

# **EDDYSTONE RIFLE PLANT**

## **History of the Last Remaining Building**

Kurt Sellers, Major U.S. Army (retired)

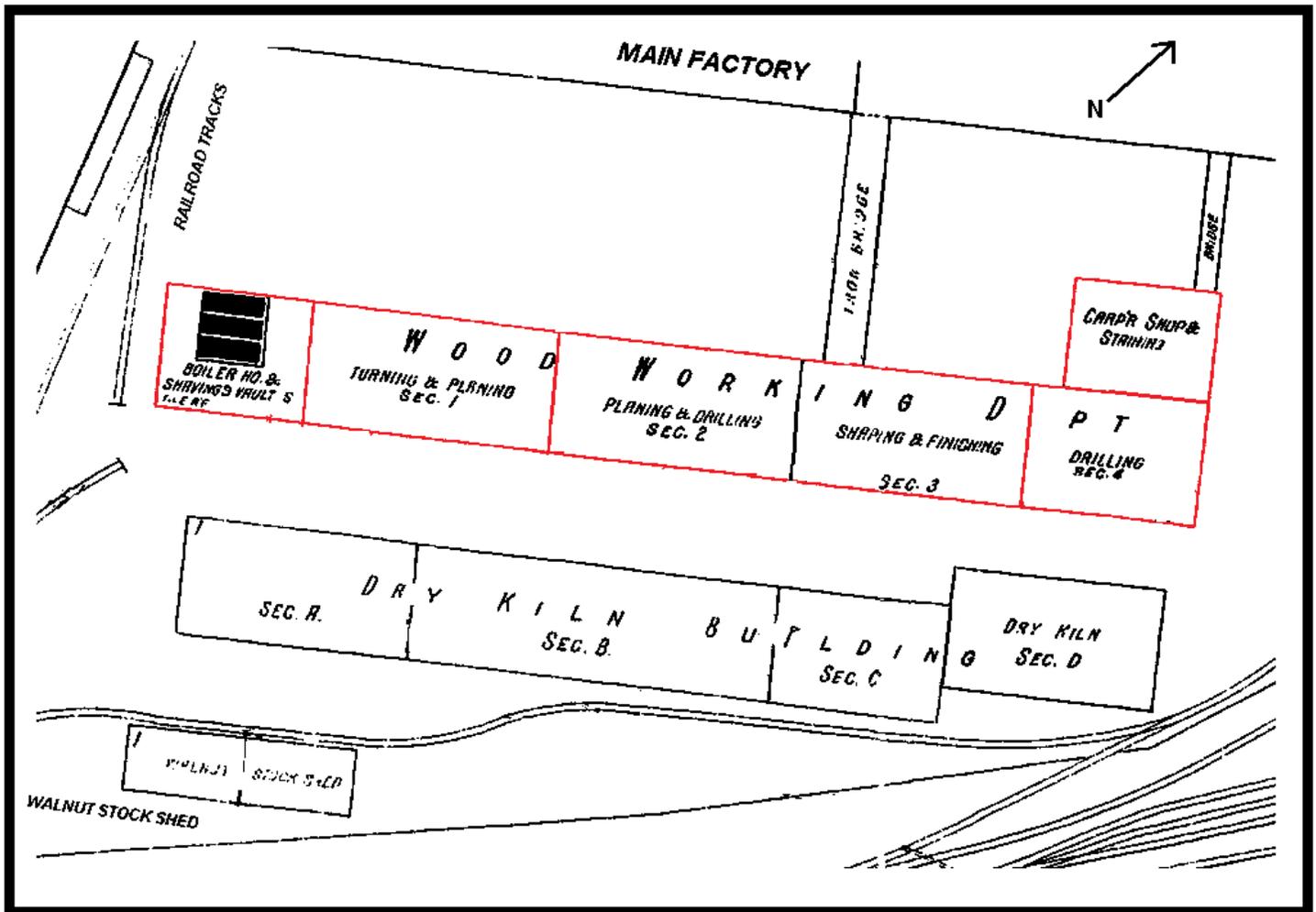
During World War I, Pennsylvania's Eddystone Rifle Plant was the largest rifle factory in the world. Between May 1916 and Jan 9, 1919, the plant made 1,957,418 rifles.<sup>1</sup> The sole surviving building of the Eddystone Rifle Plant is at 1500 Chester Pike, Eddystone PA.<sup>2</sup> It stands on private property and can be viewed from the vicinity of Simpson St. and 9th St. The building and its grounds are currently owned and operated by Aero Aggregates as a production facility for recycling glass into foamed glass construction material.

