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The American Tradition of Self-Made Arms

Joseph G.S. Greenlee
Heartland Institute

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ARTICLE

THE AMERICAN TRADITION OF SELF-MADE ARMS

JOSEPH G.S. GREENLEE*

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*Policy Advisor for Legal Affairs, Heartland Institute; Director of Constitutional Studies, FPC Action Foundation; <http://josephgreenlee.org>. The author thanks Logan Lecates and Joseph Ostini for research assistance.

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INTRODUCTION

Since the earliest colonial days, Americans have been busily manufacturing and repairing arms. In the colonies, the ability to defend one's home and community, hunt, fight wars, and ultimately win American independence depended largely on the ability to produce arms. For the newly independent nation, arms production was critical to repel invasions and insurrections, and eventually, to western expansion. The skill was always valued and in demand, and many Americans made their own arms rather than depend on others.

Americans continued producing their own arms in the nineteenth and twentieth centuries, leading to some of the greatest technological breakthroughs in the history of firearms and ammunition. The freedom to build personal arms enabled innovations that allowed Americans to better defend themselves and their country than ever before.

Meanwhile, restrictions on self-made arms have been rare throughout American history. All restrictions on arms built for personal use have emerged within the last decade, and from only a few states. While still uncommon, legislatures are increasingly targeting homemade arms due to the growing popularity of unfinished receivers and 3D-printed firearms. They worry that prohibited persons will evade legal barriers to acquiring firearms by using these resources to build arms themselves. Whether such restrictions are constitutional depends on whether the Second Amendment was originally understood as protecting self-made arms, and whether the regulations are consistent with America's tradition of firearm regulation.

Part I of this article examines Supreme Court precedent. Section A briefly explains the Court's approach to interpreting the Second Amendment. Section B identifies which arms the Second Amendment protects. And Section C considers whether the Second Amendment includes the activity of acquiring arms.

Part II explores the tradition of building and repairing arms in American history. Section A explains why the knowledge for building arms was

essential in colonial America. Section B highlights the arms shortages throughout the Revolutionary War and how domestic arms production filled the void. And Section C identifies important self-made arms in early American history.

Part III explains how many of the most important innovations in firearms and ammunition were inspired by self-made arms, including the wheellock mechanism, percussion ignition, detachable box magazines, and classic firearms such as the Henry Rifle, M1 Garand, and AR-15.

Part IV covers the history of regulations on arms built for personal use, which are uncommon and of recent vintage.

In conclusion, this article finds that the tradition of building arms for personal use is deeply rooted in American history, and that there is no tradition of regulating self-built arms. Moreover, under Supreme Court precedent, common arms are constitutionally protected regardless of how they are acquired. Thus, the Second Amendment protects an arm that is self-built if that type of arm is commonly possessed.

I. SUPREME COURT PRECEDENTS

In 2008, the Supreme Court decided *District of Columbia v. Heller*,¹ its “first in-depth examination of the Second Amendment.”² In striking a ban on handguns and a ban on functional firearms in the home, the Court established several principles that help determine whether Americans have the right to build their own arms for personal use.

A. *The Second Amendment’s Protections Are Defined by Its Text, Using History and Tradition to Determine Its Original Meaning*

The *Heller* Court conducted a textual analysis of the Second Amendment and, noting that “[c]onstitutional rights are enshrined with the scope they were understood to have when the people adopted them,”³ used history and tradition to inform the original meaning of each word and phrase.⁴ In doing

1. *District of Columbia v. Heller*, 554 U.S. 570 (2008).

2. *Id.* at 635.

3. *Id.* at 634–35.

4.

Part I (pages 574–76) of *Heller* summarized the facts of the case. Part II constituted the majority of the analysis. Part II.A presented a [twenty-four]-page (576–600) textual analysis, informed by English and American history that defined the Second Amendment’s operative and prefatory clauses and their relationship. Parts II.B–D were a 19-page (600–19) historical analysis: II.B explored state constitutions in the founding-era; II.C analyzed the drafting history of the

so, the Court held that handguns are protected arms and therefore cannot be banned⁵ but stated that some “longstanding” regulations—such as prohibitions for felons and the mentally ill—are “presumptively lawful.”⁶

B. *The Second Amendment Protects Common Arms, Regardless of How Those Arms Are Acquired*

In applying its historical analysis, *Heller* specifically addressed “*what* types of weapons” the Second Amendment protects.⁷ The Court concluded that the Second Amendment protects arms that are “typically possessed by law-abiding citizens for lawful purposes.”⁸ In other words, “the sorts of weapons protected [a]re those ‘in common use at the time.’”⁹

By contrast, “the Second Amendment does not protect those weapons not typically possessed by law-abiding citizens for lawful purposes.”¹⁰ Elaborating, the Court explained that it was referring to “dangerous and unusual weapons.”¹¹ Since a weapon that is “unusual” is the antithesis of a weapon that is “common,” an arm “in common use” cannot be “dangerous and unusual,” and is therefore protected.¹² The Supreme Court confirmed that this is the correct approach in *Caetano v. Massachusetts*,¹³ in which it vacated and remanded an opinion of the Massachusetts Supreme Judicial Court upholding a stun gun prohibition.¹⁴ In considering whether stun guns are “dangerous and unusual” weapons, the Court declined to consider the dangerousness of stun guns once it determined that the lower court’s

Second Amendment; and II.D “address[ed] how the Second Amendment was interpreted from immediately after its ratification through the end of the 19th century.” *Heller*, 554 U.S. at 605. II.E (619–26) focused mostly on Supreme Court precedents. Part III (626–28) identified traditional restrictions on the right. Part IV (628–36) addressed the ordinances at issue.

Joseph G.S. Greenlee, *The Historical Justification for Prohibiting Dangerous Persons from Possessing Arms*, 20 WYO. L. REV. 249, 271 n.146 (2020).

5. *Heller*, 554 U.S. at 629.

6. *Id.* at 626–27, 627 n.26.

7. *Id.* at 624.

8. *Id.* at 625.

9. *Id.* at 627 (quoting *United States v. Miller*, 307 U.S. 174, 179 (1939)).

10. *Id.* at 625.

11. *Id.* at 627.

12. *See Friedman v. City of Highland Park*, 784 F.3d 406, 408–09 (7th Cir. 2015) (“[I]f the banned weapons are commonly owned; . . . then they are not unusual.”).

13. *Caetano v. Massachusetts*, 577 U.S. 411 (2016) (per curiam).

14. *Id.* at 412.

unusualness analysis was flawed.¹⁵ Justice Alito’s concurrence, joined by Justice Thomas, elaborated:

As the *per curiam* opinion recognizes, this is a conjunctive test: A weapon may not be banned unless it is *both* dangerous *and* unusual. Because the Court rejects the lower court’s conclusion that stun guns are “unusual,” it does not need to consider the lower court’s conclusion that they are also “dangerous.”¹⁶

In sum, as the *Caetano* concurrence stated, to determine whether arms are protected, “the pertinent Second Amendment inquiry is whether [the arms] are commonly possessed by law-abiding citizens for lawful purposes today.”¹⁷

The Supreme Court has not yet defined “commonly possessed.” There was no need in *Heller* or *McDonald v. City of Chicago*¹⁸ because both cases dealt with handgun bans, and handguns are “the most popular weapon chosen by Americans for self-defense in the home,”¹⁹ so they are unquestionably common. But *Heller* did establish that what matters is whether the arms are among “the sorts of weapons” or “of the kind” that are in common use.²⁰ So the specific features, make, or model of the arm in question need not be common. Nor does it matter how the arm was obtained—i.e., whether the arm was purchased, inherited, won in a raffle, self-manufactured, or otherwise. What matters, according to the Supreme Court, is only whether the *type* of arm is common.²¹

Applied to self-built arms, as long as the type of arm is common, it is protected. For example, since *Heller* held that handguns are protected arms, if an individual constructs his own handgun, it is protected. Assuming rifles are also protected arms, a self-built rifle must be protected by the Second Amendment as well.

15. *Id.*

16. *Id.* at 417 (Alito, J., concurring); *see also* *Fyock v. City of Sunnyvale*, 779 F.3d 991, 997 (9th Cir. 2015) (“To determine [whether a weapon is ‘dangerous and unusual’], we consider whether the weapon has uniquely dangerous propensities *and* whether the weapon is commonly possessed by law-abiding citizens for lawful purposes.” (emphasis added)); *Hollis v. Lynch*, 827 F.3d 436, 448–51 (5th Cir. 2016) (conducting an analysis first to determine whether machineguns are uniquely dangerous, and then conducting another to determine whether machineguns are also unusual).

17. *Caetano*, 577 U.S. at 420 (Alito, J., concurring) (emphasis omitted).

18. *McDonald v. City of Chicago*, 561 U.S. 742 (2010).

19. *District of Columbia v. Heller*, 554 U.S. 570, 629 (2008).

20. *Id.* at 624, 627 (quoting *United States v. Miller*, 307 U.S. 174, 179 (1939)).

21. *Id.* at 622 (quoting *Miller*, 307 U.S. at 178).

While the *per curiam* opinion in *Caetano* focused on the lower court's infidelity to *Heller*, the concurrence went further, analyzing the commonality of stun guns to determine whether they are protected arms. The concurrence concluded that stun guns are common—and therefore protected—because “[h]undreds of thousands of Tasers and stun guns have been sold to private citizens, who it appears may lawfully possess them in 45 States.”²² According to Justices Alito and Thomas, the absolute number of arms and the number of jurisdictions in which those arms are lawful control.²³ To date, this is the most specific indication from the Supreme Court of what factors are relevant in determining commonality.

Applying the *Caetano* factors to self-built arms, it is lawful to build arms for personal use under federal law and in forty-four states, with no special restrictions.²⁴ Only six states and the District of Columbia regulate the manufacture of arms for personal use, and as discussed *infra*, most of those are restrictions (such as requirements that serial numbers be stamped into the firearm) rather than prohibitions.²⁵ This is nearly identical to the jurisdictional analysis that led the *Caetano* concurrence to conclude that stun guns were protected arms.²⁶

Importantly, a ban on common arms cannot be justified by the existence of available alternatives. As *Heller* explained, “[i]t is no answer to say . . . that it is permissible to ban the possession of handguns so long as the possession of other firearms (*i.e.*, long guns) is allowed.”²⁷ A court considers the commonality of the specific type of arm at issue, regardless of what other arms may be available.²⁸

Similarly, modern arms—including arms made through modern methods—are protected as robustly as all other arms.²⁹ In response to the argument, “bordering on the frivolous, that only those arms in existence in

22. *Caetano*, 577 U.S. at 420 (Alito, J., concurring) (alteration in original) (internal quotations omitted) (quoting *People v. Yanna*, 824 N.W.2d 241, 245 (Mich. Ct. App. 2012)).

