449.44	$1,085.56	$286.27	$412.54
Boxes	1,288.4	515.36	363.93	879.29		
Second year:						
Cups	1,275.4	510.16	315.59	825.75	170.77	341.54
Boxes	1,208.8	483.52	171.46	654.98		
Third year:						
Cups	839.5	335.80	198.71	534.51	256.69	513.38
Boxes	529.4	211.76	66.06	277.82		
Fourth year:						
Cups	788.2	315.28	196.56	511.84	258.24	516.48
Boxes	474	189.60	64.00	253.60		

NOTE.—The arbitrary price of 40 cents per gallon for spirits of turpentine represents an average net price at Ocilla during the past season, based on the daily market quotations.

FIG. 1.—EFFECT OF SLIGHT STORM ON "BACK-BOXED" TIMBER.

"A New Method of Turpentine Orcharding," 1903. Washington, D.C.: U.S. Dept. of Agriculture, Bureau of Forestry.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Charles H. Herty "Industrial and Scientific Aspects of the Pine and its Products," *Journal of the Elisha Mitchell Scientific Society* (University of Chapel Hill, NC), Vol. 23, 1907. Retrieved from the Internet Archive (archive.org).

INDUSTRIAL AND SCIENTIFIC ASPECTS OF THE PINE AND ITS PRODUCTS.*

BY CHAS. H. HERTY, PH.D.

Consideration of the annual production of volatile oils shows at once the great preponderance of spirits of turpentine over all others combined. Each quart of spirits of turpentine represents approximately one year's output of this product from one tree. At least nine-tenths of the world's supply of this substance comes from our Southern States, for the production of which not less than one hundred and twenty millions of trees are annually subjected to turpentining. Two millions of acres of virgin timber are annually brought into operation to supply the place of exhausted timber. Millions of pines which have never been turpentined are felled each year by the mills in Mississippi, Louisiana and Texas. Every winter the entire turpentine producing section is swept by ground fires which destroy most of the seedlings, and thus make impossible reproduction on any large scale. The annual revenue from the naval stores industry can be conservately estimated under present prices at not less than forty millions of dollars. Surely such a situation justifies and demands systematic experimental work in the hope of conserving this valuable native resource.

EFFECT OF TURPENTINING ON LUMBER.

The pine has a two-fold commercial value, first, as timber, second, as a producer of the oleo-resin, "crude turpentine."

*Reprinted from *The Chemical Engineer*, March, 1907.

Charles H. Herty "Industrial and Scientific Aspects of the Pine and its Products," *Journal of the Elisha Mitchell Scientific Society* (University of Chapel Hill, NC), Vol. 23, 1907. Retrieved from the Internet Archive (archive.org).

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TABLE OF CONTENTS

EDITORIALS

FIRST PLACE TO GOVERNMENT NEEDS

It is the desire of THIS JOURNAL to be of any service possible to the chemists of our government who are charged with the investigation of special problems connected with the war; likewise to serve those chemists who in university and private laboratories are patriotically coöperating with the government in the solution of such problems. In this spirit we therefore gladly depart from normal editorial policy and beg to tender to all such chemists throughout the continuance of the war this first portion of the editorial section for announcing any needs which may arise in the prosecution of their important work.

Dr. W. F. Hillebrand, Acting Director of the Bureau of Standards, under date of June 14, 1917, asks that publicity be given to the following:

GAS INTERFEROMETER NEEDED

The National Bureau of Standards requires for immediate use in an important military investigation several gas interferometers and desires information as to where such apparatus can be purchased or borrowed. The apparatus needed is the Rayleigh gas interferometer with gas tubes 100 cm. long of the form built by the Zeiss Company, or an apparatus equivalent to this. Any information relating to such apparatus should be forwarded to the Director, Bureau of Standards, Washington, D. C., Attention of Gas Laboratory.

