

2021 Tennessee Section Historic Civil Engineering Landmark Designation

The built environment of Tennessee is made up of many diverse and innovative civil engineering projects. These constructed civil works are a reflection of the colorful, talented, and dedicated civil engineers who have worked in Tennessee over two centuries. The aim of the Tennessee Section Historic Civil Engineering Landmark Designation is to recognize civil engineering projects, structures, and sites so as to:

- Increase public appreciation of civil engineering contributions to the progress and development of society;
- Provide civil engineers with an historical awareness of their own profession for both practical insights and pride;
- Encourage the preservation of significant historic civil engineering works;
- Foster the inclusion of civil engineering landmark information in encyclopedias, guidebooks and maps; and
- Identify potential State Landmarks for nomination to National Historic Civil Engineering Landmark status.

We are seeking nominations for the State Historic Civil Engineering Landmark Designation that generally meet the following criteria (adapted from the National Historic Civil Engineering Landmark criteria):

1. Be of state, regional, or national historic civil engineering significance.
2. Represent a significant facet of civil engineering history in Tennessee (but does not have to be designed or constructed by a civil engineer).
3. Display some uniqueness (e.g., first constructed), or used a unique or significant construction or engineering technique.
4. Should be generally available for public viewing (although safety considerations or geographic isolation may restrict access).
5. Must be at least 50 years old since substantial completion.

One nomination from each Tennessee Section Branch is requested for consideration for this year's designation. Please see the attached nomination form which describes the requested information. The nominees will be scored by each Branch President and the Section President. The Section History and Heritage Chair will compile the scores and recommend a provisional designated site for approval by the Section Board of Directors. In case of a tie in scoring, more than one provisional designated site may be forwarded to the Section Board of Directors.

Please note that the following sites are National Historic Civil Engineering Landmarks in Tennessee and are not eligible for the State designation:

1. The Tennessee State Capitol
2. Norris Dam
3. Montgomery Bell's Tunnel
4. Morrison's Memphis Bridge
5. Royal Colonial Boundary of 1685

In addition, previous Section designees are not eligible:

1. Ocoee Dam No. 1 (2016)
2. Memphis Sewerage System (2017)
3. Harahan Bridge, Memphis (2018)
4. Riverside Drive, Memphis (2019)
5. No Award (2020)

Thank you for your support of this program.

Tennessee Section Historic Civil Engineering Landmark Designation Nomination Form for 2021

Branch: Holston Branch

Nominated Site Name: Eastman Chemical Company (Tennessee Operations)

Site Address: 100 Eastman Road
Kingsport, TN 37662

Latitude/Longitude: 36°31'42" N 82°32'35" W

Owner: Eastman Chemical Company

1. Dates of construction (and other significant dates-must be at least 50 years since substantial completion):

1920 – Tennessee Eastman Corporation began to supply methanol for Kodak

1925 – Manufacturing expansion for byproducts to be used in tars, wood preservatives and disinfectants

1928 – Spinning yarn plant built in as Fibers department grows

1932 – As Great Depression sets in Tennessee Eastman has rapid growth of facility

1933 – Hydroquinone Plant

1936 – Acetate Staple Fiber Plant

1942 – Wexler Bend laboratory and RDX plant produces 1.5 million lbs. of explosive daily

1945 - Acetate Yarn Plant Expansion

1952 – Cellulose Acetate plant for filter tow used in cigarette filters

1958 – Rerouted portion of the South Fork of Holston River

1958 – Kodel fiber textile expansion

2. Names of key civil engineer and other professionals associated with project:

Tennessee Eastman Engineering

3. Historic (state or local) significance of this proposed landmark

World War I caused scarcity in raw materials like photographic paper, optical glass, gelatin and many chemicals, including methanol, acetic acid and acetone. At the close of the war in 1918, Eastman Kodak founder George Eastman was determined to have an independent supply of chemicals for his photographic processes. In his search for suitable quantities of methanol and acetone, Eastman turned his attention to the forests

of the Southern United States, specifically Kingsport, Tenn. Tennessee Eastman was founded in 1920 with two major platforms — organic chemicals and acetals. From the primary feedstock of pyroligneous acid, many of Eastman's basic chemical building blocks were manufactured, studied and perfected. Products such as calcium acetate, sodium acetate, acetic acid and acetic anhydride became the basis for other major manufacturing platforms.

World War II brought more involvement for Eastman. RDX, a powerful explosive, was manufactured for the U.S. government at Holston Ordnance Works at Tennessee Eastman sites. At the peak of production, close to the end of the war, the ordnance plant was producing 1.5 million pounds of explosives each day. Eastman management became the operations lead on the Y-12 plant of Clinton Engineer Works in Oak Ridge, Tenn., which helped develop the atomic bomb. Eastman's involvement was demanded because it was viewed as a "get something done" company.

Eastman's involvement to safely and effectively develop RDX, which had a much greater explosive force than the traditional explosive TNT used at the time, had a significant historical impact. The use of RDX during World War II helped to turn the tide of the war as RDX was much more effective than TNT against enemy targets. When the atomic bombs were developed as part of the Manhattan Project, they needed an explosive to be used as a detonator. RDX was chosen as this denotator and thus detonated the atomic bombs which helped to bring an end to the war. Eastman's involvement with manufacturing RDX had a significant historical impact in the county, state, country and world along with continuing a rich history of innovation as a Chemical Company within the region.