23. *Id.* at 420 (Alito, J., concurring).

24. *See infra* Part III.

25. *See infra* Part III.

26. *Caetano*, 577 U.S. at 420 (Alito, J., concurring).

27. *District of Columbia v. Heller*, 554 U.S. 570, 629 (2008).

28. *See id.* at 629 (listing reasons for the popularity of the handgun as a chosen weapon of self-defense in America).

29. *See Caetano*, 577 U.S. at 419 (Alito, J., concurring) (clarifying “modern developments” do not “change [the Court’s] interpretation of the right [to bear arms]” (quoting *Heller*, 554 U.S. at 627–28)).

the 18th century are protected by the Second Amendment,” *Heller* explained:

We do not interpret constitutional rights that way. Just as the First Amendment protects modern forms of communications, *e.g.*, *Reno v. [ACLU]*, 521 U.S. 844, 849, 117 S. Ct. 2329, 138 L. Ed. 2d 874 (1997), and the Fourth Amendment applies to modern forms of search, *e.g.*, *Kyllo v. United States*, 533 U.S. 27, 35-36, 121 S. Ct. 2038, 150 L. Ed. 2d 94 (2001), the Second Amendment extends, *prima facie*, to all instruments that constitute bearable arms, even those that were not in existence at the time of the founding.³⁰

This reasoning ensures that arms made via modern methods—including, for example, 3D-printers—fall within the Second Amendment’s protections.

C. *The Second Amendment Protects the Act of Acquiring Arms*

Heller held that the Second Amendment guarantees “the individual right to possess and carry weapons in case of confrontation.”³¹ Because one cannot “keep” or “bear” something without acquiring it, the act of acquiring arms must be included in the Second Amendment’s “right to keep and bear arms.”³² This is true for the same reason that “[t]he right to speak would be largely ineffective if it did not include the right to engage in financial transactions that are the incidents of its exercise.”³³ For “[t]here comes a point . . . at which the regulation of action intimately and unavoidably connected with [a right] is a regulation of [the right] itself.”³⁴ In a recent Sixth Amendment case, Justice Thomas addressed this principle as it relates to the Second Amendment:

Constitutional rights thus implicitly protect those closely related acts necessary to their exercise. . . . The right to keep and bear arms, for example, “implies a corresponding right to obtain the bullets necessary to use them,” *Jackson v. City and County of San Francisco*, 746 F.3d 953, 967 (C.A.9 2014) (internal quotation marks omitted), and “to acquire and maintain proficiency in their

30. *Heller*, 554 U.S. at 582.

31. *Id.* at 592.

32. U.S. CONST. amend. II.

33. *McConnell v. FEC*, 540 U.S. 93, 252 (2003) (Scalia, J., concurring in part, concurring in judgment in part, and dissenting in part), *overruled by* *Citizen v. FEC*, 558 U.S. 310 (2010).

34. *Hill v. Colorado*, 530 U.S. 703, 745 (2000) (Scalia, J., dissenting).

use,” *Ezell v. Chicago*, 651 F.3d 684, 704 (C.A.7 2011). . . . Without protection for these closely related rights, the Second Amendment would be toothless.³⁵

Case law supports the right to acquire arms. One example is *Andrews v. State*,³⁶ an 1871 Tennessee Supreme Court case that *Heller* cited favorably.³⁷ In *Andrews*, the Tennessee Supreme Court—interpreting its state constitution, which it equated with the Second Amendment—declared that “[t]he right to keep arms, necessarily involves the right to purchase them, to keep them in a state of efficiency for use, and to purchase and provide ammunition suitable for such arms, and to keep them in repair.”³⁸

In 2014, the Northern District of Illinois reached the same conclusion: “[C]ertain fundamental rights are protected by the Constitution, put outside government’s reach, including the right to keep and bear arms for self-defense under the Second Amendment. This right must also include the right to *acquire* a firearm”³⁹ The court added that the “acquisition right is far from absolute,” noting “many long-standing restrictions on *who* may acquire firearms (for examples, felons and the mentally ill have long been banned) and . . . restrictions on the sales of arms (for example, licensing requirements for commercial sales).”⁴⁰ Notably, these restrictions have no bearing on the right of law-abiding citizens to build firearms for themselves.

In *Jackson v. City and County of San Francisco*,⁴¹ the Ninth Circuit found that a ban on the sale (but not possession) of hollow-point ammunition implicated the Second Amendment because “eliminating a person’s ability to obtain or use ammunition could thereby make it impossible to use firearms for their core purpose. Thus ‘the right to possess firearms for protection implies a corresponding right’ to obtain the bullets necessary to

35. *Luis v. United States*, 578 U.S. 5, 26–27 (2016) (Thomas, J., concurring).

36. *Andrews v. State*, 50 Tenn. 165 (1871).

37. *See* *District of Columbia v. Heller*, 554 U.S. 570, 608, 614, 629 (2008) (acknowledging the Tennessee Supreme Court’s ruling that the state constitution protects the right to personal self-defense).

38. *Andrews*, 50 Tenn. at 178. Tennessee’s constitution provided “that the citizens of this State have a right to keep and to bear arms for their common defense. But the Legislature shall have power by law, to regulate the wearing of arms, with a view to prevent crime.” *Id.* at 194 (internal quotation marks omitted) (quoting TENN. CONST. art. I, §26).

39. *Ill. Ass’n of Firearms Retailers v. City of Chicago*, 961 F. Supp. 2d 928, 930 (N.D. Ill. 2014).

40. *Id.*

41. *Jackson v. City & Cnty. of San Francisco*, 746 F.3d 953 (9th Cir. 2014).

use them.”⁴² A few years later, in *Teixeira v. County of Alameda*,⁴³ the Ninth Circuit determined that in addition to protecting the right to acquire ammunition, the Second Amendment protects the right to acquire firearms: “As with purchasing ammunition and maintaining proficiency in firearms use, the core Second Amendment right to keep and bear arms for self-defense ‘wouldn’t mean much’ without the ability to acquire arms.”⁴⁴ The court avoided “defin[ing] the precise scope” of the right because the plaintiff “failed to state a claim that the ordinance impedes Alameda County residents from acquiring firearms.”⁴⁵

The Third Circuit, in *Drummond v. Robinson Township*,⁴⁶ considered “[w]hether restrictions on where citizens can purchase . . . firearms implicate the right to bear arms.”⁴⁷ Specifically, Drummond challenged Robinson Township’s ordinance allowing only a “Sportsman’s Club”—defined as a “nonprofit entity formed for conservation of wildlife or game”⁴⁸—to sell arms, effectively prohibiting businesses from selling firearms for a profit. The court held that limiting who could sell firearms to only Sportsman’s Clubs violated the Second Amendment right to acquire arms.⁴⁹

First, the court found a “lack of historical foundations” for the sales restriction.⁵⁰ “[T]he closest comparison” was “rules restricting who could purchase weapons,” such as colonial and reconstruction era laws that “made it illegal to sell guns to enslaved or formerly enslaved people and members of Native American tribes.”⁵¹ But these comparisons were “not especially close,” and “[i]t should go without saying that such race-based exclusions would be unconstitutional today,” thus making them poor precedents.⁵²

42. *Id.* at 967 (internal citation omitted) (quoting *Ezell v. City of Chicago*, 651 F.3d 684, 704 (7th Cir. 2011)).

43. *Teixeira v. Cnty. of Alameda*, 873 F.3d 670 (9th Cir. 2017).

44. *Id.* at 677 (first quoting *Ezell*, 651 F.3d at 704; and then citing *Jackson*, 746 F.3d at 967).

45. *Id.* at 678.

46. *Drummond v. Robinson Twp.*, 9 F.4th 217 (3d Cir. 2021).

47. *Id.* at 222.

48. *Id.* at 224 (internal quotation marks omitted).

49. *Id.* at 234.

50. *Id.* at 227.

51. *Id.* at 228 (first citing *NRA v. ATF*, 700 F.3d 185, 200 (5th Cir. 2012); and then citing *Teixeira v. Cnty. of Alameda*, 873 F.3d 670, 685 (9th Cir. 2017)).

52. *Id.* at 228, 228 n.8 (internal quotation marks omitted) (quoting *Kanter v. Barr*, 919 F.3d 437, 458 n.7 (7th Cir. 2019) (Barrett, J., dissenting)).

Next, noting that “[m]ost purchase . . . restrictions merit intermediate rather than strict scrutiny,”⁵³ the court determined that the purchase restriction failed intermediate scrutiny because “less intrusive tools” than prohibiting for-profit clubs to sell guns were “readily available.”⁵⁴ So the regulation limiting from whom one could acquire firearms was held unconstitutional.⁵⁵

Cases that recognize the Second Amendment right to acquire arms support the right to build one’s own arms.⁵⁶ The definition of “acquire” is “to come into possession or control of often by unspecified means” or “[t]o gain possession or control of.”⁵⁷ To acquire something does not require payment—for example, skills, qualities, and habits are often acquired through personal development. The same is true of firearms.

The Second Amendment’s text makes no distinction between the different methods of acquiring the firearms that Americans have a right to keep and bear.⁵⁸ The text shows no preference for purchasing a firearm built by another individual over building one’s own firearm.⁵⁹ After all, it would not be much of a right if one unnecessarily had to pay others to exercise it—just as the freedom of speech would be diminished if people had to pay a printing press to express themselves in writing. Firearms can cost many thousands of dollars. Some people can produce higher quality arms than are available or affordable. Some can build a specialized firearm that better suits their specific wants or needs than any retail firearm. And ammunition can get so expensive that many people who practice often—particularly competitive shooters—cannot afford retail ammunition. Nothing in the Second Amendment’s text or the Supreme Court’s precedents require Americans to pay more for arms they can produce themselves.⁶⁰

53. *Id.* at 229.