Constructed by Baldwin Locomotive Works in 1915 and operational in 1916, the building housed the wood working department. It was here that rifle stocks were crafted for contracted British Pattern 14 rifles and, later, the U.S. Model 1917 rifles. Baldwin erected the rifle factory under agreement they would assume control of the buildings after the war to expand their existing locomotive plant. Indeed, the rifle factory buildings were specifically designed for use in later locomotive production.<sup>3</sup> The rifle plant closed in January 1919, and the transfer was completed in the early 1920's. The wood working facility was converted to a steam plant that provided heating to the locomotive factory.

The surviving building is about 730 feet long and 86 feet wide. It retains its original steel frame and roof trusses. Much of original interior roofing, brick interior walls and hollow terra cotta tile outer walls also remain. Nearby are remnants of the 1.4 miles of rail track that once transported materials within the rifle factory grounds. These lie parallel to Simpson St. (Some other track remnants in the area date from the postwar period of locomotive manufacture.)



**Wood Department Building**  
*southern side looking northeast (3/29/2017)*



### Eddystone Rifle Plant Wood Working Facilities

Extract from Sanborn Map 83 of the Eddystone Munitions Plants. Edited for clarity. See complete map below.

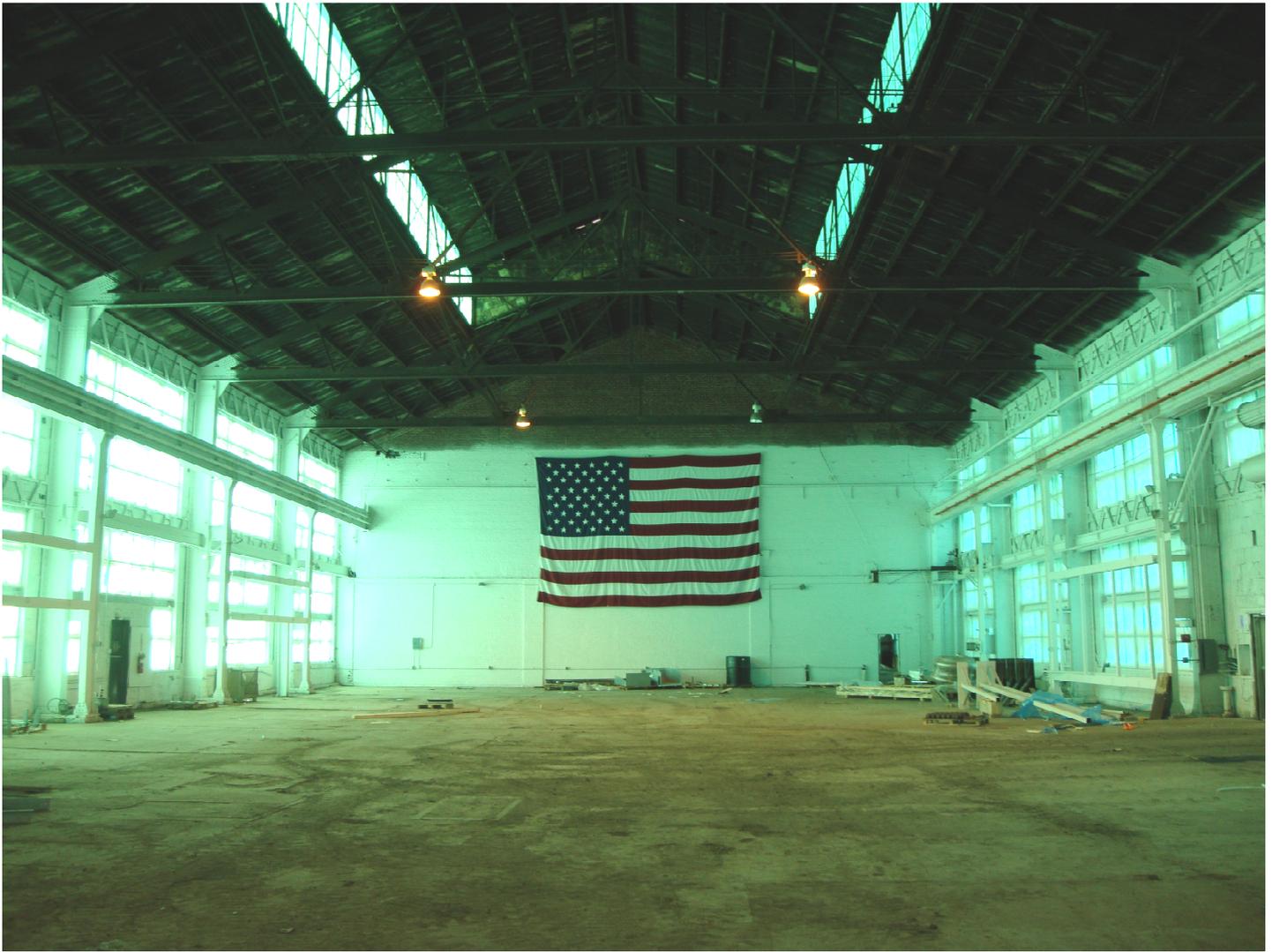
During World War I, the bays of the building contained different wood working functions:

- Section 1: turning and planing
- Section 2 : planing and drilling
- Section 3 : shaping and finishing
- Section 4 : drilling

A boiler and shavings vault occupied the westernmost end of the building adjacent to section 1. A carpentry shop and staining facility projected northward from section 4 forming an 'L' at the eastern end of the building.

Two overhead bridges connected the wood working building with the main factory building to the north. The bridges projected from section 3 and the carpentry shop. Still present is ironwork that marks the location of the bridge from section 3.

A building containing wood drying kilns and a storage shed for stocks were located south of the wood working building.<sup>4</sup> These were above the railroad tracks that formed the southern boundary of the entire rifle plant. Vintage photographic evidence shows the kiln building and storage shed were removed shortly after the war.

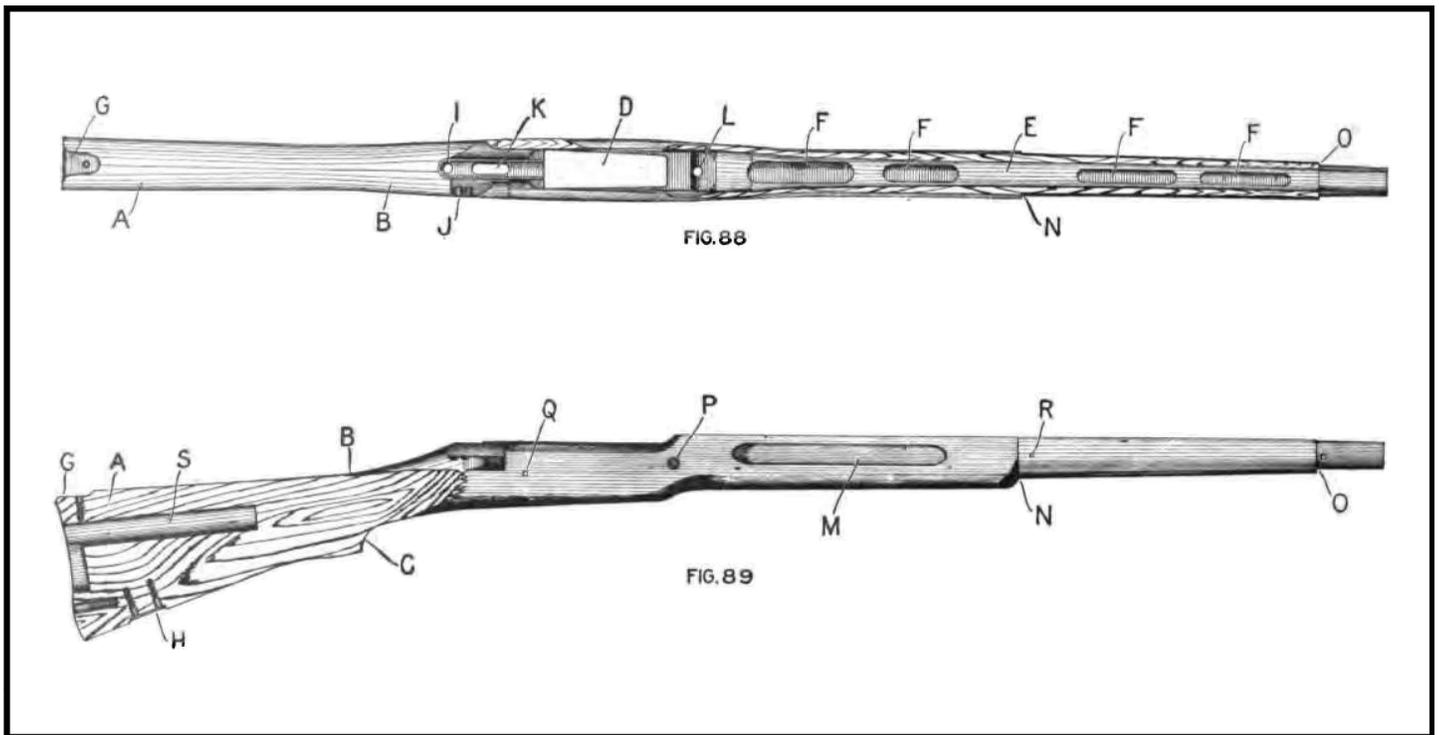


## **Turning and Planing Room ( Section 1)**

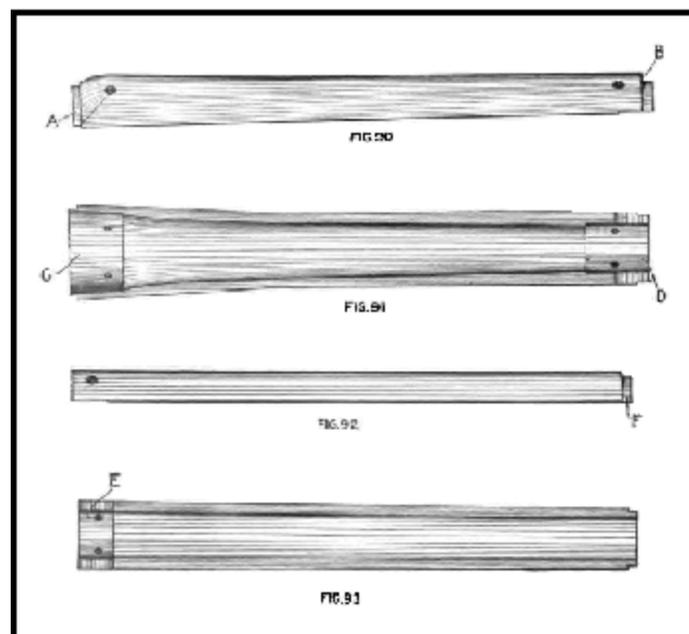
*looking westward. (3/29/2017)*

A rifle stock is obviously an essential component of a complete rifle. Stocks begin as blanks; lumber cut in the rough proportion of the stock. Stock blanks were shipped to the factory where the real work began. As the illustrations below suggest, the woodworking requires a great deal of lathing, cutting, drilling and inletting as well as sanding and finishing. Completed stocks and hand guards were bathed in raw linseed oil and air dried.<sup>5</sup> Later the metal fittings were attached (e.g., buttplate, recoil bolt, handguard clips and sling swivels).