4. Unique features or characteristics which set this proposed landmark apart from other civil engineering projects.

Eastman's Tennessee Operations site continues to grow in size and complexity, and its in-house engineers maintain the site and support its continued growth. What started as a raw material provider to Kodak, now has more than 700 buildings, with 300+ of those buildings added prior to 1971. Tennessee Eastman consists of more than 28 miles of paved streets and more than 42 miles of railroad tracks. The 859-acre site consists of three powerhouses generating all the needed steam for the site with 196,000 kW generating capacity that could power 170,000 average homes. The magnitude of the site created the need for a wastewater treatment plant that has a capacity of 30 million gallons daily or the capacity needed for the metropolitan area of Knoxville.

5. Contribution which this structure or project made toward the development of: (1) the civil engineering profession; (2) the state or a large region thereof:

Tennessee Operations has made contributions toward the civil engineering profession with the rapid design and construction of many facilities, such as the one that safely produced the RDX explosive used in World War II. In 1958, to allow for plant expansion, Tennessee Eastman even worked to reroute a portion of the Holston River. This was a huge undertaking, and it's difficult to imagine this happening today.

The development of the Tennessee Operations site in Kingsport helped to develop the region of Northeast Tennessee by becoming Tennessee's largest manufacturer in the state and one of the largest chemical plants in the world. What began as a supplier of reliable raw materials for Kodak, grew into an independent company based in Kingsport, Tenn. The company produces 1,200 chemicals and has more than 50 facilities around the world.

6. A list of published references concerning this nomination (not required, but may be helpful).

Eastman History Exhibit – B-310 at Eastman in Kingsport, TN

Utilities History Exhibit – B-469 at Eastman in Kingsport, TN

Eastman Timeline (<https://www.eastman.com/Images/Timeline/index.htm>)

Eastman History Book: “Years of Glory. Times of Change” (1990 vintage)

Eastman website

(https://www.eastman.com/Company/About_Eastman/Pages/Introduction.aspx)

Eastman Kodak and the Manhattan Project by Dr. Robert Schrader

(<https://www.atomicheritage.org/sites/default/files/resources/Robert%20Schrader%20Storybook.pdf>)

(<https://www.atomicheritage.org/resource/eastman-kodak-and-manhattan-project-dr-robert-schrader>)

The Secret History of RDX: The Super-Explosive that Helped Win World War II by Colin F. Baxter (<https://www.jstor.org/stable/j.ctt2111h03>)

7. A list of additional documentation in support of this nomination. (Not required, but may be helpful; please list all enclosed documents),

A History of Innovation: Then. Now. Next. Eastman Centennial 2020

About Eastman: An Engineer's View of History

Eastman History Videos (On Eastman Streaming Media)

- Eastman History Timeline Part 1 Against all Odds: 1920 – 1945
- Eastman History Timeline Part 2 Coming of Age: 1945-1975
- Eastman Tennessee Operations Drone Tour

8. Publications, photographs, and supporting historical evidence. Digital images are requested for publicity and presentation purposes.

See attached.

9. The recommended citation for Section Board consideration.

The Eastman facility in Kingsport, Tenn., with construction and substantial completion between 1920 and 1971 is a timeline of civil engineering projects for the facility that acts like a city of its own. From the beginnings after World War I to provide reliable raw materials to Kodak, to being positioned to rapidly develop and manufacture the RDX explosive used in World War II and to detonate the atomic bombs ending the war, Eastman has shown a history of innovation and growth requiring a sophisticated infrastructure to make it all happen.

10. A statement of the owner's support of the nomination (attach).

See attached.

Note: Designation by ASCE as a National or State Historic Civil Engineering Landmark carries no legal commitment on the part of ASCE, the owner, or the governmental jurisdiction in which it is located.

Use additional sheets, if required. Please contact Ken Barry at kbarry@smeinc.com, or at 865-804-1481 if you have any questions.

An aerial photograph of the Eastman campus in Rochester, New York, showing a mix of modern and older buildings, green spaces, and a river. The image is in black and white, with a white diagonal overlay on the right side.

EASTMAN

CELEBRATING
100 YEARS
1920 - 2020

A history of innovation

Then. Now. Next.
Eastman centennial 2020

Celebrating a legacy that began a century ago

Eastman has played a major role in many areas of history. This tradition of leadership and innovation has shaped our past and will continue to direct our future as an innovation leader in an ever-changing world.



Innovation. Then. Now. Next.