54. *Id.* at 232–33 (internal quotation marks omitted) (quoting *McCullen v. Coakley*, 573 U.S. 464, 494 (2014)).

55. *See id.* at 234 (remanding for the district court “to analyze whatever evidence the Township presents in light of these governing principles”).

56. *See, e.g., Teixeira*, 873 F.3d at 677 (quoting *Ezell v. City of Chicago*, 651 F.3d 684, 704 (7th Cir. 2011)) (recognizing the core of the Second Amendment encompasses the right to acquire arms).

57. *Acquire*, MERRIAM WEBSTER’S COLLEGIATE DICTIONARY (10th ed. 1996); *Acquire*, BLACK’S LAW DICTIONARY (11th ed. 2019).

58. *See* U.S. CONST. amend. II (containing no differentiation between modes of acquisition of firearms).

59. *See id.* (making no mention of purchase versus self-build).

60. *See id.* (having no description of how arms are to be acquired).

The Supreme Court’s explicit language regarding “what types of weapons” the Second Amendment protects establishes that self-built arms, however they may be constructed, are protected as long as they are “of the kind in common use.”⁶¹ Yet a historical analysis of self-built arms is useful to establish how firmly rooted in American history the tradition is, and also, to determine whether any longstanding regulations exist that could be used to justify modern restrictions.

II. THE TRADITION OF SELF-BUILT ARMS IN AMERICAN HISTORY⁶²

A. *Colonial America*

Knowledge of building firearms started in the colonies with gunsmiths, who were extremely important and highly valued in their communities. “From the earliest periods American gunsmiths had made and repaired military firearms.”⁶³ Indeed, the colonists in the first permanent English settlements had the express right to import arms and the items necessary to make them. Binding his “Heirs and Successors,” King James I in 1606 granted Virginia the right to import from Great Britain “the Goods, Chattels, Armour, Munition, and Furniture, needful to be used by them, for their said Apparel, Food, Defence, or otherwise.”⁶⁴ And the 1620 Charter of New England granted colonists the right “to take, load, carry, and transport . . . Shipping, Armour, Weapons, Ordinances, Munition, Powder, Shott, Victuals, and all Manner of Cloathing, Implements, Furniture, Beasts, Cattle, Horses, Mares, and all other Things necessary for the said Plantation, and for their Use and Defence, and for Trade with the People there.”⁶⁵

61. *District of Columbia v. Heller*, 554 U.S. 570, 624 (2008) (emphasis omitted) (quoting *United States v. Miller*, 307 U.S. 174, 179 (1939)).

62. Portions of this section are also found in a complaint filed by the author’s organization prior to publication and are thus without attribution. Complaint at 7–9, *Rigby v. Carney*, No. 1:21-CV-01523 (D. Del. Oct. 27, 2021).

63. HAROLD L. PETERSON, *ARMS AND ARMOR IN COLONIAL AMERICA: 1526–1783*, at 178 (Bramhall House eds., 2d ed. 1956).

64. *The First Charter of Virginia (1606)*, reprinted in 7 *THE FEDERAL AND STATE CONSTITUTIONS: COLONIAL CHARTERS, AND OTHER ORGANIC LAWS OF THE STATES, TERRITORIES, AND COLONIES NOW OR HERETOFORE FORMING THE UNITED STATES OF AMERICA* 3783, 3787–88 (Francis Newton Thorpe ed., 1909).

The definition of “armour,” at the time, included all weapons as well defensive clothing. See *District of Columbia v. Heller*, 554 U.S. 570, 581 (2008) (discussing the definition of “arms”).

65. *The Charter of New England (1620)*, reprinted in 3 *THE FEDERAL AND STATE CONSTITUTIONS: COLONIAL CHARTERS, AND OTHER ORGANIC LAWS OF THE STATES*,

Early colonies hired armorers⁶⁶ to ensure that arms could be produced locally. In 1621, “the Plymouth Company hired London armorer William Pitt who arrived” in the Plymouth Colony “on the *Fortune* in November, 1621.”⁶⁷ Other gunsmiths would soon settle in other towns throughout the colonies. In 1630, Eltweed Pomeroy founded a gunsmithery in Massachusetts Bay Colony.⁶⁸ His family remained in the gunsmith business until 1849.⁶⁹ Maryland had gunsmiths by 1631, a year before the colony was chartered; Salem, Massachusetts had a gunsmith by 1632; New Haven had an armorer by 1640; New Amsterdam had a gunsmith by 1646; and Boston had three gunsmiths by 1650.⁷⁰ Because American colonists relied so heavily on arms for food, sport, and survival, the ability and skill to manufacture arms was cherished. Indeed, “[t]he Colonists in America were the greatest weapon-using people of that epoch in the world. Everywhere the gun was more abundant than the tool.”⁷¹

Harold Gill, who studied gunsmithing in colonial Virginia, explained that “[t]he importance of gunsmithing in Virginia during the colonial period is clear. Gunsmiths were found nearly everywhere: in port towns along the coast, in settled inland areas, and—probably the busiest ones—on the frontier.”⁷² M. L. Brown confirmed that gunsmiths were similarly valued throughout the other colonies:

The influence of the gunsmith and the production of firearms on nearly every aspect of colonial endeavor in North America cannot be overstated, and that pervasive influence continuously escalated following the colonial era

. . . .

Of all the creative craftsmen identified with colonial America[,] the gunsmith can be considered foremost among them, for he frequently labored with the most basic hand tools under the most primitive conditions to fashion

TERRITORIES, AND COLONIES NOW OR HERETOFORE FORMING THE UNITED STATES OF AMERICA 1827, 1834–35 (Francis Newton Thorpe ed., 1909).

66. An armorer was “[a] maker of armor or arms; a manufacturer of instruments of war.” *Armorer*, 1 NOAH WEBSTER, AN AMERICAN DICTIONARY OF THE ENGLISH LANGUAGE (1970).

67. M. L. BROWN, FIREARMS IN COLONIAL AMERICA 149 (1980). Brown notes that “[i]t is possible that English blacksmith James Read repaired firearms at Jamestown in 1607 though no concrete evidence supports that contention.” *Id.*

68. *Id.*

69. *Id.* at 149–50.

70. *Id.* at 150.

71. 1 CHARLES WINTHROP SAWYER, FIREARMS IN AMERICAN HISTORY 9 (1910).

72. HAROLD B. GILL, JR., THE GUNSMITH IN COLONIAL VIRGINIA 1 (1974).

or repair a complex and inordinately vital commodity needed for survival in a pristine and generally hostile environment.⁷³

Firearms historian Charles Winthrop Sawyer explained,

In the large gunsmith shops of the cities it is probable that many minds were given to the making of a gun But in the smaller shops which formed the great majority—mere cabins on the outskirts of the wilderness—one man with or without an apprentice did every part of the work.⁷⁴

The gunsmiths who built their arms entirely themselves did not always achieve perfection, but their arms were adequate to serve the frontiers:

Those lone, isolated workers were men of wonderful resource; poor, and without machinery, they not only made guns but also the tools with which to do their work. They were ignorant of science, and they cared nothing for cause, but they were skilful in effect. They could not calculate in advance the chamber pressure in foot-tons, the velocity of the bullet, bearing surface, friction, trajectory, flip, drift, penetration, and work in accord with the calculations; they did not bore their barrels correct to the five-thousandth part of an inch; they could not cut all the grooves of exactly the same width and depth; but after the gun was done they adjusted the bullet, the powder, and the sights until the rifle would shoot into the bull's-eye at a measured distance—perhaps a two-inch bull's-eye at eight rods would do for the average, some would better it.⁷⁵

Despite their common imperfections, some of the most popular and important firearms in American history were produced by these solo gunsmiths. For example, “[t]he gun makers who turned out Kentucky rifles . . . were capable of producing the whole gun”⁷⁶

“The number of gunsmiths active in North America dramatically escalated with the inordinate population explosion during the first quarter

73. BROWN, *supra* note 67, at 149.

74. 1 SAWYER, *supra* note 71, at 145.

75. *Id.* at 145–46.

76. 2 J.F. HAYWARD, *THE ART OF THE GUNMAKER* 273 (1963); *cf.* HENRY J. KAUFFMAN, *EARLY AMERICAN IRONWARE: CAST AND WROUGHT* 111 (1956) (“It is known that, at times, a gun was made by a number of craftsmen; and that at other times, a complete gun was made by one man.”); JAMES B. WHISKER, *THE GUNSMITH’S TRADE* 5 (1992) (“In small shops one tradesman performed all operations required to make a gun. . . . There was no division of labor . . .”).

of the eighteenth century.”⁷⁷ James Whisker, a historian of gunsmiths, believes there were over 4,000 gunsmiths and armorers in colonial America.⁷⁸ But because very often “[t]he shop of the isolated gunsmith was a log cabin” in the remote wilderness,⁷⁹ it is difficult to find records of many of them.⁸⁰

Most gunpowder during the early colonial days was homemade. In 1642, the Massachusetts Bay Colony required colonists to build compost piles to increase the availability of the nitrate needed for gunpowder.⁸¹ This undertaking became known as the birth of America’s chemical industry.⁸² Lead was scarce, too, so colonists smelted amounts from small galena deposits.⁸³ “Like gunpowder manufacture, casting bullets was a common household enterprise”⁸⁴

B. *Revolutionary War*

During the Revolutionary War, when the British attempted to prevent the Americans from acquiring firearms and ammunition, the Americans needed to build their own arms to survive.⁸⁵

As tensions simmered in the colonies, the British attempted to disarm the Americans by suffocating their supply of gunpowder. The British prevented colonists from accessing their gunpowder reserves stored in central powder houses and in some circumstances, confiscated the powder.⁸⁶ In response,

77. BROWN, *supra* note 67, at 242.

78. WHISKER, *supra* note 76, at 74; *see also* CLAYTON E. CRAMER, LOCK, STOCK, AND BARREL: THE ORIGINS OF AMERICAN GUN CULTURE 30 (2018) (“[T]he evidence is clear that gunsmiths were very common in Colonial, Revolutionary, and Early Republic America.”); CRAMER, *supra*, at 45 (“In the several decades before the Revolution, the number of surviving firearms that are clearly American-made increase[d].”).

79. 1 SAWYER, *supra* note 71, at 146.