GREETINGS TO PROFESSOR GRIGNARD

Among the distinguished members of the scientific commissions from France and England now visiting this country, chemists will be especially interested in the presence of Professor V. Grignard of France. He has come to us at the request of the National Research Council to confer with the Chemistry Committee of the Council and with our War and Navy Departments, and to give us the benefit of the experience which two years of war have brought to the chemical profession in his country. Appreciation of Professor Grignard's brilliant achievements in chemical research and respect for his sound judgment, make doubly warm the hearty greetings which all American chemists extend to him.

CHEMICAL STATISTICS ASSURED

It is a great pleasure to be able to announce the completion of the two thousand-dollar fund for the coöperation of the American Chemical Society with the Bureau of Foreign and Domestic Commerce in the compilation of a census of imports of chemicals other than dyestuffs in a typical pre-war fiscal year. The hope expressed at the conclusion of the rather despondent editorial on this subject in the June issue has been justified; the full amount has been pledged, and the work can now promptly begin.

The detailed itemization of these imports, together with the amounts of each, will constitute a valuable and safe guide to those who patriotically desire for our country national self-containedness in its chemical industries.

There is a deeper significance in this movement, however, than the compilation of such a census. The fund subscribed by representatives of the chemical industries is proof of a desire not only for information from government records on the basis of which new lines of needed manufacture may be inaugurated, but also for prompt and regular issuance of statistics on current imports, which will give invaluable aid to the continued, healthy growth of all of our chemical industries. If those in charge of and responsible for such matters will but compare the character of the information on imports now furnished our chemical manufacturers with that which the German government has for years furnished its manufacturers, they will readily see to how great an extent we have been handicapped by lack of such basic facts. The many problems now to be solved concerning the character of the classifications and itemizations of this census will determine the form of the statistics on current imports. Again we express a hope, namely, that complete statistics on current chemical imports will soon become an asset of the American chemical manufacturer.

THE TARIFF COMMISSION AND SCHEDULE A

Soon after its organization the Tariff Commission announced that it would begin at an early date a thorough investigation of Schedule A (chemicals). To aid the Commission in this complex field an expert adviser was to be appointed. In this connection the following letter was received, under date of May 31, 1917, from Dr. F. W. Taussig, Chairman of the United States Tariff Commission:

My dear Dr. Herty:

It will interest you, I believe, to know that the Tariff Commission has appointed Professor Grinnell Jones to act as Special Expert in connection with its inquiries upon the chemical industries of the country and Schedule A of the existing tariff act.

As you know, the Tariff Commission conferred with Professor Stieglitz and the Advisory Council of the Chemical Society and secured from the Council lists and recommendations of chemists whose services would be helpful to the Commission. Some of the gentlemen suggested proved not to be able to give continuous service, such as is necessary for the work of the Commission, and we finally selected Professor Jones. We are glad to have been able to act in coöperation with the Chemical Society and are indebted to you for the suggestion which led to this coöperation. There is no reason now why public mention of the action taken by the Commission should not be made.

. . . . . .

This action of the Tariff Commission gives rise to several very pleasant reflections.

Heartiest congratulations to Professor Grinnell Jones upon the unsolicited opportunity thus afforded for public service of nation-wide import! Likewise congratulations to the Tariff Commission upon having secured for its expert adviser in matters pertaining to the chemical industries one of the brilliant young chemists of America whose attainments and character assure thoroughness, accuracy of detail, breadth of vision, uncompromising rectitude and patriotic loyalty!

The Journal of Industrial and Engineering Chemistry, July 1, 1917,vol. IX, no. 7.
Retrieved from HathiTrust (hathitrust.org).

AN INTERNATIONAL COURTESY

It is a pleasure to reproduce here the invitation from the Secretary of the Chemical Society (London) to all chemists who visit England, and the reply of Secretary Parsons of the AMERICAN CHEMICAL SOCIETY.