EASTMAN

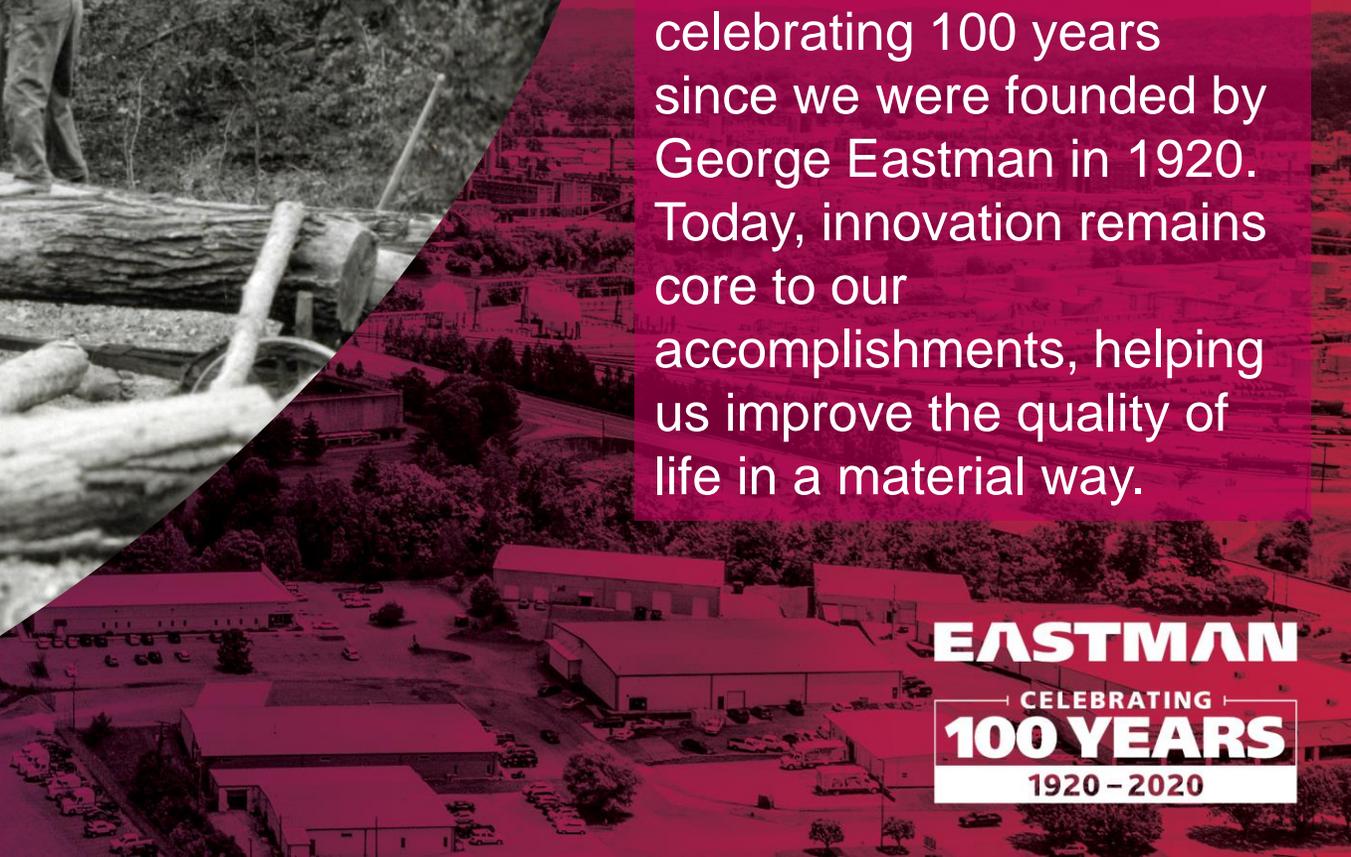
— CELEBRATING —
100 YEARS
1920 - 2020



A CENTURY OF LEADERSHIP

In 2020, Eastman is celebrating 100 years since we were founded by George Eastman in 1920. Today, innovation remains core to our accomplishments, helping us improve the quality of life in a material way.

EASTMAN
CELEBRATING
100 YEARS
1920 - 2020





Perley Wilcox

First general manager
Tennessee Eastman Corporation

EASTMAN

CELEBRATING
100 YEARS
1920 - 2020

World War II

- Synthetic rubber
- Explosives
- Oak Ridge





Coal gasification

1983

1993 and 1994 milestones



Innovation. Then. Now. Next.



Specialty materials transformation





Employees are the key to our success.

EASTMAN

About Eastman: An Engineer's View of History

Tim Nolen, Engineering Leader and
Fellow

July 2012

Eastman History Resources

- Eastman History Exhibit – B-310
- Utilities History Exhibit – B-469
- Eastman History Videos (3 on streaming media)
- Eastman Timeline (online)
- Eastman History Book: “Years of Glory. Times of Change” (1990s vintage)



Kodak Needed Materials

- World War I interrupted commerce and George Eastman was determined to secure his supply.
- Kingsport had a wood distillation plant, a willing spirit, and a new railroad.