80. WHISKER, *supra* note 76, at 74.

81. BROWN, *supra* note 67, at 127.

82. *Id.* “John Winthrop, Jr., the governor’s son, was put in charge of the enterprise” *Id.*

83. *Id.* at 128.

84. *Id.*

85. *See id.* at 241 (“Despite the rapid proliferation of gunsmiths in colonial America at the beginning of the eighteenth century, the colonists were still obliged to look to the mother country for adequate supplies of firearms, gunpowder, and related ordnance material and in British America they remained dependent until the War of Independence.”).

86. For example, Massachusetts’s Royal Governor Thomas Gage “order’d the Keeper of the Province’s Magazine not to deliver a kernel of powder (without his express order) of either public or private property.” Correspondence (July 22, 1774), *in* LETTERS OF JOHN ANDREWS, ESQ., OF BOSTON, 1772–1776, at 17, 19 (Winthrop Sargent ed., 1866); *see* Correspondence (Sept. 2, 1774), *in* LETTERS OF JOHN ANDREWS, *supra*, at 38, 39 (“A Guard of Soldiers is set upon the Powder house at

the Americans organized raids to steal gunpowder from the British⁸⁷ and encouraged the domestic manufacture of gunpowder.⁸⁸

The benefits of the home production of ammunition became evident during the Powder Alarm on September 1, 1774.⁸⁹ Redcoats were sent to the Charlestown powder house to seize hundreds of barrels of gunpowder.⁹⁰ When the colonists learned of the plot, they “began to collect in large bodies, with their arms, provisions, and ammunition, determining by some means to give a check to a power which so openly threatened their destruction, and in such a clandestine manner rob them of the means of their defence.”⁹¹ According to a patriot in Litchfield, Connecticut, while

the back of ye. Common, so that people are debar'd from selling their own property’); Letter from Thomas Gage to Earl of Dartmouth (Nov. 2, 1774), in 1 AMERICAN ARCHIVES, FOURTH SERIES 951, 951 (Peter Force ed., 1843) (indicating Gage issued “an order to the Storekeeper not to deliver out any Powder from the Magazine, where the Merchants deposite it”); O.W. Stephenson, *The Supply of Gunpowder in 1776*, 30 AM. HIST. REV. 271, 272 (1925) (“Within a few hours of the time when the minute-men faced the redcoats on Lexington green and at Concord bridge, Governor Dunmore, down in Virginia, laid hold of the principal supplies in the Old Dominion.”); BROWN, *supra* note 67, at 298 (“[T]he American Revolution was nearly precipitated in Virginia on the night of April 20–21[, 1775], for in Williamsburg Gov. Dunmore had ordered the Royal Marines to remove the colony gunpowder supply from the magazine. As in Massachusetts the plan was discovered and the militia called to arms. . . . Lord Dunmore . . . placated the irate populace by making immediate restitution for the powder.”).

Because the black powder of the eighteenth century was so volatile, large quantities were sometimes stored in central powder houses.

87. “In May, 1775, the ‘Liberty Boys’ in Savannah, Georgia, seized 600 pounds stored in the magazine of that town, and, July 10, one of the king’s ships was boarded and something like 12,700 pounds were carried away.” Stephenson, *supra* note 86, at 272.

The Americans sometimes preempted gunpowder seizures by emptying powder houses before the British could. For example, on September 14, 1774, Abigail Adams informed John Adams that in their hometown of Braintree, Massachusetts, “about 200 Men, preceeded by a horse cart, . . . marched down to the powder house from whence they took the powder and carried” it away, “[i]n consequence of the powders being taken” from Charlestown. Letter from Abigail Adams to John Adams (Sept. 14, 1774), in THE BOOK OF ABIGAIL & JOHN: SELECTED LETTERS OF THE ADAMS FAMILY 1762-1784, at 71, 72 (L.H. Butterfield ed., 2002). Knowing she was a patriot, the men offered her powder on their way past the Adams home. *Id.*

88. See *infra* Part II B.2 (discussing the official requests made by the colonies to its citizens for arms production). “Powder mills had operated in the colonies during the seventeenth and eighteenth centuries, but they fell into disrepair after the French and Indian War. In 1774 the only significant mill in the colonies was located on Frankford Creek, just north of Philadelphia.” David L. Salay, *The Production of Gunpowder in Pennsylvania During the American Revolution*, 99 PENN. MAG. HIST. & BIOGRAPHY 422, 423 (Oct. 1975).

89. Charles Hopkins Clark, *The 18th Century Diary of Ezra Stiles*, 208 N. AM. REV. 410, 419 (Sept. 1918).

90. *Id.*

91. Unsigned report (Sept. 5, 1774), in 1 AMERICAN ARCHIVES, *supra* note 86, at 762, 762.

the men hurried to save the gunpowder, women and children stayed home and produced ammunition:

[A]ll along were armed men rushing forward, some on foot, some on horseback; at every house women and children making cartridges, running bullets, making wallets, baking biscuit, crying and bemoaning, and at the same time animating their husbands and sons to fight for their liberties tho not knowing whether they should ever see them again.⁹²

The British ransacked the powder house before the colonists arrived, but the Powder Alarm demonstrated the convenience of at-home arms production and its ability to obstruct a tyrannical government.

Frustrated with the Americans' circumvention of the gunpowder restrictions, King George III cut off the importation of arms and ammunition into the colonies on October 19, 1774.⁹³ But the Americans

92. Charles Hopkins Clark, *supra* note 89, at 419.

93. 5 ACTS OF THE PRIVY COUNCIL OF ENGLAND, COLONIAL SERIES, A.D. 1766–1783, at 401 (Burlington, Can.: TannerRitchie Pub., 2005) (James Munro & Almeric Fitzroy eds., 1912). Secretary of State Lord Dartmouth sent a letter that day “to the Governors in America,” announcing “His Majesty’s Command that [the governors] do take the most effectual measures for arresting, detaining and securing any Gunpowder, or any sort of arms or ammunition, which may be attempted to be imported into the Province under your Government.” Letter from Earl of Dartmouth to the Governors in America (Oct. 19, 1774), in 8 DOCUMENTS RELATIVE TO THE COLONIAL HISTORY OF THE STATE OF NEW YORK 509, 509 (1857). The order was initially ordered for six months but was “repeatedly renewed, remaining in effect until the Anglo-American peace treaty in 1783.” David B. Kopel, *How the British Gun Control Program Precipitated the American Revolution*, 6 CHARLESTON L. REV. 283, 297 (2012).

Soon after the order was issued, the British deployed “several capital ships of war, and six cutters” in the Atlantic “to obstruct the American trade, and prevent all European goods from going there, particularly arms and ammunition.” 1 FRANK MOORE, DIARY OF THE AMERICAN REVOLUTION 61 (1860) (entry of Apr. 4, 1775); *see also* STEPHEN P. HALBROOK, THE FOUNDERS’ SECOND AMENDMENT: ORIGINS OF THE RIGHT TO KEEP AND BEAR ARMS 64 (2008) (discussing a “letter from Bristol dated the day after Christmas,” which stated “several frigates to be fitted out immediately to sail for America, to be stationed there in order to cruise along the coasts, to prevent any ammunition or arms being sent to the Americans by any foreign power”); *Providence, January 14*, PROVIDENCE GAZETTE, Jan. 14, 1775, reprinted in 1 NAVAL DOCUMENTS OF THE AMERICAN REVOLUTION 62 (William Bell Clark ed., 1964) (“Orders have been given for the seizing every Ship, of what Nation soever, employed in conveying Arms or Ammunition to the Americans.”).

They had some success. For instance, in October 1774, an armed British cutter near Amsterdam blockaded a Rhode Island vessel that “had been sent expressly to load different sorts of firearms, and had already taken on board forty small pieces of cannon.” DANIEL A. MILLER, SIR JOSEPH YORKE AND ANGLO-DUTCH RELATIONS 1774–1780, at 39 (1970). In January 1775, “[t]wo vessels, laden with gun-powder and other military utensils, bound for the other side of the Atlantick, were stopped at Gravesend . . . by the out clearers, in consequence of the King’s proclamation.” *London, Oct. 27.*, PA. GAZETTE, Dec. 21, 1774, at 2.

evaded the import ban as well, by finding ways to smuggle arms shipments from other countries,⁹⁴ stealing arms from the British,⁹⁵ and manufacturing their own arms.⁹⁶ In fact, some of the colonists who fought in the Battle of Lexington “had brought along a handful of homemade musket balls.”⁹⁷

At the start of the war, there were few factories capable of manufacturing large quantities of firearms, gunpowder, or edged weapons in the colonies. Indeed, “the British . . . had prohibited any large-scale manufacturing facility for guns in the colonies” for decades leading up to the war.⁹⁸ And prior to May 1775, there may have been only one powder mill in operation.⁹⁹ To sustain themselves against a large and well-supplied British military throughout the eight-year war, the Americans relied on gunsmiths, individuals with knowhow from working on their own arms, and Americans who were willing to learn the art of arms manufacturing. When the colonies

94. Benjamin Franklin orchestrated the importation of arms from Spanish, French, and Dutch. See *London, Feb. 16*, VA. GAZETTE, Apr. 22, 1775, at 1 (“It is beyond doubt that six large ships sailed lately, three from Holland, and the rest from France, with arms, ammunition, and other implements of war, for our colonies, and more are absolutely preparing for the same place.”); MILLER, *supra* note 93, at 41 (In May 1776, “eighteen Dutch ships . . . left Amsterdam . . . with powder and ammunition for America,” in addition to “powder shipments disguised as tea chests, rice barrels, *et cetera*.”); Salay, *supra* note 88, at 423 (“From May to June alone, in 1775, the Pennsylvania Committee spent £20,300 (plus £4,000 for freight) to procure arms, ammunition, and medicine from Europe . . .”); Stephenson, *supra* note 86, at 279–80 (discussing the French contribution to increased gunpowder imports in the face of the British blockade).