Chemical Society
Burlington House, London, W. 1
July 25, 1918

Mr. Charles L. Parsons
Secretary, American Chemical Society

DEAR SIR:

No doubt there are many members of your Society ordinarily residing in America who are now in this country, and I am writing to ask you to be good enough to use such means as may occur to you to inform your members that they are most cordially invited by the Council of this Society to avail themselves of the use of our Library and Rooms, and to attend our meetings. Perhaps, also, you would be good enough to place on your notice board a notice to this effect so that any of your members who are about to leave your shores for this country may be informed of this.

I may say that I have been in communication with Sir Harry Britain, who has very kindly promised to place on the notice board of the American Club for Officers a notice inviting them to make what use they can of this Society.

Believe me,

Yours very truly,
(Signed) SAMUEL SMILES
Honorary Secretary

Washington, D. C.
August 15, 1918

Samuel Smiles, Esq.
Honorary Secretary, Chemical Society
Burlington House, London, W. 1, England

DEAR SIR:

Your letter of July 25 is fully appreciated.

Lieutenant Colonel James F. Norris at the American Embassy is one of the members of our Council and a prominent member of the American Chemical Society. He is the scientific attaché on chemical problems to the American Embassy, and I would suggest that you write him a letter calling the same facts to his attention that you have sent me. I would communicate with him, but I think he would appreciate a letter of this kind from you direct. He will be in touch with most of the American chemists that come to England, and through him I believe more of them can be reached than through me, as I do not always know when they are ordered to your country.

I am sending your letter to the Editor of our JOURNAL OF INDUSTRIAL AND ENGINEERING CHEMISTRY, who, I am sure, will be glad to publish your kind invitation so that it may reach all of our members who may be going abroad.

With full appreciation of the courtesy of yourself and your Society, I am

Sincerely yours,
(Signed) CHARLES L. PARSONS, *Secretary*

THE CUSTODIAN IN ACTION

The appointment of Mr. James A. Branegan, of Philadelphia, as Vice President of the Heyden Chemical Works, an enemy-owned corporation recently taken over by the Government, will prove gratifying to all chemists, not only because of the high esteem in which Mr. Branegan is held by his many personal friends, but because the appointment evidences the sound policy of the Alien Property Custodian of appointing on the directing boards of seized organizations technical experts fully qualified to assure that the purposes of the Government will be carried out.

Custodian Palmer and his corps of able associates have evidently taken no vacation this summer. The thorough anti-financial-camouflage campaign which is being quietly and patiently conducted is bearing fruit, and we have a hunch that the results disclosed so far are but the forerunner of a great mass of important contributions to truth still to be made.

The interesting researches now being conducted by Custodian Palmer should be aided by every loyal chemist in possession of facts which would contribute to proof of enemy ownership masquerading in American garments.

WAR CHEMISTRY IN THE ALLEVIATION OF SUFFERING

A few days ago we asked a well-known organic chemist, one who has been particularly successful in working out methods for the manufacture of certain much-needed coal-tar medicinals, "Suppose during your researches you made some new compound which you believed would prove more efficacious against certain diseases than any of the known compounds whose details of manufacture you have solved, where would you turn to have it tested thoroughly?" He replied, "I don't know."

We were returning from a baseball game at the Polo Grounds, had walked over to Broadway and were about to enter the subway when the conversation took place. The subject proved so mutually interesting, that, perched upon an iron railing amidst the upper Broadway crowds, we carried on the discussion for an hour. He had been engrossed in the problem of reproducing compounds already known and used for the relief of the physical sufferings of humanity; we were thinking of the still greater service American scientists should be enabled to perform.

The negative answer was not surprising, rather it was confirmatory. It is a peculiar situation that exists in this country to-day. The three great commercial applications of the so-called "coal-tar chemicals" are, first, explosives, for which means are never lacking for the thorough testing of new products; second, dyestuffs, for which fortunately the equipment for testing as to standard, fastness, durability and aesthetic suitability is simple, inexpensive and accessible to every worker; third, medicinals, and here the problems of investigation become much more complex and the responsibility even greater. Rarely does the chemist possess the technique for their testing; he must rely upon the pharmacologist and the physiologist to determine the therapeutic value of his product.