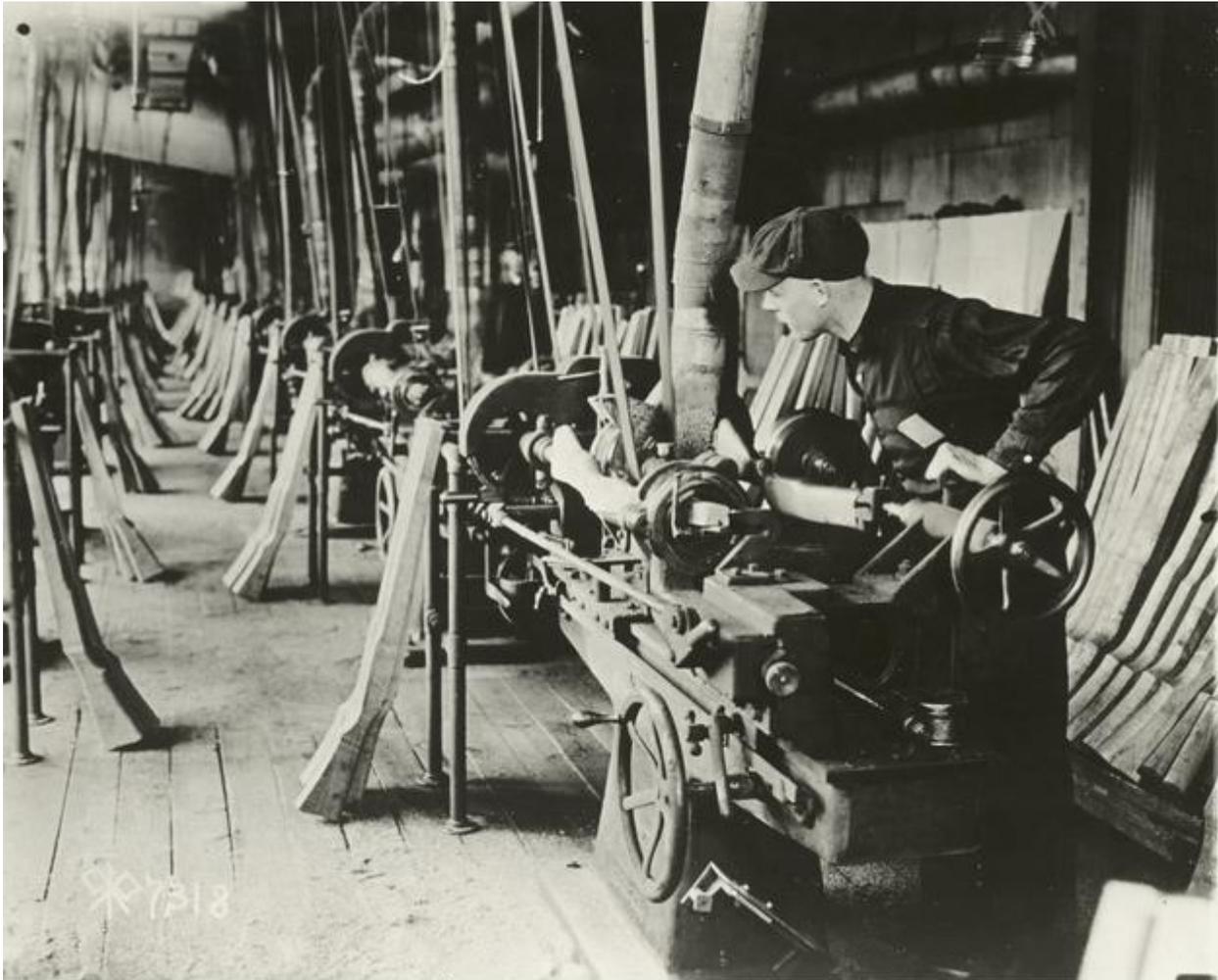
Stocks were formed to precise dimensions. A poor stock will render a rifle inaccurate regardless of precision in producing the metal parts such as barrel and trigger mechanism. Sufficient tolerance must be made to allow for temperature changes, notably a hot barrel. If the metal working parts do not fit well to the stock and the barrel is not properly bedded, the rifle will be unacceptably inaccurate. Similarly, the wood must be of high quality. Wood prone to either warping or excessive flexing during recoil destroys rifle accuracy.