Kodak needed and we delivered

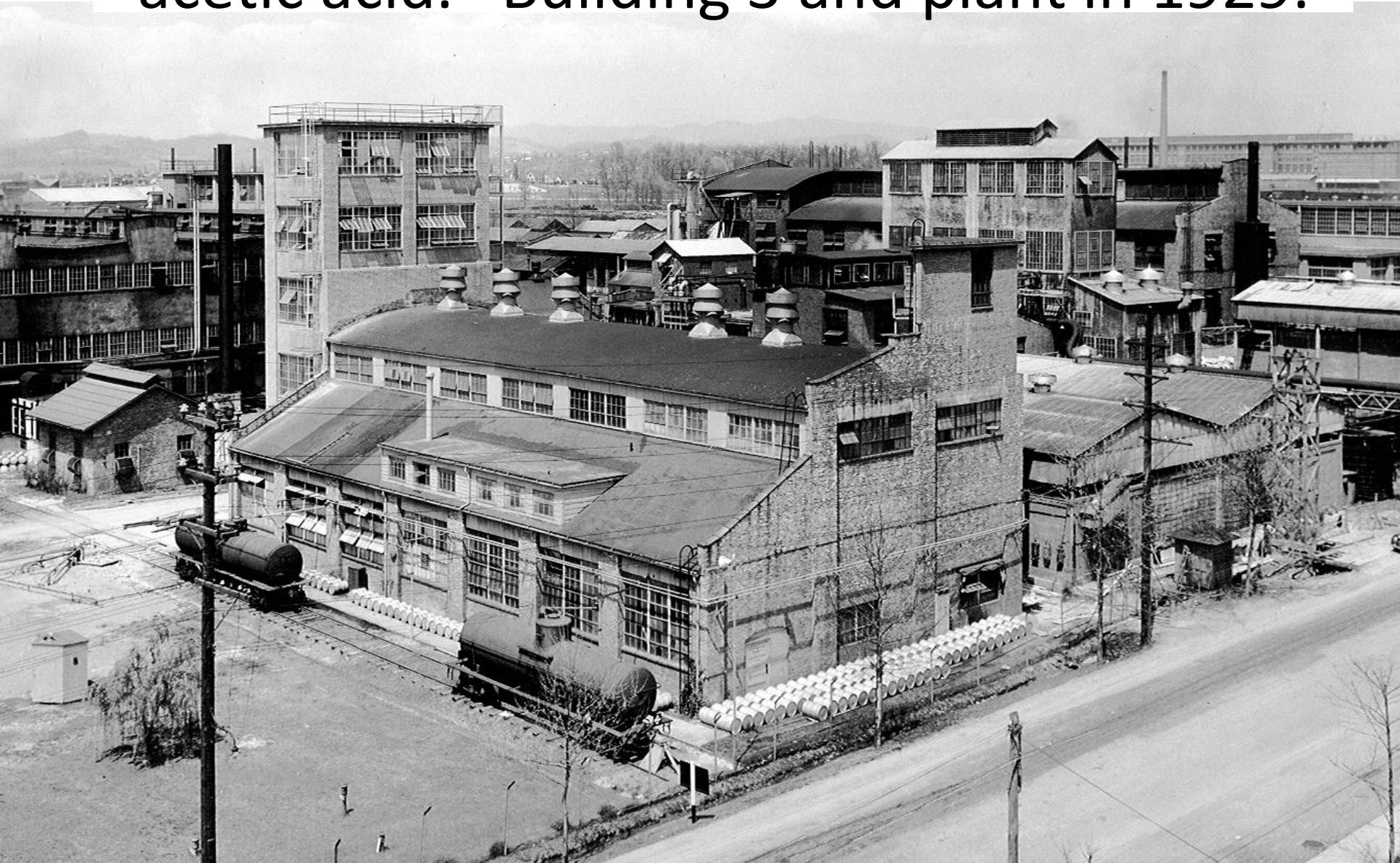
- Methanol
- Cellulose acetate (safety film)
- Hydroquinone
- PET
- Photographic chemicals