95. For example, when the Boston Committee of Correspondence discovered the location of ships containing seized arms near New Hampshire, it sent Paul Revere to deliver the news to New Hampshire. See Letter from Governor Wentworth to Governor Gage (Dec. 14, 1774), in 18 PARLIAMENTARY HISTORY OF ENGLAND, FROM THE EARLIEST PERIOD TO THE YEAR 1803, at 145, 145 (1813) (“Yesterday in the afternoon, Paul Revere arrived in this town, express from a committee in Boston to another committee in this town . . .”). As New Hampshire’s Royal Governor John Wentworth explained, around 400 patriots created “an insurrection . . . and . . . attacked, overpowered, wounded and confined the captain, and thence took away all the King’s powder.” Letter from Governor Wentworth to Governor Gage (Dec. 16, 1774), in 18 PARLIAMENTARY HISTORY OF ENGLAND, *supra*, at 146, 146–47; see also Letter from Governor Wentworth to Governor Gage (Dec. 14, 1774), *supra* (stating that “about four hundred men were collected together, and immediately proceeded to his Majesty’s castle . . . and forcibly took possession thereof”). The patriots took “upwards of 100 barrels of powder, 1500 stand of small arms, and several pieces of light cannon.” Letter from Hugh Percy to Grey Cooper (after Dec. 13, 1774), in LETTERS OF HUGH EARL PERCY FROM BOSTON AND NEW YORK, 1774–1776, at 46, 46 (Charles Bolton ed., 1902).

96. See *infra* Part II B.1 (discussing how the colonists were forced to make their own arms because of the arms shortage during the Revolution).

97. DAVID HARSANYI, *FIRST FREEDOM: A RIDE THROUGH AMERICA’S ENDURING HISTORY WITH THE GUN* 43 (2018).

98. *Id.* at 68.

99. Salay, *supra* note 88, at 423.

faced major arms shortages throughout the war, domestic arms manufacturing filled the void.

1. Arms Shortages

George Washington sent a dire warning to Congress about the scarcity of gunpowder on July 10, 1775:

Upon the article of ammunition, I must reecho the former complaints on this subject. We are so exceedingly destitute, that our artillery will be of little use, without a supply both large and seasonable. What we have must be reserved for the small arms, and that managed with the utmost frugality.¹⁰⁰

In August, Brigadier General John Sullivan wrote to Congress “upon a matter that requires the utmost secrecy”: that “we have not powder Enough in the whole army to furnish half a pound a man.”¹⁰¹ General Washington “was so struck” upon discovering the shortage, Sullivan explained, “that he did not utter a word for half an hour.”¹⁰²

Writing to Congress that same month, Washington again addressed “our melancholy situation,” reiterating “the necessity of an immediate supply” of gunpowder, and emphasizing that “the existence of the army, and the salvation of the Country, depends upon something being done” to increase the powder supply.¹⁰³ Until then, Washington warned, the powder shortage must “be kept a profound secret.”¹⁰⁴ On Christmas in 1775, Washington wrote, “Our want of powder is inconceivable. A daily waste

100. Letter from General Washington to the President of Congress (July 10, 1775), in 3 THE WRITINGS OF GEORGE WASHINGTON; BEING HIS CORRESPONDENCE, ADDRESSES, MESSAGES, AND OTHER PAPERS, OFFICIAL AND PRIVATE 17, 22 (Jared Sparks ed., 1833).

101. Letter from General Sullivan to the Committee of Safety (Aug. 5, 1775), in 7 DOCUMENTS AND RECORDS RELATING TO THE PROVINCE OF NEW-HAMPSHIRE, FROM 1764 TO 1776, at 572, 572 (Nathaniel Bouton ed., 1873). Washington described the quantity as “not more than nine rounds a man.” 1 GEORGE WASHINGTON, THE LIFE OF GENERAL WASHINGTON 141 (Charles W. Upham ed., 1851). General Nathanael Greene expressed similar dismay, writing from Prospect Hill: “Oh, that we had plenty of powder; I should then hope to see something done here for the honour of *America*.” Letter from General Greene to Henry Ward (Dec. 18, 1775), in 4 AMERICAN ARCHIVES, FOURTH SERIES 311, 312 (Peter Force ed., 1843).

102. Letter from General Sullivan to the Committee of Safety (Aug. 5, 1775), *supra* note 101.

103. 1 WASHINGTON, *supra* note 101, at 142.

104. *Id.*

and no supply administers a gloomy prospect.”¹⁰⁵ And the following month he lamented that the army was “without any money in our treasury, powder in our magazines, arms in our stores.”¹⁰⁶

John Adams, updating James Warren about the gunpowder supply in Boston, wrote, “Every Thing, has been done, and is now doing, to procure the *Unum Necessarium*”—i.e., the one necessity, gunpowder—but regretted that he could not offer “a more agreeable account of the Salt Petre Works.”¹⁰⁷

Joseph Hewes represented North Carolina in the Continental Congress and later signed the Declaration of Independence.¹⁰⁸ He voiced concern on November 9, 1775, that

Arms and Ammunition . . . are very scarce throughout all the Colonies. I find on enquiry that neither can be got here, all the Gunsmiths in this Province are engaged and cannot make Arms near so fast as they are wanted. Powder is also very Scarce notwithstanding every effort seems to have been exerted both to make and import.¹⁰⁹

On February 13, 1776, Hewes expressed frustration over the effectiveness of the British arms embargo and declared that “Americans ought to be more industrious in making those articles at home, every Family should make saltpetre, every Province have powder Mills and every body encourage the making of Arms.”¹¹⁰

In sum, “[t]he writings of civil and military leaders of the time are crowded with expressions bewailing the scarcity of powder; and many a military movement was either not attempted or was abandoned because of this lack.”¹¹¹ To overcome this potentially disastrous obstacle, the colonists

105. Letter from George Washington to Joseph Reed (Dec. 25, 1775), in 4 THE WRITINGS OF GEORGE WASHINGTON FROM THE ORIGINAL MANUSCRIPT SOURCES 1745–1799, at 184, 185 (John C. Fitzpatrick ed., 1930).

106. Letter from George Washington to Joseph Reed (Jan 14, 1776), in 4 THE WRITINGS OF GEORGE WASHINGTON, *supra* note 105, at 240, 241.

107. Letter from John Adams to James Warren (Sept. 26, 1775), in 3 THE ADAMS PAPERS: THE PAPERS OF JOHN ADAMS 168, 168 (Robert J. Taylor ed., 1979).

108. SANDERSON’S BIOGRAPHY OF THE SIGNERS TO THE DECLARATION OF INDEPENDENCE 664–65, 668 (Robert T. Conrad ed., 1846).

109. Letter from Joseph Hewes to Samuel Johnston (Nov. 9, 1775), in 10 THE COLONIAL RECORDS OF NORTH CAROLINA, 1775–1776, at 314, 314 (William L. Saunders ed., 1890).

110. Letter from Joseph Hewes to Samuel Johnston (Feb. 13, 1776), in 10 THE COLONIAL RECORDS OF NORTH CAROLINA, *supra* note 109, at 446, 447.

111. Stephenson, *supra* note 86, at 280.

frantically incentivized domestic arms production to overcome the embargo of firearms and gunpowder, as President of the Continental Congress John Hancock explained to Washington in March 1776:

With regard to arms, I am afraid we shall, for a time, be under some difficulty. The importation is now more precarious and dangerous. To remedy this, a Committee is appointed to contract for the making arms; and, as there is a great number of gunsmiths in this and the neighbouring Colonies, I flatter myself we shall soon be able to provide ourselves without risk or danger.”¹¹²

While the importation of arms remained indispensable and contributed the majority of arms used during the war,¹¹³ domestic production was critical to securing enough firearms and ammunition to maintain the necessary supply of both, especially when imports slumped.¹¹⁴ As Washington wrote to Rhode Island's governor, “No Quantity [of powder], however Small, is beneath notice”¹¹⁵ As the following governmental requests demonstrate, the same was true for firearms.

2. Official Requests for Domestic Arms Production

Faced with critical arms shortages from the import bans, many Americans remained confident they had the skills and resources to build enough arms domestically. John Adams believed that Americans “could make a sufficient quantity of both” arms and ammunition.¹¹⁶ He added, “We have many manufacturers of fire-arms now, whose arms are as good as any in the world. Powder has been made here, and may be again, and so may saltpetre. . . . We have all the materials in great abundance, and the process is very simple.”¹¹⁷ A “Gentleman of Philadelphia” wrote to a member of the British Parliament to warn that the British arms embargo would “be rendered ineffectual by a manufactory of Gunpowder, which has lately been

112. Letter from John Hancock to George Washington (Mar. 6, 1776), in 5 AMERICAN ARCHIVES, FOURTH SERIES. 83, 83 (Peter Force ed., 1843).

113. See, e.g., Stephenson, *supra* note 86, at 277 (listing the amounts of saltpetre and gunpowder imported by each colony prior to fall of 1777).

114. See Salay, *supra* note 88, at 441 (reporting 34.6% of gunpowder used in the first two years of war was produced by American mills).

115. Letter from George Washington to Governor Nicholas Cooke (Aug. 4, 1775), in 3 THE WRITINGS OF GEORGE WASHINGTON FROM THE ORIGINAL MANUSCRIPT SOURCES 1745–1799, at 385, 386 (John C. Fitzpatrick ed., 1935).

116. JOHN ADAMS, *Novanglus*, in 4 THE WORKS OF JOHN ADAMS 11, 39 (Charles Francis Adams ed., 1851).

117. *Id.* at 39–40.

set on foot in this Province,” and because there are “Gunsmiths enough in this Province to make one hundred thousand stand of Arms in one year.”¹¹⁸

The Americans had no choice but to find out. On December 8, 1774, the Massachusetts Provincial Congress made recommendations “to the people.”¹¹⁹ Noting that “firearms have been manufactured in several parts of this colony,” the Provincial Congress “recommend[ed] the making [of] gun-locks, and furniture” as well as “earnestly recommend[ing] the making of saltpetre, as an article of vast importance.”¹²⁰ While the Provincial Congress lamented “the ruins of several powder mills” and asserted that “every man among us who loves his country, must wish the establishment of manufactories for that purpose [of manufacturing gunpowder],” it relied on the people to pick up the slack in the meantime through private manufacture.¹²¹

Continuing to rely on the colonists’ knowhow, on February 15, 1775, the Provincial Congress directed the towns and districts within the colony to “encourage such persons as are skilled in the manufacturing of firearms and bayonets, diligently to apply themselves thereto, for supplying such of the inhabitants as may still be deficient.”¹²² The Congress promised to purchase “so many effective arms and bayonets as can be delivered in a reasonable time, upon notice given to this Congress at its next session.”¹²³ The following month, the Provincial Congress sought the “number of men . . . in the province acquainted with the business of making firearms,” presumably to continue to increase the domestic production.¹²⁴

On August 2, 1775, a Committee appointed by Maryland’s Provincial Convention “to enquire into the practicability of establishing a manufactory of Arms within this Province” determined that “Arms may be furnished sooner, and at less expense by engaging immediately all Gun Smiths, and

118. Extract of a Letter from a Gentleman of Philadelphia to a Member of the British Parliament (Dec. 24, 1774), in 1 AMERICAN ARCHIVES, *supra* note 86, at 1066, 1066.