**Model 1917 rifle stock (above) and hand guard (below)**



Wood for rifle stocks and hand guards had to be of acceptable grain and seasoning and were subject to rigorous inspection. Springfield Armory 1916 specifications are representative. The "best grade of black walnut" was preferred. Wood could not "contain more than 5% moisture content after final treatment in the dry house and exposure to the atmosphere for 36 hours". Wood had to be "hard, straight grained and thoroughly sound."<sup>6</sup> Substitute woods such as birch were allowed provided they met the same standard. There is no evidence any wood, but walnut was ever actually used.



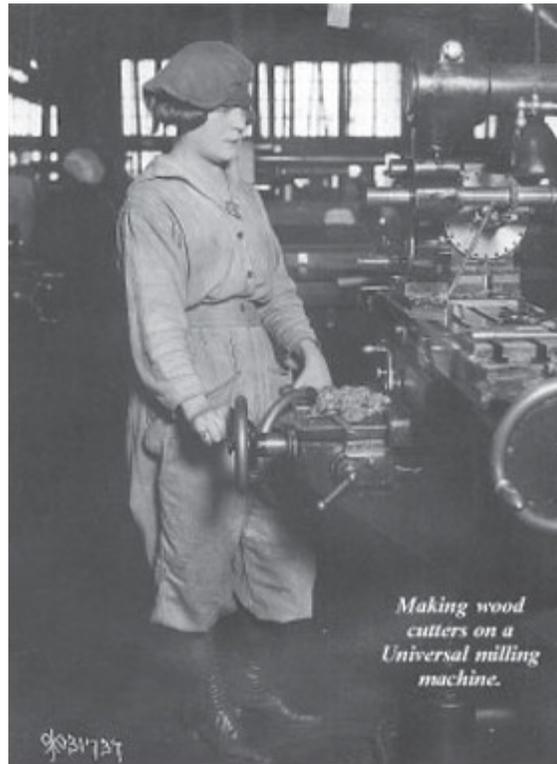
### **Turning lathe on rifle stocks, Eddystone**

note the stock blanks

Eddystone innovated woodworking production methods by later substituting six side shapers for rough turning of rifle stocks. Shaper operation was faster and reduced manpower from eleven to six. This process also released twenty four lathes, four tip turners and three centering drills for other stock making operations.<sup>7</sup>

M1917 rifle production was at times delayed because of material shortages. The most consequential instance was a shortage of wood for stocks in mid-1918. In peacetime, the wood for rifle stocks was stored in a "dry house" for two years until properly seasoned. This procedure could not meet the demands of wartime production. A new kiln drying process was developed that allowed wood dried for sixty days to be sufficient for lathe working.<sup>8</sup> Sixteen such kilns were installed at Eddystone.<sup>9</sup> A shortage of black walnut was eventually overcome by nationwide canvassing. Nevertheless, wood shortages continued for some time causing stock production to lag production of steel parts.<sup>10</sup>

A rifle stock blank required eight board feet of lumber for cutting. A walnut tree yielded an average of 28 stock blanks. Three hundred and twenty walnut trees were cut into stock blanks for shipment to Eddystone each working day.<sup>11</sup> The final production (Jan 1919) of 1,332,464 M1917 rifles equates to 47,588 walnut trees - over 3,000 acres of trees. To these must be added a percentage of stocks manufactured as spare parts.