Eastman Chemical's True Founding Father: Perley Wilcox

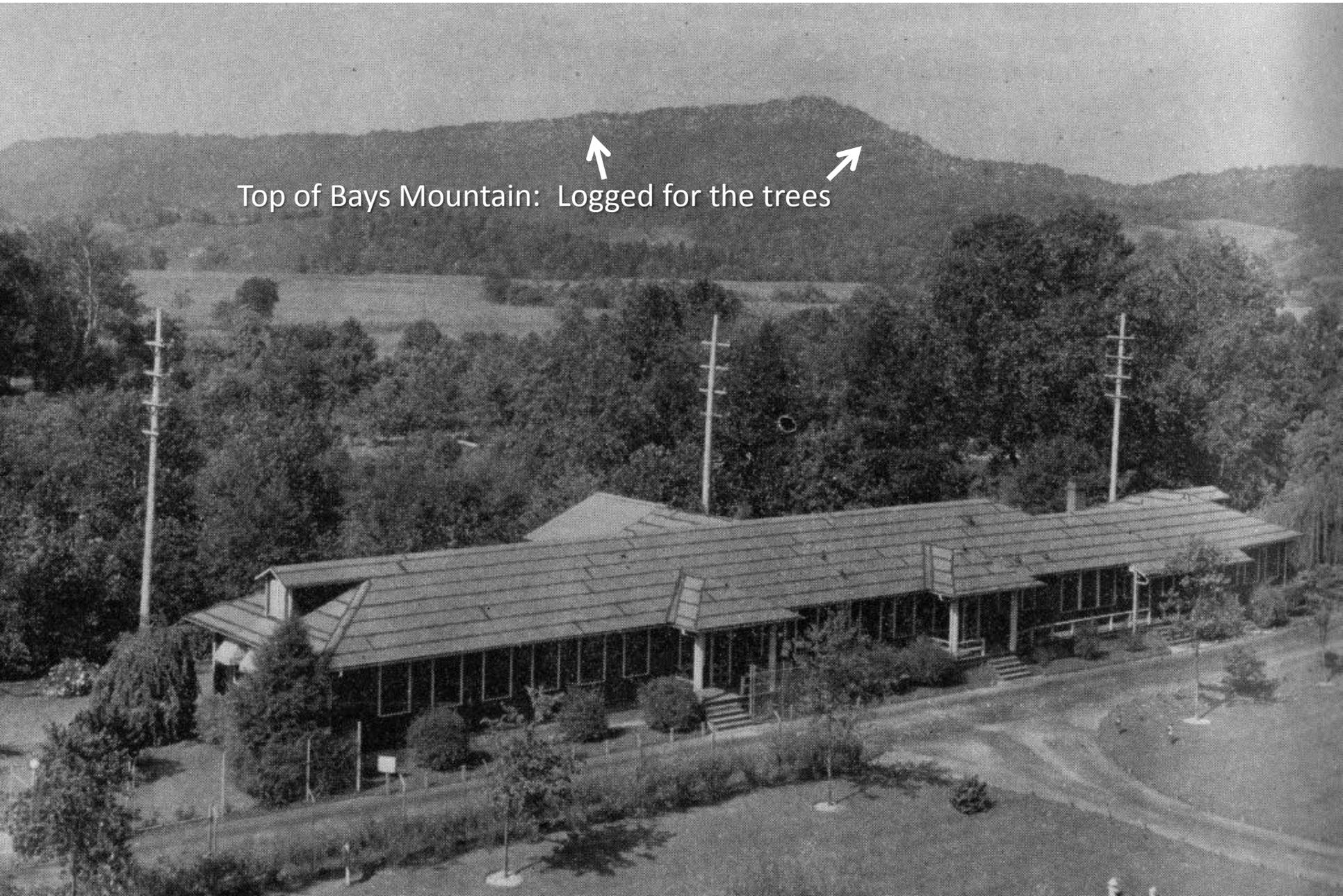


Perley S. Wilcox (1874–1953) was referred to as the “father” of Tennessee Eastman Corporation or, more commonly, as “Uncle Perley” by many people in Kingsport. Wilcox was elected a director and appointed general manager of the newly formed TEC in 1920. Joining Eastman Kodak Company in 1898, Wilcox served in various executive positions over the years. In 1945, he became chairman of the Kodak board. As James C. White said, “. . . it was only because of the great ability, the hard work, and especially the great determination of Perley S. Wilcox that we weathered the very substantial monetary losses that were experienced during our first 15 years of operation. It is a historical fact that except for Mr. Wilcox and the support he received from Frank W. Lovejoy at Rochester there would be no Eastman operation in Kingsport today.”

Wood Distillation provided methanol and acetic acid. Building 3 and plant in 1929.



Building 1: Administration



Top of Bays Mountain: Logged for the trees

Sawmill devours ever more

Band sawmill operated between 1927 and 1945

Sawmill location occupied today by tow warehouse between B-150 and B-162

White farmhouse is today research pilot plant area

Log Pond fed by "Hales Branch" which today is submerged near Konnarock and Lincoln street and runs under corner of B-150C to NW corner of B-162



From the TNO Utilities Division Archives



January 1931

Adaptation: Cellulose acetate for textile fibers, not just safety film

Yarn plant, B-70, 1932. It's still in operation today!



Today, you can get a Chik-fil-a.

Henry Ford: Any color you want, as long as it's black.

1933 Kingsport Phone Book

Taylor S Z r 142 Wanola..... 968

Templeton S D Grocery Store
1026 Maple..... 414

***TENNESSEE EASTMAN CORPORATION:**

Business hours—8:00 a. m. to 5:30 p. m.

Call..... 5101

Holidays and after 5:30 p. m. to 8:00 a. m.

General Office Building 1..... 5101-1

Turbine Room Building 6..... 5101-2

Band Sawmill..... 5101-3

Laboratory Building 51..... 5101-4

Gate House Cellulose Acetate Plant
Building 52..... 5101-51

Gate House Wood Distillation Plant
Building 18..... 5101-52

Building No 10..... 5101-6

Laboratory Building 57..... 5101-7

Stair Tower Building 58..... 5101-81

Gate House Acetate Yarn Plant
Building 60..... 5101-82

Machine Shop..... 5101-9

Main Power House Building 53..... 5101-10

Bays Mtn Fire Stations:

Blair's Gap Store..... 3302

Braggs..... 3303

Depews..... 3304

Haynes J F r Van Hill..... 3305

Morrison Burton r..... 3306

Tenn Motor Co Ford Agency Sullivan..... 63

Tenn Motor Co Used Car Dept Center..... 724

1939



1939 – Before the War



Hale's Branch

saw mill and wood yard

Eastman Road

Baseball Field

B-83

Yarn plant

Edgewood
Village

B-53

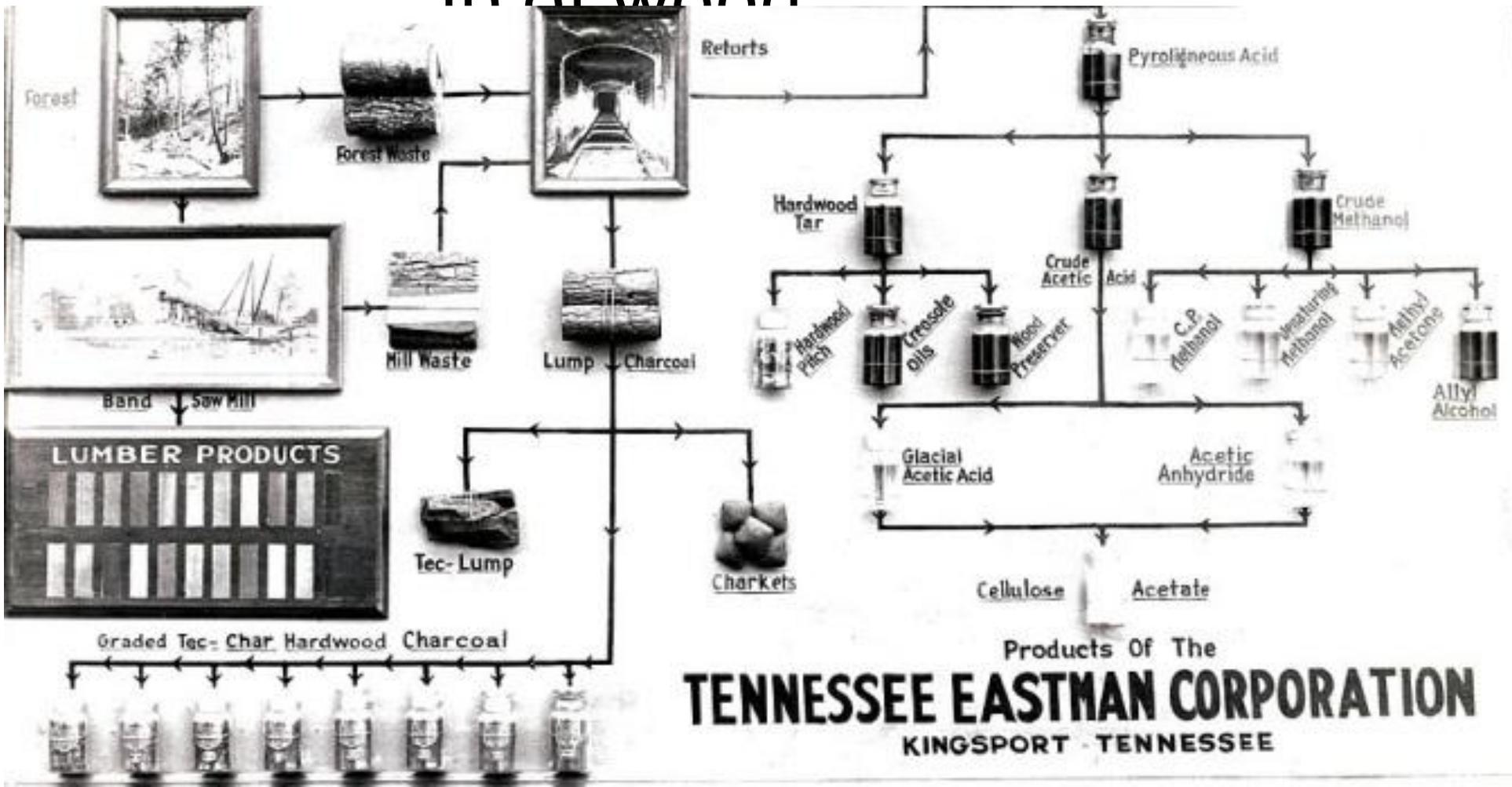
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Retorts and distillation building