119. Report of the First Provincial Congress of Massachusetts (Dec. 8, 1774), in THE JOURNALS OF EACH PROVINCIAL CONGRESS OF MASSACHUSETTS IN 1774 AND 1775, AND OF THE COMMITTEE OF SAFETY 62, 63 (William Lincoln ed., 1838).

120. *Id.* at 63–64.

121. *Id.* at 64.

122. Report of the Second Provincial Congress of Massachusetts (Feb. 15, 1775), in THE JOURNALS OF EACH PROVINCIAL CONGRESS OF MASSACHUSETTS, *supra* note 119, at 100, 103.

123. *Id.*

124. Report of the Second Provincial Congress of Massachusetts (Mar. 23, 1775), in THE JOURNALS OF EACH PROVINCIAL CONGRESS OF MASSACHUSETTS, *supra* note 119, at 109, 110.

others concerned in carrying on that business.”¹²⁵ The Committee noted many gunsmiths already existing in the province, and figured that “from the great encouragement Artificers in this business will receive, their number will soon be greatly increased.”¹²⁶ The Committee assumed that people capable of building firearms but not engaged in the business would be incentivized to make guns for the province. The following month, Maryland’s Council of Safety, “desirous of forwarding the Intentions of the Convention in promoting the Manufacture of Salt, Saltpetre, Gunpowder, and fire Arms,” published an advertisement in the *Maryland Gazette* seeking proposals from “any persons who are inclined to engage, on liberal Encouragement, in the Manufacture of Fire Arms, or to erect a powder Mill . . . or Salt, or Saltpetre-works.”¹²⁷

Twelve days later, on September 13, 1775, Commissioners representing Virginia sought “a further number of Gunsmiths, *and other artists*, capable of managing that business in its various branches” to help supply the colony during the war.¹²⁸

Finding that “it is of the utmost Importance to the Welfare and Happiness of these Colonies, that the Manufacturing of Fire Arms & Provisions of Military Stores be effectually promoted & encouraged,” the Massachusetts House of Representatives on November 4, 1775, empowered military officers to acquire “all Fire-Arms which Shall be offered them for Sale,” if they met manufacturing specifications.¹²⁹ The solicitation was aimed at “the Manufacturers of Fire Arms” in each town as well as “the Inhabitants of each Town.”¹³⁰ The act also allocated one hundred pounds for “an Armorer *or some other Judicious Person*” to invest in “Steel, Files & other Tools necessary to carry on [a] manufactory.”¹³¹ Thus, the House of Representatives expected a non-armorer to have the knowledge to identify and acquire the materials needed to build a large quantity of arms.

125. Report of the Maryland Convention (Aug. 2, 1775), in 11 ARCHIVES OF MARYLAND 64, 64–65 (William Hand Browne ed., 1892).

126. *Id.* at 65.

127. Report of the Council of Safety of Maryland (Sept. 1, 1775), in 11 ARCHIVES OF MARYLAND, *supra* note 125, at 77, 77.

128. Commissioners Report (Sept. 13, 1775), in 3 AMERICAN ARCHIVES, FOURTH SERIES 700, 700 (Peter Force ed., 1843) (emphasis added).

129. 19 THE ACTS AND RESOLVES, PUBLIC AND PRIVATE, OF THE PROVINCE OF THE MASSACHUSETTS BAY 134–35 (1918).

130. *Id.* at 135.

131. *Id.* (emphasis added).

In January 1776, the New Hampshire House of Representatives resolved to pay anyone who “made” a firearm to specification. “[E]very good firearm Manufactured in this Colony” was rewarded with “Three pounds for Each.”¹³² That same month, Pennsylvania began offering five shillings per pound of saltpeter.¹³³

The following month, South Carolina’s Provincial Congress appointed commissioners “to contract for the making, or purchasing already made, any number, not exceeding one thousand stand, of good Rifles, with good bridle-locks, and proper furniture” for up to “thirty Pounds each,” and “[a]lso for the making, or purchasing already made, one thousand stand of good smoothbored Muskets” for up to “twenty Pounds each.”¹³⁴

In March 1776, a committee of New York’s Provincial Congress published notice “in all the publick Newspapers in this Colony” that “this Committee are ready to receive proposals from, and treat with, any person or persons who are willing to engage in manufacturing good Muskets, or the Locks, Barrels, or any necessary parts thereof.”¹³⁵ The Provincial Congress offered rewards for the manufacturers who could produce the greatest number of arms for the colony but excluded “any person with whom the Congress or Committee of Safety of this Colony have already contracted”—thus incentivizing those capable of manufacturing arms but not necessarily in the firearms business.¹³⁶

A month later, the North Carolina Provincial Congress called for “all Gunsmiths, and other mechanicks, who have been accustomed to make, or assist in making Muskets” to be recruited to manufacture arms for the colony.¹³⁷ The Congress ensured “that they be furnished, at the expense of this Colony, with tools, implements and utensils, and materials for carrying on the said work.”¹³⁸

132. Report of the House (Jan. 12, 1776), in 8 DOCUMENTS AND RECORDS RELATING TO THE STATE OF NEW-HAMPSHIRE DURING THE PERIOD OF THE AMERICAN REVOLUTION, FROM 1776 TO 1783, at 13, 15–16 (Nathaniel Bouton ed., 1874).

133. Salay, *supra* note 88, at 427.

134. Report of the South Carolina Provincial Congress (Feb. 24, 1775), in 5 AMERICAN ARCHIVES, *supra* note 112, at 580, 581.

135. Report of the New York Committee of Safety (Mar. 30, 1776), in 5 AMERICAN ARCHIVES, *supra* note 112, at 1418, 1418.

136. Report of the New York Provincial Congress (Mar. 16, 1776), in 5 AMERICAN ARCHIVES, *supra* note 112, at 388, 392.

137. Report of the New Hampshire Congress (Apr. 24, 1775), in 5 AMERICAN ARCHIVES, *supra* note 112, at 1336, 1338.

138. *Id.*

On June 14, 1776, the Connecticut General Assembly instructed “the committee who have procured fire-arms to be made” in the colony to distribute them to the troops throughout the colony.¹³⁹

That the colonies were targeting persons outside the firearms business was made clear by efforts to teach the public how to manufacture arms. “Saltpeter recipes . . . appeared in American newspapers and pamphlets for patriots willing to collect the ‘effluvia of animal bodies’ from outhouses, barns, stables, tobacco yards, and pigeon coops, preferably ‘moistened from time to time with urine.’”¹⁴⁰

Many patriot communities operated charcoal kilns and artificial niter beds, collecting human urine and taking it to a place with dry, sandy soil where it was dumped and eventually leached out small quantities of saltpeter. . . . [E]ven the earth under compost heaps was processed to recover saltpeter, while also searched were attics, caves, church steeples, lofts, and other bird rookeries. Small amounts of sulphur were recovered from the earth surrounding sulphurous springs and the water was distilled in the quest for that vital commodity.¹⁴¹

Paul Revere “engraved a plate diagramming how to refine saltpeter, an essential component in the making of gunpowder,” and published his instructions in the *Royal American Magazine* in August 1774.¹⁴² On March 14, 1776, New York’s Provincial Congress printed 3,000 copies of Henry Wisner’s forty-page *Essays Upon the Making of Salt-Petre and Gun-Powder*.¹⁴³ And on March 31, 1776, Abigail Adams offered to send John

139. THE PUBLIC RECORDS OF THE COLONY OF CONNECTICUT, FROM MAY 1775 TO JUNE 1776, at 419 (Charles J. Hoadly ed., 1890).

140. RICK ATKINSON, THE BRITISH ARE COMING 127–28 (2019).

141. BROWN, *supra* note 67, at 302.

142. HALBROOK, *supra* note 93, at 33.

143. NEW YORK IN THE REVOLUTION AS COLONY AND STATE SUPPLEMENT 58 (Frederic G. Mather ed., 1901); *see also* CATALOGUE OF MANUSCRIPTS AND RELICS IN WASHINGTON’S HEAD-QUARTERS, NEWBURGH, N.Y. 55 (E.M. Ruttenber ed., 1890) (listing “Essays upon the making of Salt-Petre and Gun-Powder Published by order of the Committee of Safety of the Colony of New York” among the books and pamphlets present in Washington’s Headquarters).

Wisner was a New York delegate to the First and Second Continental Congresses—at the latter, voting in favor of Independence—and served on the committee that drafted New York’s first state constitution. G. FRANKLIN WISNER, THE WISNERS IN AMERICA AND THEIR KINDRED 35, 64 (1918).

During the Revolution, Wisner—a farmer and politician—manufactured spears, bayonets, and gun flints, collected lead, and operated a successful gunpowder mill that produced one thousand pounds per week. *Id.* at 38, 64, 70–71. Regarding the instructions he published to inform the public about how to make gunpowder, Wisner wrote:

Adams instructions for manufacturing powder that had been circulated in Massachusetts: “I have lately seen a small Manuscrip de[s]cribing the proportions for the various sorts of powder, fit for cannon, small arms and pistols. If it would be of any Service your way I will get it transcribed and send it to you.”¹⁴⁴ Indeed, “[p]rinting presses throughout the colonies worked overtime, making and distributing broadsides and pamphlets with explicit instructions for manufacturing gunpowder and locating and preparing the ingredients.”¹⁴⁵

On January 3, 1776, Pennsylvania’s Committee of Safety—which included future signers of the Constitution Benjamin Franklin, George Clymer, Robert Morris, and John Dickinson—initiated a program to have persons familiar with the process “instruct the inhabitants of the different Counties in the manufactory of Salt Petre,” and also to have handbills “printed & distributed in the English & German Languages, setting forth the process for extracting and refining Salt Petre.”¹⁴⁶ “A number of counties responded by establishing model works and providing demonstrations. During 1775 and 1776, these efforts produced tangible results as enthusiastic patriots delivered amounts of saltpeter varying from ten ounces to 400 pounds,”¹⁴⁷ and the colony, which had one operating mill a year earlier, benefited from nine new mills.¹⁴⁸

The efforts were not limited to gunpowder production—instructions for manufacturing firearms were also distributed. For example, on April 2, 1776, Pennsylvania’s Committee of Safety approved a contract with three

Having for many months been seriously affected with the great disadvantage the colonies labor under for want of ammunition, I thought it my duty to apply myself to the attainment of those necessary arts of making saltpetre and gunpowder, and having far exceeded my expectations in both manufactures, I think myself further obliged to communicate the so much needed knowledge to my country at large.