In university circles there is often lacking that spirit of coöperation between the several classes of research workers which would insure a thorough examination of these new products of the organic chemical laboratory, or, if the spirit be willing, the means for conducting the tests are too limited, especially now when university finances are so severely contracted. In a few manufacturing establishments provision is made for animal experimentation, but these facilities are entirely inadequate and not available to all organic chemists. In government laboratories some provision is made for this work, but restrictions are enforced by inadequate appropriations. And still people suffer,

Charles H. Herty. "War Chemistry in the Alleviation of Suffering," *The Journal of Industrial and Engineering Chemistry*, September, 1918, vol. X, no. 9. Retrieved from HathiTrust (hathitrust.org).

though much suffering has been alleviated by discoveries made in other lands.

Fortunately, through the generous provision of wealthy individuals, certain institutions have been established and endowed where the chemist and the biologist can work in the closest coöperation. The importance of the intimate coöperation of these workers is evidenced by the work on the synthesis of a new anti-syphilitic drug which was recently accomplished in the laboratories of the Rockefeller Institute for Medical Research. This remedy is now tested from the clinical viewpoint in the hospital of the same institution. Similar institutions, however, are few in number and the capacity for work of this kind is necessarily restricted.

The laboratory technique, from the chemist's standpoint, is fortunately quite similar whether in preparing explosives, dyestuffs or medicinals; and the war period has developed many brilliant organic chemists whose talent could be applied to the relief of suffering.

How can this application be made? A suggestion has been advanced which seems to cover the situation admirably, namely, that an institution somewhat analogous to the Mellon Institute be founded, in which adequate provision for laboratory tests of all kinds would be made and to which, through the establishment of fellowships, manufacturing organizations could send well-trained young men for working out specific problems. Coöperation should be established between this institution and the organic laboratories of our universities, as well as with the hospitals of the country.

An institution of this character would prove a great stimulus to the creation of more adequate research facilities within the manufacturing establishments, for the great glory of the Mellon Institute lies, it seems to us, not so much in the actual results obtained under its roof as in the indirect creation of research departments in industries which first caught the full significance of research through the fellowships established in that institution.

Perhaps there is a better method to accomplish this object. The columns of THIS JOURNAL stand at the disposal of any who will contribute to the discussion. If the heart of any man should be moved in behalf of humanity to fill this great need from the abundance of his riches, he can count with certainty upon the counsel of the ablest scientists of this country in working out the safe policies and many details of so important an undertaking.

A DYESTUFF SECTION OF THE AMERICAN CHEMICAL SOCIETY

The American Dyestuff Manufacturers' Association and the dyestuff section of the Chemical Alliance afford ample machinery to care for questions of general policy, internal and external, affecting the newly developed industry in this country. These, however, are strictly trade organizations. Without desiring to inflict any further burden of organization upon the industry, which has its hands full in supplying pressing commercial needs, we would like to second the suggestion of Mr. R. Norris Shreve (page 750) as to the formation of a dyestuff section of the AMERICAN CHEMICAL SOCIETY.

The days of experimental and large scale production of known dyestuffs have been accomplished. To rest content with the present status of the industry would not be characteristic or worthy of this nation, which is justifiably proud of its initiative, resourcefulness, and inventive spirit. New lines must be developed and new advances made in technical methods, if we are to be more than mere copyists. No surer provision could be made for these efforts than the semi-annual gathering of the research men from the various dyestuff laboratories, in the atmosphere of a great assembly of chemists. The presentation of papers and their discussion would establish facts of value to all, broader viewpoints would be obtained and sympathetic personal relationships formed which would stand in good stead.

It is natural, perhaps, that each commercial organization should desire to retain for itself the benefits of research, yet, carried too far, it is a short-sighted policy, in view of the varied workings of different minds. Too much secrecy as to certain fancied advantages has already proved in some cases the cause of industrial "dry rot." Community of knowledge as to scientific achievement, safeguarded by critical discussion of results, will prove so valuable a means of industrial advance that it must not be neglected.