### **Milling wood cutters, Eddystone**

by September 1918, the 3,000 women employed at Eddystone constituted nearly 20% of the labor force<sup>12</sup>

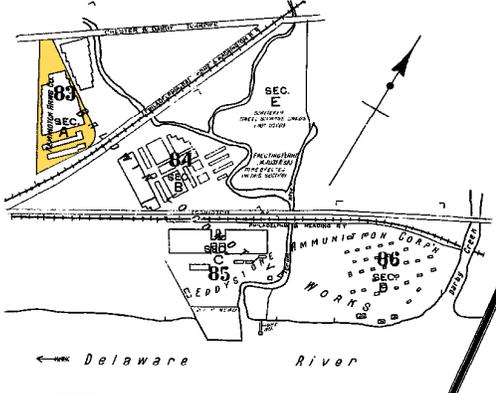
The Eddystone Rifle Plant occupied 34.5 acres and was surrounded by over a mile of fencing. The yellow shaded area of Sanborn Map 83 below is the rifle factory grounds. Note the size of the main factory building; it covered 14 acres of ground, was 1,040 feet long and had a maximum width of 816 feet.<sup>13</sup> The woodworking building with connecting bridges is at lower left.

The manufacture of rifle stocks is merely one component part of rifle manufacture in Eddystone. It is a representative piece, however, of " *...one of the great industrial achievements of the war.*"<sup>14</sup>

*The boundaries of the former rifle factory grounds are still present. Chester Pike forms the northern boundary and railroad tracks are in the vicinity of the southern limit. Simpson St. forms the western boundary. The eastern boundary is very closely approximated by the current road leading from Chester Pk. into a shopping area. A present day Walmart is in the center of the former rifle plant area. A present day Shoprite and a strip mall are on the former grounds of the locomotive erection shop built in 1907.*

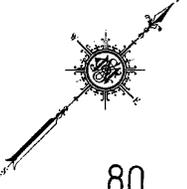
CHESTER, PA.  
**83**

GENERAL PLAN  
- OF THE -  
EDDYSTONE MUNITION PLANTS



**EDDYSTONE**  
SCALE 100 FT. TO AN INCH

**REMINGTON ARMS CO.**  
**PLANT OF MILITARY RIFLES**  
GENERAL PLAN FROM PLANS  
RECEIVED FROM THE U.S. ARMY  
ENGINEERING DISTRICT OFFICE  
AT PHILADELPHIA, PA.  
ON APRIL 15, 1918.  
THESE PLANS WERE PREPARED BY  
THE ARCHITECTURAL FIRM OF  
HARRIS, HARRIS & HARRIS,  
PHILADELPHIA, PA.  
ON APRIL 15, 1918.  
THESE PLANS WERE PREPARED BY  
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HARRIS, HARRIS & HARRIS,  
PHILADELPHIA, PA.  
ON APRIL 15, 1918.



80

81

CHESTER & DARBY TURNPIKE

SIMPSON AV.  
E. 11th ST.  
E. 10th ST.  
E. 9th ST.

78

84

Scale 100 Ft. to One Inch.  
Copyright 1917 by the Eddystone Map Co.