B-99



Wood distillation provided only
1 lb of methanol / acetic per 6
lb of wood



Eastman's new products in the 30's and 40's

- Acetic acid cracking
- Ethanol to acetic acid
- Butanol to butyric acid
- Tenite plastics
- Acetate Staple Fiber
- Acetate dyes
- Triethyl phosphate
- Isopropyl Acetate
- HQ and derivatives

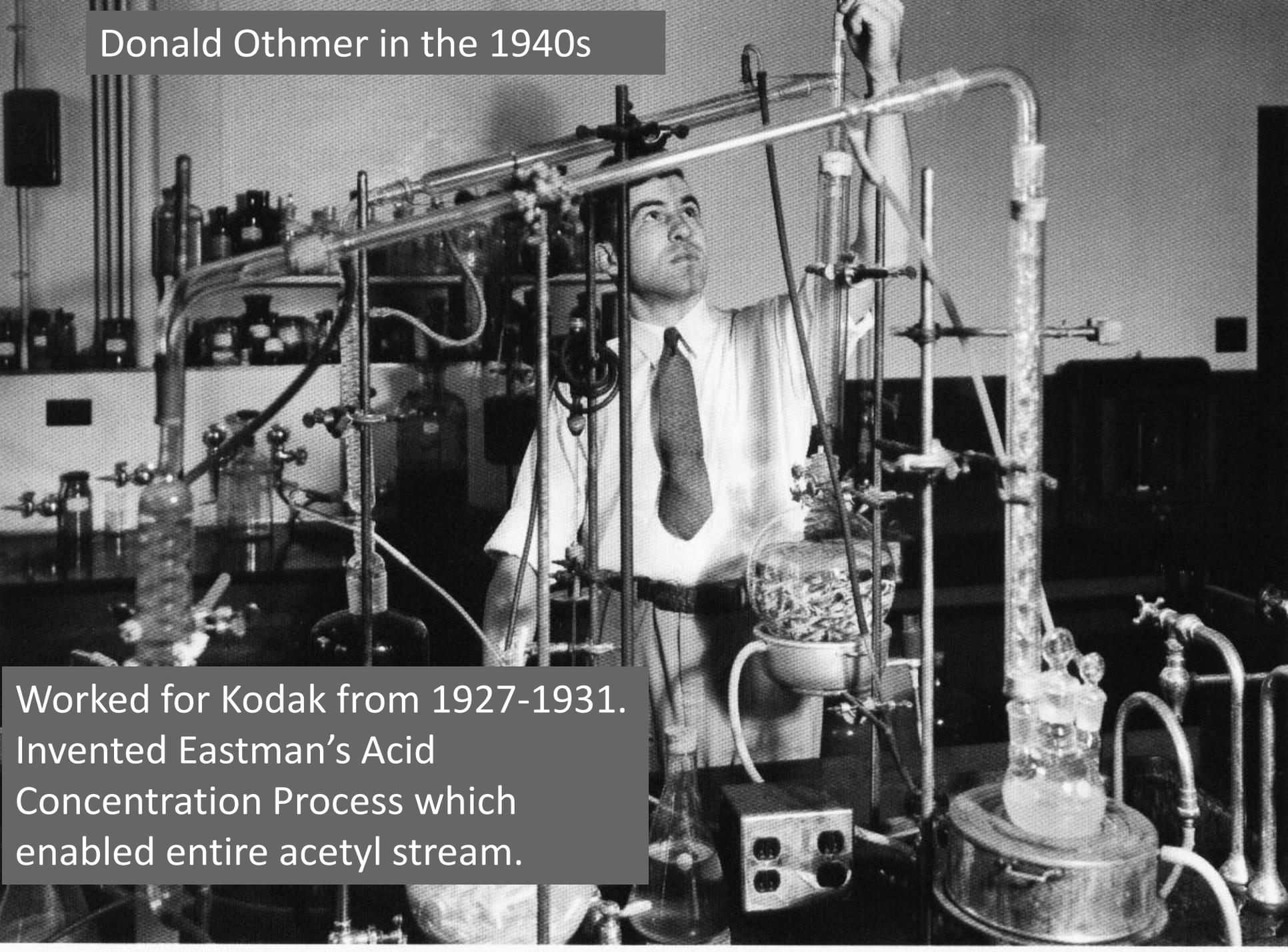
Eastman's first profit was not realized until 1932.