Success to those who are taking the preliminary steps for the formation of a dyestuff section of the AMERICAN CHEMICAL SOCIETY!

THE BULL'S EYE

Look out for the bull's eye on the chemical products (not machinery) to be exhibited at the Fourth National Exposition of Chemical Industries.

Since its inception this annual display of the results of chemists' activities has sought to accomplish one thing above others, namely, an exhibition of progress made in products manufactured for the first time in this country during the war period. Unfortunately in the past no distinguishing mark has been given to such products, consequently only a confused idea could be obtained by the layman, and even by many chemists, as to actual progress made. An effort will be made to correct this during the coming Exposition by placing a "bull's eye" upon all new products whose manufacture has been developed since the outbreak of the war.

This new feature will prove of interest to all, and we are equally sure that the large number of exhibits bearing no such distinguishing mark will be a revelation to the public of the manifold achievements of American chemists prior to the war.

Charles H. Herty. "War Chemistry in the Alleviation of Suffering," *The Journal of Industrial and Engineering Chemistry*, September, 1918, vol. X, no. 9. Retrieved from HathiTrust (hathitrust.org).

May 26, 1930.
[S. 1171.]
[Public, No. 251.]

CHAP. 320.—An Act To establish and operate a National Institute of Health, to create a system of fellowships in said institute, and to authorize the Government to accept donations for use in ascertaining the cause, prevention, and cure of disease affecting human beings, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Hygienic Laboratory of the Public Health Service shall hereafter be known as the National Institute of Health, and all laws, authorizations, and appropriations pertaining to the Hygienic Laboratory shall hereafter be applicable for the operation and maintenance of the National Institute of Health. The Secretary of the Treasury is authorized to utilize the site now occupied by the Hygienic Laboratory and the land adjacent thereto owned by the Government and available for this purpose, or when funds are available therefor, to acquire sites by purchase, condemnation, or otherwise, in or near the District of Columbia, and to erect thereon and to furnish and equip suitable and adequate buildings for the use of such institute. In the administration and operation of this institute the Surgeon General shall select persons who show unusual aptitude in science. There is hereby authorized to be appropriated, out of any money in the Treasury not otherwise appropriated, the sum of $750,000, or so much thereof as may be necessary for construction and equipment of additional buildings at the present Hygienic Laboratory of the Public Health Service, Washington, District of Columbia.

National Institute of Health.

Hygienic Laboratory, Public Health Service transferred to.

Ante, pp. 150, 152.
Post, pp. 1228, 1586.

Acquisition of site and equipment.

Additional sites.

Selection of personnel.

Amount authorized for construction, etc., of additional buildings.

SEC. 2. The Secretary of the Treasury is authorized to accept on behalf of the United States gifts made unconditionally by will or otherwise for study, investigation, and research in the fundamental problems of the diseases of man and matters pertaining thereto,

Unconditional gifts acceptable for study, etc., of diseases of man.

and for the acquisition of grounds or for the erection, equipment, and maintenance of buildings and premises: *Provided*, That conditional gifts may be accepted if recommended by the Surgeon General and the National Advisory Health Council. Any such gifts shall be held in trusts and shall be invested by the Secretary of the Treasury in securities of the United States, and the principal or income thereof shall be expended by the Surgeon General, with the approval of the Secretary of the Treasury, for the purposes indicated in this Act, subject to the same examination and audit as provided for appropriations made for the Public Health Service by Congress. Donations of $500,000 or over in aid of research will be acknowledged permanently by the establishment within the institute of suitable memorials to the donors. The Surgeon General, with the approval of the Secretary of the Treasury, is authorized to establish and maintain fellowships in the National Institute of Health, from funds donated for that purpose.

Proviso.
Conditional gifts may be accepted, to be held in trust.

Memorials to donors of $500,000, to be established.

