

LECTURE OUTLINE: Technology, Civil War, and the War's Larger Implications

A. The Civil War (1861-1865) as a great divide in American history that results in the rise of "modern" America

B. What was different about the Civil War compared with other wars?

--an industrially-based war that witnessed the mass production of many things:
--mass transportation (esp. railroads/steamboats)
--the Civil War as a railroad war

--Telegraphy

--Firearms and the spread of the "uniformity system" to other areas of manufacturing:

Examples:

***Textiles (uniforms, shirts, socks, tents, blankets, etc.)

***Boots and shoes of standard sizes

***Wagons and wheeled vehicles

***Food products: canned goods

C. "A Deadly Affair"

a. Even though Union troops were the best equipped in history, many died:

620,000 soldiers die [360K feds; 260K Confederates] Two out of three die of disease

500,000 wounded, 75,000 of whom later die of their wounds

c.50,000 civilians (mostly Southerners) die as a direct result of war

Total war = ~750,000

b. The great battlefield killer: rifled firearms

--1st Manassas (July 1861): Casualties: c.3,000 (North), c.2,000 (South)

--Shiloh (Mar. 1862): each side has more than 1,700 killed/8,000 wounded

--Antietam (Sept. 1862): Casualties: 11,000/2108 killed (North);

13,000/2,700 killed (South)

--Fredericksburg (Dec. 1862): Casualties: 12,600/1,284 killed (North); c. 5,000/595 killed (South)

--Gettysburg (July 1863): Casualties: 23,000/3,153 killed (North);

27,000/3,903 killed (South). CSA losses on 3rd day = 50%

--Wilderness to Petersburg (May-June 1863): Casualties: 64,000 (North); 30,000 (South)

--Total casualties on both sides, 1861-65 = 1,095,000

c. Civil war medicine: battlefield surgery

D. Larger implications/impact of the Civil War

1. Postwar “take-off” in economic growth:

“Between 1870 and 1920, the United States changed in ways that the founders could have never dreamed possible. Under the conditions of industrialization... people became linked together in large, complex networks that are... both physical and social: technological systems.” (Cowan, p. 149)

2. When did people begin thinking seriously about technological/managerial systems?

- John C. Calhoun and the War Dept.’s uniformity system (1817+)
- John McLean and the Post Office (1820s)
- the spread of the factory system: Springfield (1820s)
- the “Lowell system” (1820s+)
- the transportation system, esp. railroads after 1828 (remember the General Survey Act of 1824 and its import)

3. System thinking and large systems building does not become pervasive until after the Civil War

See Cowan, chap. 7 on:

--The telegraph system (note the role of govt. subvention in building the first telegraph line between Baltimore and Washington, 1844-45)

--The railway system:

--between 1850 and 1871, the federal govt. turns over 131 million acres of land to subsidize the construction of 19,000 of privately owned railroads.

--Railroad mileage: 30,000 (1860); 35,000 miles (1865); 93,000 (1880); 164,000 (1890); 254,000 (1916)

--The spread of other systems after the Civil War:

- ***Petroleum (Rockefeller and Standard Oil)
- ***The Bell telephone system
- ***The electric power system (Edison)

INDUSTRIAL FALLOUTS/IMPLICATIONS OF THE CIVIL WAR:

QUESTION: What role did the war play in the spread of systemic thinking and what is known as “the rise of big business” c. 1865-1890?

--The war introduced hundreds of thousands to experience of working in large hierarchical organizations: the army and the navy

--working in large wartime organizations had a learning-by-doing effect: it provided a model for budding entrepreneurs to follow;

--and prepared them for the passage from preindustrial/agrarian society to a full-fledged industrial society

SOME EXAMPLES OF THE TRANSITION:

--the spread of time-keeping and time-consciousness with access to cheap timepieces [example: Waltham watches]

--the spread of standardized manufacturing methods from firearms to uniforms to railway track gauges.

--the trend toward large projects: e.g. the transcontinental railroad (1869)

--the cultivation of global markets: e.g. the postwar international arms trade

--growing concerns about the management of large-scale enterprises, esp. the management of workers under increasingly competitive/industrialized conditions

***trade unions and strikes: e.g. 1877

***Frederick W. Taylor and the rise of “scientific management”

--the problem of “soldiering” or pacing;

--Early attempts to control pacing:

***Lt. Daniel Tyler @ Springfield (1829-31)

***Lammot du Pont (1870s)

***Lt. Henry Metcalfe @ Frankford Arsenal (1870s-80s)

***Henry R. Towne of Yale & Towne Lock Co. (1880s)

--Taylor delivers his first paper to ASME (1895)

***Taylor publishes his most important work, SHOP

MANAGEMENT, as well as a more popular version of his management system, THE PRINCIPLES OF SCIENTIFIC MANAGEMENT, in 1911.