Donald Othmer invented acid concentration process

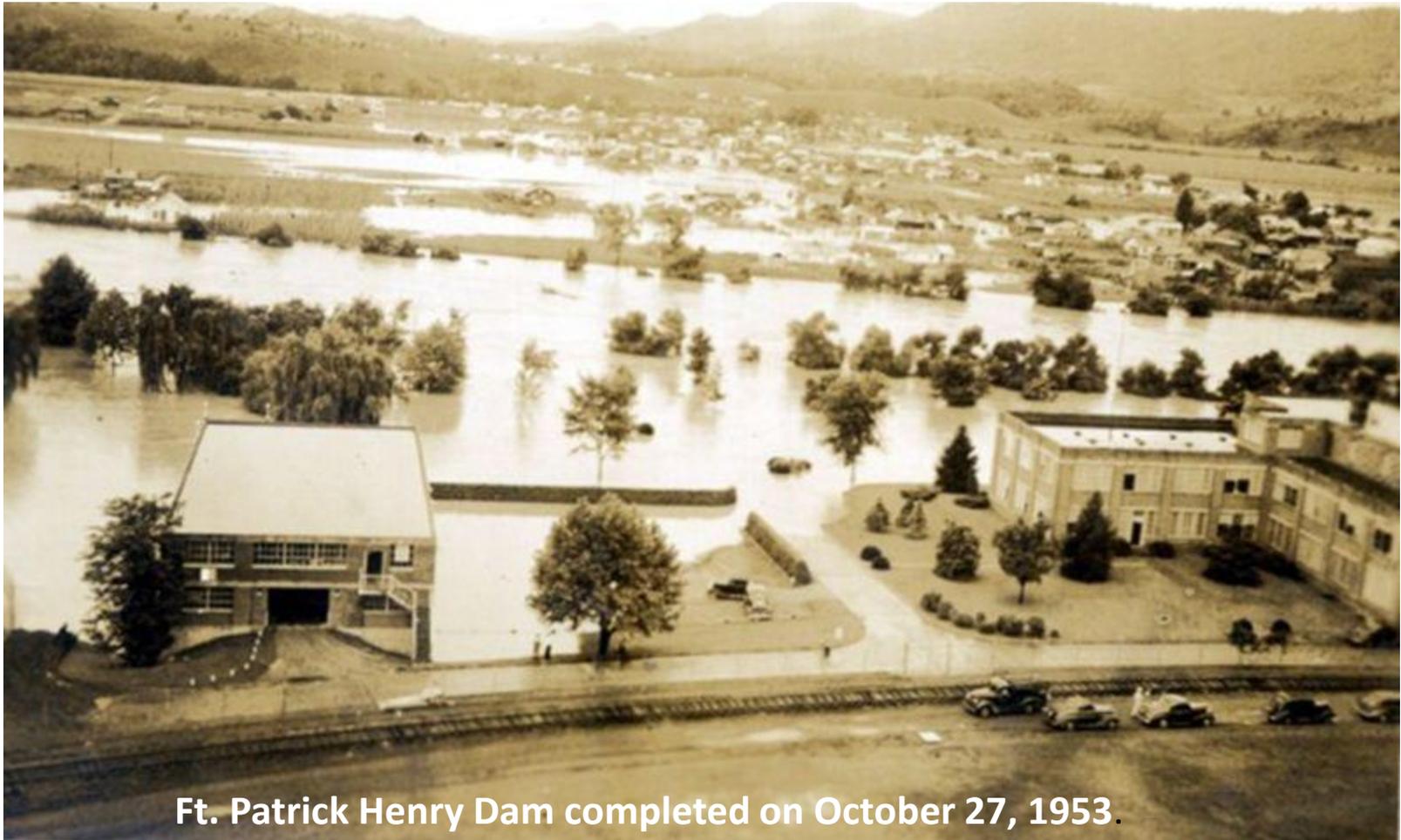
- Ph.D. in chemical engineering from U. of Nebraska in 1925.
- Worked for Kodak in Rochester from 1927 to 1931.
- Was professor at Brooklyn Polytechnic starting in 1932 (150 patents / 350 publications).
- Collaborated with Raymond Kirk on Kirk-Othmer Encyclopedia of Chemical Industry.
- Invested with Warren Buffett (also from Omaha) in the 1950s.
- Died in 1995 with an estate worth \$750 million.
- He and his second wife Mildred had no children, and gave estate to many charitable organizations.

Donald Othmer in the 1940s

Worked for Kodak from 1927-1931.
Invented Eastman's Acid
Concentration Process which
enabled entire acetyl stream.