Fellowships to be maintained.

SEC. 3. Individual scientists, other than commissioned officers of the Public Health Service, designated by the Surgeon General to receive fellowships may be appointed for duty in the National Institute of Health established by this Act. During the period of such fellowship these appointees shall hold appointments under regulations promulgated by the Secretary of the Treasury and shall be subject to administrative regulations for the conduct of the Public Health Service. Scientists so selected may likewise be designated for the prosecution of investigations in other localities and institutions in this and other countries during the term of their fellowships.

Scientists receiving fellowships, may be appointed for duty in National Institute of Health.

Rules for.

Investigations abroad, etc.

SEC. 4. The Secretary of the Treasury, upon the recommendation of the Surgeon General, is authorized (1) to designate the titles and fix the compensation of the necessary scientific personnel under regulations approved by the President; (2) in accordance with the civil service laws to appoint, and in accordance with the Classification Act of 1923, and amendments thereto, fix the compensation of such clerical and other assistants; and (3) to make such expenditures (including expenditures for personal services and rent at the seat of government, for books of reference, periodicals, and exhibits, and for printing and binding) as he deems necessary for the proper administration of such institution.

Title and compensation of scientific personnel.

Clerks, etc.

Office expenses.

SEC. 5. The facilities of the institute shall from time to time be made available to bona fide health authorities of States, counties, or municipalities for purposes of instruction and investigation.

Facilities available to State, etc., authorities.

SEC. 6. That hereafter the Director of the National Institute of Health while so serving shall have the rank and shall receive the pay and allowances of a medical director of the Public Health Service.

Rank and pay of Director.

Approved, May 26, 1930.

The Ransdell Act of 1930.