**Eddystone Rifle Plant**

## ENDNOTES

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- <sup>1</sup> Eddystone manufactured 604,941 Pattern 14 rifles on contract to Britain. The Model 1917 is a modification of the Pattern 14. Eddystone made 1,181,908 M1917 rifles by Nov 9, 1918, and an additional 170,569 rifles in the postwar period before plant closure on Jan 9, 1919. Baldwin, p.126 states nearly 300,000 rifles were in the process of manufacture at the time of closing.
- <sup>2</sup> The factory was originally the Eddystone Rifle Works managed by Remington Arms Co. of Delaware. Upon acquisition by Midvale Steel and Ordnance Co. in Jan. 1918, it was renamed the Eddystone Rifle Plant.
- <sup>3</sup> Williams, p.299 and Baldwin p.127.
- <sup>5</sup> Brophy, p.541.
- <sup>6</sup> Ibid., p.541.
- <sup>7</sup> Williams, p.516.
- <sup>8</sup> McConoughy, p.17
- <sup>9</sup> Williams p.515.
- <sup>10</sup> McConoughy, p.17
- <sup>11</sup> Data from "Closing the Doors on the World's Greatest Rifle Plant" a typed manuscript (date and author unknown) presented to Conrad Nelson. Extracts of data in the original document are quoted by Ferris pp. 121-124.  
Nelson was a former chief inspector at Rock Island Arsenal who served as Superintendent of the Eddystone plant.
- <sup>12</sup> Williams, p.514.
- <sup>13</sup> Data from "Closing the Doors on the World's Greatest Rifle Plant"
- <sup>14</sup> Williams, p.299. Italics in the original.

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## BIBLIOGRAPHY

- Anonymous. "Closing the Doors on the World's Greatest Rifle Plant". Undated manuscript presented to Conrad Nelson, in Ferris p.121-124.
- Baldwin Locomotive Works. History of the Baldwin Locomotive Works, 1831-1920. Philadelphia: Baldwin Locomotive Works, 1920.
- Brophy, William S. The Springfield 1903 Rifles. Harrisburg PA: Stackpole, 1985.
- Colvin, Fred H. and Ethan Viall. United States Rifles & Machine Guns. New York: McGraw-Hill, 1917.
- Crowell, Benedict. America's Munitions 1917-1918: Report of Benedict Crowell, the Assistant Secretary of War, Director of Munitions. Washington: Government Printing Office, 1919.
- Ferris, C.S. United States Rifle Model of 1917. Export PA: Scott A. Duff Publications, 2004.
- McConoughy, Miriam. History of Rifles, Revolvers, and Pistols. Army Ordnance 1917-1919, No. 1865. Washington D.C.: Government Printing Office, 1920.
- Skenneron, Ian D. The U.S. Enfield. Margate, Australia: Ian Skenneron, 1983
- Williams, William Bradford. Munitions Manufacture in the Philadelphia Ordnance District. Philadelphia, Pa: A. Pomerantz & Co., Printers, 1921.

## ILLUSTRATIONS

- Environmental Data Resources (EDR), Inc. Fire insurance maps of Eddystone Munitions Plants. Sanborn Map Co., 1917. Obtained from EDR, Inc., Shelton CT, courtesy of Ron Spencer, Environmental Management Group (EMG), Edgemont PA.
- U.S. Signal Corps photo. *Turning lathe on rifle stocks, Midvale Steel & Ordnance Co, Eddystone, Pa.* Miriam and Ira D. Wallach Division of Art, Prints and Photographs: Photography Collection, The New York Public Library. (1860 - 1920).  
<https://digitalcollections.nypl.org/items/510d47d9-bd43-a3d9-e040-e00a18064a99>
- U.S. Signal Corps photo. *Making wood cutters on a universal milling machine [at Eddystone]*. Roy Marcot and Joe Poyer. "The Story of Eddystone". Remington Society of America.  
<http://www.remingtonsociety.org/the-story-of-eddystone/>
- U.S. Ordnance Dept. Description and Rules for the Management of the United States Rifle, Caliber .30, Model of 1917, No. 1917. Washington: G.P.O., 1918.
- Building photos (2017) by the author.

*Special thanks to Andrew Filshill, owner-manager of Aero Aggregates, for generously supporting this research. He allowed unconstrained access to the buildings and ground and his engineering expertise was essential for identifying the construction features and materials that are original to the building*