Long Island Flood of 1940



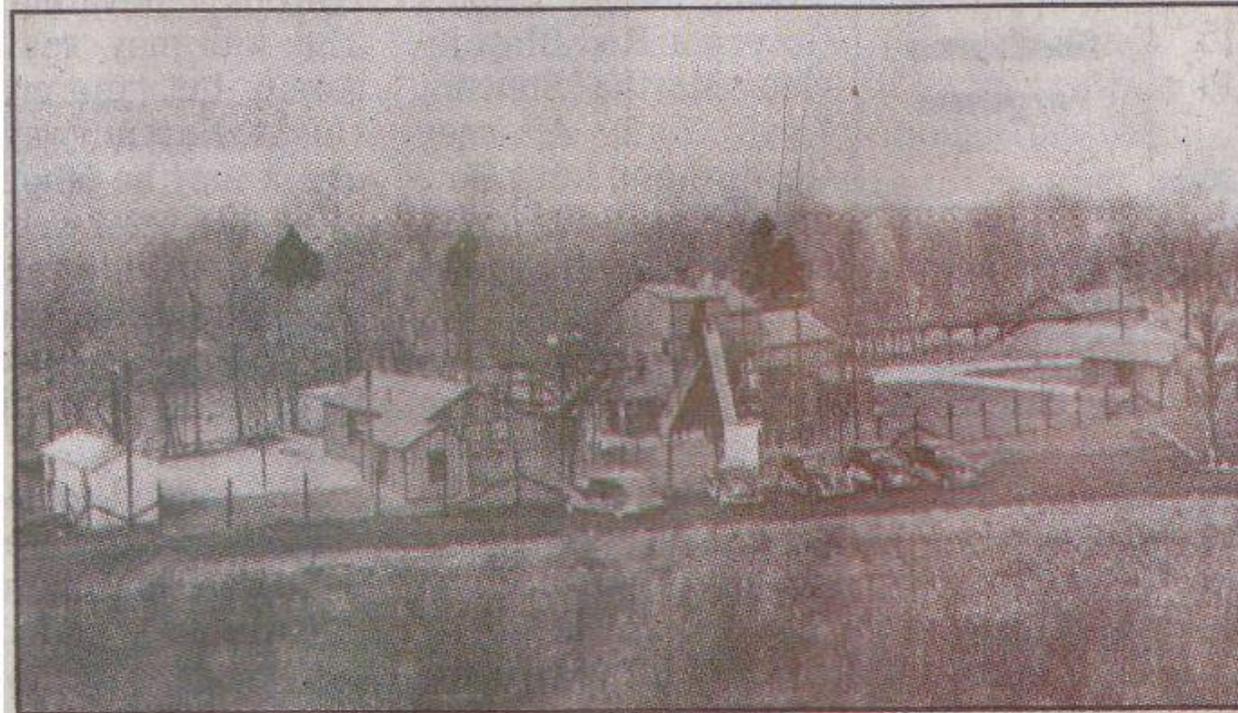
Ft. Patrick Henry Dam completed on October 27, 1953.

Tennessee Eastman Company Wins the War

- Implemented U. Michigan process to make RDX, high explosive
- Created Wexler Bend Pilot Plant to make RDX within 26 days of being asked by the government
- Was contractor for atomic bomb Manhattan Project at Oak Ridge
- Eastman employed 30,000 people at Oak Ridge and Holston Ordnance Works at height of effort(!)

Produced first RDX in 26 days

Sunday, June 24, 2012



This photo contributed by the U.S. Army shows the original Wexler Bend Pilot Plant, which manufactured RDX for the Allied effort before the Horse Creek Pilot Plant and Holston Ordnance Works were constructed. The photo below, by Sharon Caskey Hayes, shows the plaque that marks the site of the Wexler Bend Pilot Plant, next to Eastman just below John B. Dennis Highway, along the Holston River.



February 1948 B-54 filtered water basins

1948 – Yes, the world was in color



1955 – Golden Age of Manufacturing in America





**Picture: March
1955**

**Most elements of the Research Complex were
established 1948-1952.**



1958
We'd like
the river
over
there,
please.



Research Building 150, 150A in 1965



Adapting Acetyls

- 1930 – cellulose acetate for safety film
- 1931 – cellulose acetate for textiles
- 1932 – cellulose acetate for plastics
- 1938 – cellulose acetate butyrate
- 1952 – filter tow for cigarette filters
- On and on to other applications in coatings and films

The Dawn of Polyester

- Polyethylene Terephthalate was developed at ICI in the 1930s.
- DuPont and Eastman produced it during WWII as a nylon substitute to meet war demand.
- After the war, DuPont licensed PET to Eastman for use as film base
- Eastman licensed PET bottle patents from DuPont and made its first PET for bottles in 1979.
- Eastman ended production of PET fibers for textiles in 1993.
- Eastman sold the PET business in 2011.

Polyester Adaptation / Innovation

- Got into fibers for war production (1940s)
- Adapted PET as film base for Kodak (1950s)
- Developed TPA / DMT processes (1950s)
- Built two EG plants at Texas in the 1960s to integrate
- Changed TPA chemistry in the early 1980s to avoid acetylaldehyde-to-acetic acid co-production
- Adopted direct esterification of TPA (PTA)
- Created Integrex™ technology for esterification (2000s)
- Built iso-phthalic acid plant in the late 1990s
- Created co-polyesters to build specialty plastics business



Fall of 1920



Fall of 1930



August, 1929. Starting construction of first Power House and Acetate Plant south of Horse Creek Road.







Moving the South Fork of the Holston River in 1958.



Moving the South Fork
of the Holston River in
1958.

June 18, 2021

Richard Beck
President, ASCE Holston Branch
200 S Wilcox Dr.
Kingsport, TN 37660

To Whom It May Concern:

We are honored that the ASCE Holston Branch wants to nominate the Eastman facility in Kingsport, TN for the 2021 ASCE Tennessee Section Historic Civil Engineering Landmark Award. As the representative of Eastman, we fully support the nomination.

Sincerely,



J. Mark Bogle
Vice President, CASE Manufacturing
Tennessee Operations Site Leader