Id. at 37.

144. Letter from Abigail Adams to John Adams (Mar. 31, 1776), *in* 1 THE ADAMS PAPERS: ADAMS FAMILY CORRESPONDENCE 369, 371 (Lyman H. Butterfield ed., 1963).

145. BROWN, *supra* note 67, at 301.

146. Report of the Pennsylvania Committee of Safety (Jan. 3, 1776), *in* 10 MINUTES OF THE PROVINCIAL CONGRESS OF PENNSYLVANIA, FROM THE ORGANIZATION TO THE TERMINATION OF THE PROPRIETARY GOVERNMENT 443, 443 (1852).

147. Salay, *supra* note 88, at 427.

148. *Id.* at 437.

individuals “for making publick the art of boring and grinding Gun-barrels, and instructing such persons as they shall require to be taught that art.”¹⁴⁹

The emphasis on domestic arms production alarmed Pennsylvania's former acting governor, the Tory Richard Penn, who informed the Duke of Richmond before the House of Commons that Pennsylvanians were building “great numbers” of arms:

[Duke:] Do they make gunpowder in Pennsylvania?

[Penn:] They have lately.

[Duke:] Have they taken any methods to procure salt-petre?

[Penn:] They have established several works for that purpose.

[Duke:] Do they cast brass cannon?

[Penn:] They do in the city of Philadelphia.

[Duke:] Have they the materials and means of casting iron cannon?

[Penn:] They have, in great plenty.

[Duke:] Do they make small arms?

[Penn:] They do, in great numbers, and very complete.¹⁵⁰

It is difficult to determine how many Americans manufactured firearms during the Revolutionary War because many “American gunmakers avoided putting their names or insignias on the firearms so that there remained few clues that might lead to retribution should the American experiment be squashed by the British.”¹⁵¹ Additionally, persons who made their own firearms without intending to sell any had no reason to mark them—unlike manufacturers seeking to market their product. Nevertheless, one scholar's “far from complete list of gunsmiths . . . reveals that at least 612 were working in America between 1775 and 1783.”¹⁵² These gunsmiths were so

149. Report of the Pennsylvania Committee of Safety (Apr. 2, 1776), in 5 AMERICAN ARCHIVES, *supra* note 112, at 734, 734.

150. The Duke of Richmond's Examination of Richard Penn (Nov. 10, 1775), in 18 PARLIAMENTARY HISTORY OF ENGLAND, *supra* note 95, at 910, 913.

151. HARSANYI, *supra* note 97, at 68 (2018); see also GILL, JR., *supra* note 72, at 1 (“[M]any of these men remain obscure. They left little trace and the records reveal their names only incidentally.”).

152. CRAMER, *supra* note 78, at 54.

critical that they were often exempted, or even prevented, from serving in the militia.¹⁵³

When victory for the British appeared imminent in 1777, the British began preparing for a post-war America. Preventing future rebellions was a primary objective. Thus, Colonial under Secretary of State William Knox's comprehensive plan, *What Is Fit to Be Done with America?*, called for the confiscation of arms, forbade arms manufactories, and required licenses for arms imports:

The Militia Laws should be repealed and none suffered to be re-enacted, & the Arms of all the People should be taken away . . . nor should any Foundry or manufactory of Arms, Gunpowder, or Warlike Stores, be ever suffered in America, nor should any Gunpowder, Lead, Arms or Ordnance be imported into it without Licence.¹⁵⁴

After winning independence, Americans ensured that their new government could not impose the same tyranny that caused their separation from Great Britain. Britain's attempts to ban arms imports and prevent domestic production were fresh wounds when the Founders ratified the Second Amendment.¹⁵⁵ So was the fact that domestic arms production maintained the colonies through the arms shortage during the war, and that

153. See Massachusetts Bay Council's Response to Petition of Thomas Buckmore (Sept. 20, 1776), in 2 AMERICAN ARCHIVES, FIFTH SERIES 783, 783 (Peter Force ed., 1843) ("Whereas it has been represented to this Board by *Thomas Buckmore*, of *Concord*, that he has been employed in making Fire-arms for this State . . . and that the Armourers actually employed in making such Arms are doing more essential service to the State, while thus employed, than they could do as soldiers. . . . Captain *George Minot* . . . is required and directed to discharge the said *Thomas Buckmore* and *Silas Wood* from the service for which they were drafted . . ."); General Assembly Report (Mar. 3, 1777), in 8 RECORDS OF THE STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS IN NEW ENGLAND, 1776 TO 1779, at 142, 149 (John Russell Bartlett ed., 1863) ("It is voted and resolved, that it be, and hereby is, recommended to the independent company of the Kingstown Reds, that they excuse *George Tefft* and *Jeremiah Sheffield* (who are employed in making and stocking guns), from doing service in said company . . ."); HISTORY OF BUCKS COUNTY, PENNSYLVANIA 500 (J.H. Battle ed., 1887) ("[*John Fitch*] was among the first to enlist when the revolution began; but as his services were more valuable as a gunsmith than a soldier he was not permitted to enter the active service.")

154. WILLIAM KNOX, CONSIDERATIONS ON THE GREAT QUESTION, WHAT IS FIT TO BE DONE WITH AMERICA (1777), reprinted in 1 SOURCES OF AMERICAN INDEPENDENCE: MANUSCRIPTS FROM THE COLLECTIONS OF THE WILLIAM L. CLEMENTS LIBRARY 163, 176 (Howard Peckham ed., 1978).

155. See U.S. CONST. amend. II. (preserving the people's right to bear arms, "being necessary to the security of a free State" when it was ratified in 1791, fourteen years after Britain confiscated the colonists' arms).

the British intended to confiscate their arms and prohibit arms manufacturing and imports after the war. Indeed,

Gun crafting was one of several ways Americans expressed their unrestrained democratic impulses at the time of the adoption of the Bill of Rights. . . . The climate of opinion was clearly such that it would have supported a broad distribution of this right to the people over and against government. Anything else would have been inconceivable.”¹⁵⁶

3. Self-Built Guns in the Revolutionary War

Nearly every able-bodied male between sixteen and sixty was required to provide his own arms in the colonial and founding eras.¹⁵⁷ Some built their arms themselves. The following are notable examples.

Jacobus Scout was a wheelwright, silversmith, and gunsmith from Pennsylvania.¹⁵⁸ During the Revolutionary War, an English soldier on the New Jersey side of the Delaware River “mocked” Scout, who was on the Pennsylvania side of the river.¹⁵⁹ In one of the more remarkable moments of the war, Scout raised the rifle that he built himself, and “shot [the] English soldier at 900 yards and killed him.”¹⁶⁰ It is no wonder that “[t]he state of Pennsylvania paid Scout for gunsmithing work performed for the state militia.”¹⁶¹

Joseph Belton, an inventor from Connecticut, informed the Continental Congress on April 11, 1777, that he had invented “a common small arm” that could “discharge sixteen, or twenty [rounds], in sixteen, ten, or five seconds of time.”¹⁶² That summer, Belton demonstrated his rifle before

156. WHISKER, *supra* note 76, at 91–92.

157. See David B. Kopel & Joseph G. S. Greenlee, *The Second Amendment Rights of Young Adults*, 43 S. ILL. U. L.J. 495, 533–600 (2019) (describing the militia laws in each colony and state that required men to provide their own arms for use in law enforcement, self-defense, and battle).

158. THE HISTORY OF BUCKS COUNTY, PENNSYLVANIA, FROM THE DISCOVERY OF THE DELAWARE TO THE PRESENT TIME 220 (W.W.H. Davis ed., 1876).

159. *Tales from the 1769 Vansant/Craven Burying Ground: Part 1- James (Jacobus) “Cobe” Scout*, CRAVEN HALL NEWSL. (Mar. 2021), <https://bit.ly/3CWMLYr> [<https://perma.cc/PE35-VUL3>].

160. THE HISTORY OF BUCKS COUNTY, PENNSYLVANIA, FROM THE DISCOVERY OF THE DELAWARE TO THE PRESENT TIME, *supra* note 158, at 222; *Tales from the 1769 Vansant/Craven Burying Ground: Part 1- James (Jacobus) “Cobe” Scout*, *supra* note 159.

The inscription on Scout’s gravestone noted that “he shot an English soldier at 900 yards and killed him,” and “he was an intimate friend of Thomas Paine.” *Id.*

161. WHISKER, *supra* note 76, at 150.

162. Letter from Joseph Belton to the Continental Congress (Apr. 11, 1777), in 1 PAPERS OF THE CONTINENTAL CONGRESS, COMPILED 1774–1789, at 123, 123 (1957).

leading military officers—including General Horatio Gates and Major General Benedict Arnold—and scientists—including David Rittenhouse—who verified that “[h]e discharged Sixteen Balls loaded at one time.”¹⁶³ Belton offered to build similar arms for the Congress, which ordered 100 of them,¹⁶⁴ but the deal fell through when Belton demanded what the Congress deemed “an extraordinary allowance.”¹⁶⁵

To be sure, Belton’s was not the first self-built repeating arm in America. For example, John Cookson advertised a nine-shot repeating arm in the *Boston Gazette* on April 12 and again on April 26, 1756, explaining that the rifle was “made by John Cookson and to be sold at his house in Boston: a handy gun . . . having a Place convenient to hold 9 Bullets, and Powder for 9 Charges and 9 Primings; the said gun will fire 9 Times distinctly, as quick, or as slow as you please.”¹⁶⁶

Nor was Belton’s rifle the only groundbreaking firearms invention that David Rittenhouse was involved in during the war.¹⁶⁷ Charles Willson Peale, who had formerly worked in saddlery, clockmaking, and silversmithing before becoming a world-renown portraitist, “prized a firelock” throughout the war “with a telescopic sight that he had built with

163. Letter from Joseph Belton to the Continental Congress (Jul. 10, 1777), in 1 PAPERS OF THE CONTINENTAL CONGRESS, COMPILED 1774–1789, *supra* note 162, at 139, 139.