Southern Agricultural Workers Acclaim Dr. Charles H. Herty

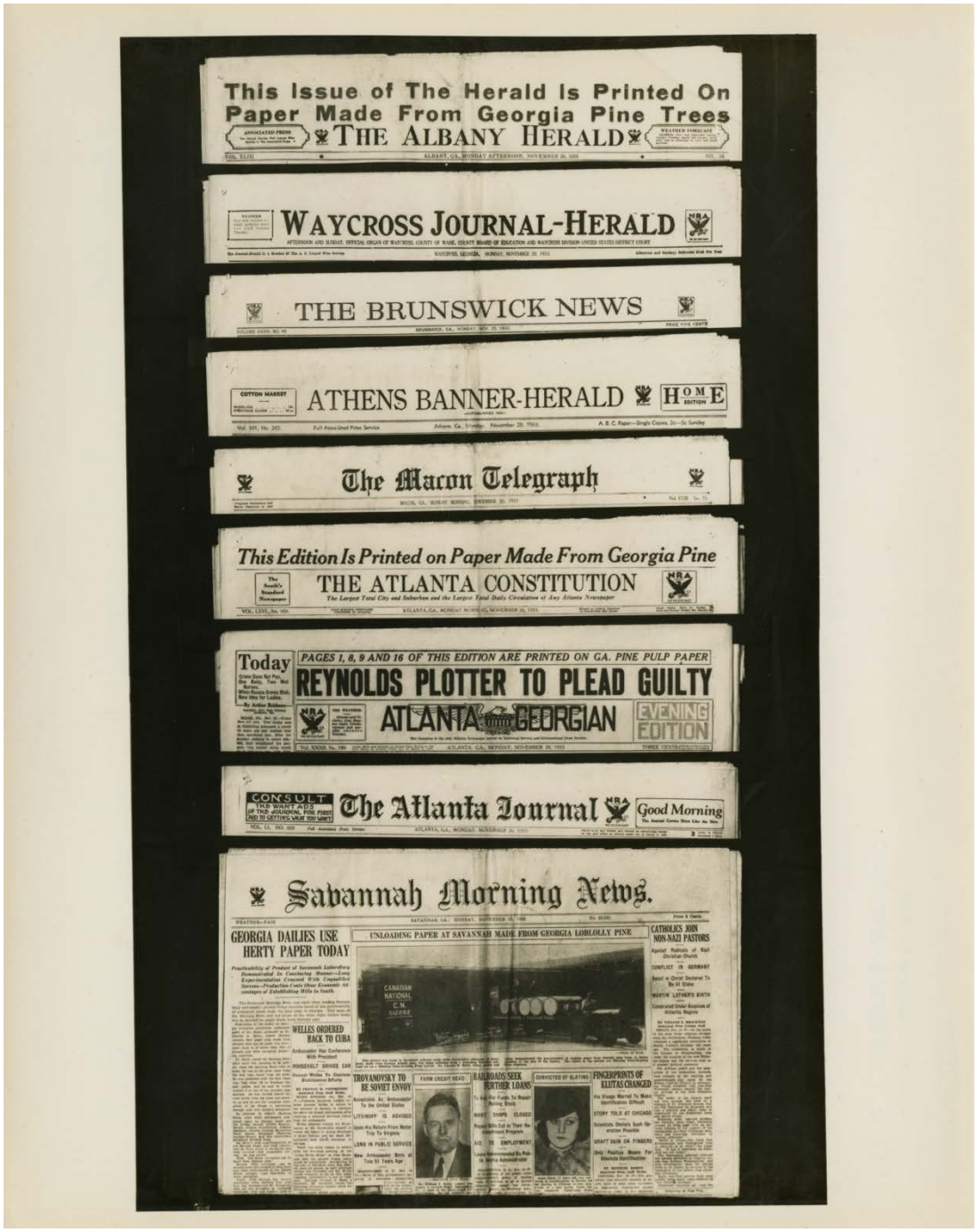
Pictured above is part of the large audience of Southern Agricultural Workers who acclaimed Dr. Charles H. Herty (inset) when he delivered his recent "Urgent Message to the South." In this address Dr. Herty stated that the rapidly growing chemical industry is choosing the South as its center because of the South's rich raw materials, and in this lies the key to Southern prosperity. He urged the agricultural group to spread the use of Southern products, and particularly chemicals, on Southern farms. He decried importations of such foreign goods as news print and sulphite pulp, sulphate of ammonia and nitrate of soda as needless, and pointed out that the American products offer equal values.

BANQUET PHOTO—BY REEVES
PHOTO DR. HERTY—COURTESY ATLANTA GEORGIAN

Notables in the banking and business world also received Dr. Herty's message with enthusiasm. Dr. Herty was greeted on his arrival by a Junior League Reception Committee of which pretty Miss Caroline Crumley and Miss Ida Sadler, pictured in the inset, were members.

"Southern Agricultural Workers Acclaim Dr. Charles H. Herty," *The Cass County Sun* (Linden, Tex.), Vol. 60, No. 15, Ed. 1 Thursday, April 11, 1935. University of North Texas Libraries, The Portal to Texas History, texashistory.unt.edu; crediting Atlanta Public Library

