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- [O.F. Mossberg & Sons, A Short Illustrated History](#)
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# CORNELL PUBS TRIVIA

May 2012

Questions derived from

**The Manufacture of Firearms and Ammunition**

**A Report to the Census Bureau by Charles H. Fitch, 1882**

1. In his 1882 report to the Superintendent of the Census, Charles Fitch says that one change in the gun industry had a greater effect than all others. What had happened in the previous fifty years that had so dramatic a change?
2. 2,272 employees at Connecticut firearms manufacturers in 1872 were males above 16 years. How many were "Females above 15 years"? How about "Children and youths," presumably 15 years old and younger?
3. At the World's Fair in 1851 in London, a number of Mississippi rifles made by Robbins & Lawrence of Vermont were exhibited and received the award of medal. Why did they receive so much attention?
4. During the Turkish War (the Russo-Turkish War of 1877-78, not the Turkish War for Independence in the 20th century), did American companies arm the Russians or the Turks?
5. In the 1870s, how many fine military rifles were produced per employee per year?
6. Who is credited with the first use of decarbonized steel for gun barrels?
7. Fitch writes that what percentage of decarbonized barrels "burst" in proving?
8. How much did Congress pay in 1845 for the rights to the invention of the ordinary copper percussion cap (patented in 1822 by Joshua Shaw)?

**The answer to every question can be found in The Manufacture of Firearms and Ammunition by Charles H. Fitch, 1882. A reprint of this report to the Census Bureau is available on our website.**

**1. In his 1882 report to the Superintendent of the Census, Charles Fitch says that one change in the gun industry had a greater effect than all others. What had happened in the previous fifty years that had so dramatic a change?**

The “interchangeable system” of manufacturing.

“It may not be too much to say that, in some respects, this system has been one of the chief influences in the rapid increase in the national wealth. Two of the great industries which constitute the basis of this wealth, agriculture and manufacturing, depend now largely upon the existence of this remarkable feature in manufacturing, which has reached its highest development

in this country. The growth of the system is due to the inventive characteristics of our people, and their peculiar habit of seeking the best and most simple mechanical methods of accomplishing results by machinery, untrammelled by traditions or hereditary habits and customs.”

Our keen readers will see traces of the theory of American Exceptionalism in Fitch’s statement.

**2. 2,272 employees at Connecticut firearms manufacturers in 1872 were males above 16 years. How many were “Females above 15 years”? How about “Children and youths,” presumably 15 years old and younger?**

The report notes 12 gun manufacturing establishments in Connecticut, out of 38 nation-wide. Those manufacturers had \$3,485,834 in “capital”, had up to 2,696 workers at peak times, and averaged 2,272 males 16 years old and older. They had 85 females above 15 years old, and 102 “Children and youths.” The report also notes that they Connecticut factories paid \$1,309,375 in wages during the year, or around \$485 per employee per year. The

factories paid \$753,386 in materials, and \$2,470,398 in “Products.”

It wasn’t until the 20<sup>th</sup> century that child labor laws became nationally popular. But as early as 1836 Massachusetts passed the first state child labor law, requiring children under 15 working in factories to attend school at least 3 months/year. In 1842, Massachusetts began limiting children’s work days to 10 hours.

**3. At the World’s Fair in 1851 in London, a number of Mississippi rifles made by Robbins & Lawrence of Vermont were exhibited and received the award of medal. Why did they receive so much attention?**

The precision and volume of manufacture was stunning.

“The locks of these were not marked for hardening, and their workmanship and

uniformity attracted much attention. This exhibit, and the reports of the Blanchard stocking machinery, caused the British government to send a commission to this country to examine the methods of manufacture. The interchangeable system ... was distinctively American.”

Previously, guns with interchangeable parts were the result of painstaking filing and precision fitting. But by 1851 Americans invented precision casting and milling methods to dramatically improve quality, and this excited foreign governments.

“In 1855 an American firm supplied British agents with 20,000 interchangeable

Enfield rifles and several sets of machinery, the first comprising 157 machines, valued at \$44,360 ... and including 8 universal milling, 57 milling, 3 double-milling, 4 screw milling, 2 clamp milling, 12 four-spindle drilling, 5 tapping, 7 edging, 8 drilling, 1 grooving, 2 squaring, 5 threading, 1 chucking, 1 broaching, 5 screw-setting, 3 screw-pointing, 3 screw-clipping, 1 chasing, 3 six-spindle drilling, 2 screw-thread finishing, 1 punching, 1 hand-planing, 1 index milling, 7 turning, and 2 rifling machines. These machines were extensively copied in England and Germany.”

#### **4. During the Russo-Turkish War of 1877-78 (not the Turkish War for Independence in the 20th century), did American companies arm the Russians or the Turks?**

Both. “[Both] the Russian and the Turkish governments were very heavily supplied with arms and munitions of war from American armories, notably by the Winchester Repeating Arms Company of New Haven; the Providence Tool Company of Providence, and the Union Metallic Cartridge Company of Bridgeport. Perhaps no more creditable instance could be adduced of the superiority of the best American gun machinery than is furnished

in the supply of Pratt & Whitney Company of Hartford.”

P&W helped the Prussians manufacture components of the Mauser rifle. The Prussian government wrote a testimonial stating, “the system upon which they are founded has rendered the government in no small degree independent of the skill and power of the workmen. In addition, a very material economy has been obtained, amounting already to one-half of the wages formerly paid.”

#### **5. In the 1870s, how many fine military rifles were produced per employee per year?**

200. “In large gun factories, under the stimulus of heavy orders, the finest military rifles are sometimes produced at the rate of 200 per annum per operative employed, on the basis of 312 working days of ten hours each in the year, and the operative labor is

divided among the several departments in proportions roundly expressed in the following percentages: making stocks, 6 2/3%; barrels, 15%; locks and other parts, 66 2/3% (comprising forging 11 1/3%; filing 9 1/3%; machining 36 2/3%; polishing 7

2/3%; sundry processes 1 2/3%); and inspection, assembling, and proof, 11

2/3%.”

**6. Who is credited with the first use of decarbonized steel for gun barrels?**

The Remingtons.

“The earliest use of decarbonized steel for gun barrels is generally credited to the Remingtons, who made steel barrels for North & Savage of Middletown, Connecticut, and for the Ames Manufacturing Company of Chicopee Massachusetts, as early as 1846. It is also

stated that some time about 1848 Thomas Warner, at the Whitneyville works, incurred so much loss in the skelp-welding of iron barrels that he voluntarily substituted steel-drilled barrels in his contract, making them of decarbonized steel, which was believed by him to be a novel expedient.”

**7. Fitch writes that what percentage of decarbonized barrels “burst” in proving?**

One-sixth of one percent.

“In proving the barrels they are set in a frame, so that a large number are discharged at a time by the action of one hammer outside the proof-house. They are loaded with heavy charges of powder and solid slugs of lead, which are fired into a sand-bank, which may be conveniently

formed with an old boiler. Although only a small percentage (for decarbonized steel barrels about one-sixth of one percent) is burst in the proving, in the long run the heavy timbers of the proof house become well scarred with the marks of these violent explosions.”

**8. How much did Congress pay in 1845 for the rights to the invention of the ordinary copper percussion cap (patented in 1822 by Joshua Shaw)?**

\$20,000, which was a princely sum then.

## Conclusion

For our readers who would like to learn more about the history of guns generally, we invite you to see the publications we offer, and specifically see

The Manufacture of Firearms and Ammunition by Charles H. Fitch,.

If I've gotten something wrong, then please let me know and, if possible, cite your source. My goal is to help preserve history and I strive to get it right!

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