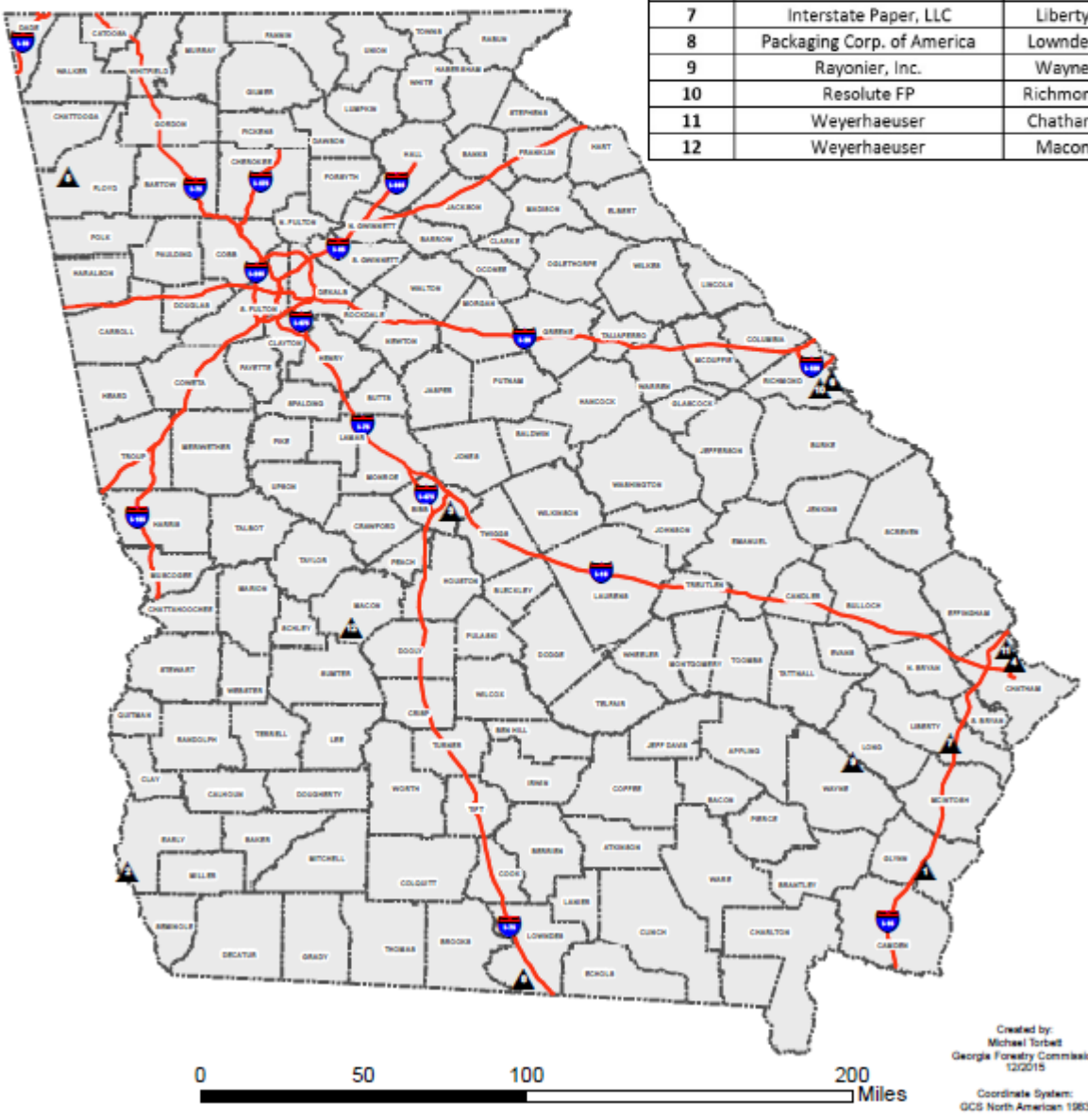
Photos of Dr. Herty's Experimental Paper Lab, 1932-1935. From the Foltz Photography Studio Photographs, MS 1360.



Papers Printed on Georgia Pine Paper, 1936. From the Foltz Photography Studio Photographs, MS1360.

Georgia Wood-Using Industries - 2015
Pulp & Paper

Map #	Mill Name	County
1	Brunswick Cellulose, LLC	Glynn
2	Georgia-Pacific, LLC	Early
3	Graphic Packaging International	Bibb
4	International Paper Co.	Chatham
5	International Paper Co.	Floyd
6	International Paper Co.	Richmond
7	Interstate Paper, LLC	Liberty
8	Packaging Corp. of America	Lowndes
9	Rayonier, Inc.	Wayne
10	Resolute FP	Richmond
11	Weyerhaeuser	Chatham
12	Weyerhaeuser	Macon



Georgia Forestry Commission, "Georgia Wood-Using Industries – 2015 Pulp and Paper. Created by Michael Torbett, December 2015.