164. Report of the Continental Congress (May 3, 1777), in 7 JOURNALS OF THE CONTINENTAL CONGRESS 1774–1789, at 323, 324 (Worthington Chauncey Ford ed., 1907).

165. Report of the Continental Congress (May 15, 1777), in 7 JOURNALS OF THE CONTINENTAL CONGRESS 1774–1789, *supra* note 164, at 361, 361.

166. GEORGE FRANCIS DOW, EVERY DAY LIFE IN THE MASSACHUSETTS BAY COLONY 136 (Dover Publ’ns, Inc. 1988) (1935).

167. A 1794 Pennsylvania act selected Rittenhouse to conduct experiments with a new invention for testing gunpowder, with the objective of establishing standards for gunpowder sold in the state. 3 LAWS OF THE COMMONWEALTH OF PENNSYLVANIA 241 (1810).

help from the astronomer David Rittenhouse.”¹⁶⁸ This may be the first use of a telescopic sight in the America.¹⁶⁹

168. ATKINSON, *supra* note 140, at 493. The following entries in Peale's diary detail his experience with the firearm and scope:

December 27, 1775, “bought a set of gun mountings 9/.”

January 1, 1776, “attended Mr. Rittenhouse all Day about a Riffle with a Tellescope to it.”

January 2, “Ditto.”

January 3, “Brought a Gun Lock 22/6 I found it faulty & offered the Man 2/6 to take it back but he would not. I bought another at 40/.”

January 5, “[purchased] a set of Loop to hang up a Gun 6/6, spent in attending & working about my riffle. . . .”

January 6, “attending the man stockg sd. Gun.”

January 8, “still attendg about my Gun.”

January 9, “pd for stockg my riffle 22/6 to Mr. Williss.”

January 10, “Attnd Mr. Palmer & Mr. Rittenhouse about sd G-n.”

January 11, “pd. Mr. Palmer for a Riffle Barrel 3=10.0 Bullit moulds 3/9 a screw wiper . . . 1/3 – finished the Riffle this mornng: Shot her afternoon in the [State] House yard, not quite Sighted.

January 12, “put a sight to my Gun.”

January 13, “Paid Joseph (Mr. Rittenhouse's Journeyman) for makg Box, Loops &c. for my riffle 15/ . . . finish a charger to load with, go out with Mr. Rittenhouse to shot, the Brich Box opened & I lost all my Bullits & wiper.”

January 16, “Cleaned by Gun, am very Idle”

February 4, “made a shot-Bag.”

February 5, “spent in trying to sight my Riffle.”

February 6, “ditto.”

February 7, “ditto.”

February 8, “ditto.”

February 9, “making piece with springs to prevent the Eye being hurt by the kicking of the Gun.”

February 10, “ditto. in soldering hard solder use chalk to prevent an old place undoing.”

February 11, “ditto.”

February 16, “shoting the Riffle.”

February 19, “shot several times in a small piece of Papier at 100 yds. distance.”

February 27, “shooting with Riffle.”

February 29, “went to see Mr. Rittenhouse who tells me he has often heard Rifflemen say, that when they shot large loads, they could never shoot true, if so, Mr. Rittenhouse accounts for it in the Manner, that the air suddenly pressed together till it will not go closer, the Ball glances off in another direction, as in the instance of Lighting flying so very crucked, which goes strait in a Vacuum.”

March 2, “shot my riffle in the [State] House yard, left the Barrel & Lock at Mr. Palmer's.”

In 1780, Rittenhouse improved the function of telescopes by using threads from spider webs for reticles rather than the usual silk threads.¹⁷⁰ This same technology would be used in many rifle scopes during the twentieth century, including scopes used by the Allies against the Nazis in World War II.¹⁷¹

Peale's ingenuity went beyond the telescopic sight. He was also active in the manufacture of gunpowder. In early 1776, Peale, who was familiar with saltpeter and gunpowder from prior experiments, visited the Frankford Powder-Mill—which apparently was the only working mill in the colonies prior to the war—and took notes on its operations.¹⁷² The most likely explanation is that the notes were used to aid in the construction of newer mills—as noted, by the end of 1776, Pennsylvania had nine new mills.¹⁷³

C. *Self-Built Guns in Early American History*

Heller “adopt[ed]” the “original understanding of the Second Amendment,”¹⁷⁴ and relied on nineteenth-century sources only to the extent that they informed that original understanding.¹⁷⁵ As the Court recently elucidated in *Gamble v. United States*,¹⁷⁶ later sources that contradict the original meaning cannot be read to limit or alter the original scope of

Hugh T. Harrington, *Charles Willson Peale's "Rifle with a Telescope to It"*, J. AM. REVOLUTION (July 10, 2013), <https://allthingsliberty.com/2013/07/charles-willson-peales-rifle-with-a-telescope-to-it/> [https://perma.cc/8NP4-QJ2X].

169. “The use of telescopic sights in the seventeenth and eighteenth century was rare and they were generally regarded as scientific curiosities rather than practical shooting accessories until the mid-nineteenth century.” BROWN, *supra* note 67, at 148. The first description of a telescopic sight on a firearm may have been provided in Francesco de Lana's *Magiser Naturae et Artis* in 1694, while a definite description was provided in Johannes Zahn's *Oculus Artificialis* in 1702. *Id.*

170. EDWARD FORD, DAVID RITTENHOUSE: ASTRONOMER-PATRIOT, 1732–1796, at 135 (1946).

171. See, e.g., Keiligh Baker, *Trapping the Enemy in Their Web: How Spiders Helped Defeat the Nazis When Their Silk Was Used As Crosshairs in Gun Sights*, DAILY MAIL (Oct. 22, 2015), <https://www.dailymail.co.uk/news/article-3284871/How-SPIDERS-helped-defeat-Nazis.html> [https://perma.cc/43BQ-5J8P] (explaining the role played by silk spider webs in constructing crosshairs in gun sights during World War II).

172. Salay, *supra* note 88, at 423–24.

173. *Id.* at 437.

174. *District of Columbia v. Heller*, 554 U.S. 570, 625 (2008).

175. See *id.* at 614 (“Since those [post-Civil War] discussions took place 75 years after the ratification of the Second Amendment, they do not provide as much insight into its original meaning as earlier sources.”).

176. *Gamble v. United States*, 139 S. Ct. 1960 (2019).

the right.¹⁷⁷ Nonetheless, it is noteworthy that Americans continued to build their own arms and that the right remained unregulated throughout American history.

1. Many Americans Used Their Knowledge of Building Guns to Supplement Their Incomes

Because gunsmithing was a universal need in early America, many early Americans who were professionals in other occupations engaged in gunsmithing as an additional occupation or hobby. Persons occupied as blacksmiths,¹⁷⁸ whitesmiths,¹⁷⁹ tinsmiths,¹⁸⁰ locksmiths,¹⁸¹

177. See *id.* at 1975–76 (discounting the importance of treatises “published after the Fifth Amendment was adopted,” and noting that nineteenth-century sources were not used to define the public understanding of the Second Amendment in *Heller*, but instead “were treated as mere confirmation of what the Court thought had already been established”).

178. Examples from the eighteenth century include Samuel Bonsall of South Carolina and John Cutler of Massachusetts. HENRY J. KAUFFMAN, *EARLY AMERICAN GUNSMITHS 1650–1850*, at 10, 21 (1952). A nineteenth century example is Mynham Cuttino of South Carolina. *Id.* at 22. Jacob Reager of West Virginia was a blacksmith who served as a gunsmith during the Revolutionary War. WHISKER, *supra* note 76, at 23.

179. Nineteenth-century examples include Daniel Searles of Ohio, Isaac King of New Jersey, and Andrew Saupp of Pennsylvania. *Id.* at 141, 155.

180. Nineteenth-century examples include Phineas Compton, Samuel Compton, and Andrew Saupp of Pennsylvania. *Id.* at 155.

181. A late eighteenth-century example is Edward Tucker of Virginia. *Id.* at 162. A nineteenth-century example is Conrad Leibrick of Pennsylvania. *Id.* at 154.

Daniel McKinney, a locksmith and gunsmith from Pennsylvania, was captured by American Indians during the Revolutionary War and sold to the British. Instructed to build firearms to be used against the Americans, McKinney intentionally made defective barrels. Reportedly, one of McKinney’s guns was used to shoot “seventeen times at Gen. Washington, but could not hit him once.” A HISTORY OF SCIOTO COUNTY, OHIO, TOGETHER WITH A PIONEER RECORD OF SOUTHERN OHIO 130–31 (Nelson W. Evans ed., 1903).

silversmiths,¹⁸² farmers,¹⁸³ clock and watchmakers,¹⁸⁴ carpenters,¹⁸⁵ mechanics,¹⁸⁶ cutlers,¹⁸⁷ stonemasons,¹⁸⁸ merchants,¹⁸⁹ and at least one

182. A seventeenth-century example is Hendrick Boelen from New York. THE WALDRON PHOENIX BELKNAP, JR. COLLECTION OF PORTRAITS AND SILVER 116 (John Marshall Phillips et al. eds., 1955).

Eighteenth-century examples include Benjamin Campbell who spent time in Maryland, New Jersey, and Pennsylvania, WHISKER, *supra* note 76, at 151, and Samuel Bonsall of South Carolina. KAUFFMAN, *supra* note 178, at 10.

Nineteenth-century examples include Absalom Garlick, Samuel Quest, and James Dillon of Pennsylvania. WHISKER, *supra* note 76, at 148–49, 151; *see also* HISTORY OF ARMSTRONG COUNTY, PENNSYLVANIA 313 (Robert Walter Smith ed., 1883) (recalling an exchange in which “Samuel Quest, then a jeweler in Kittanning,” traded “knife blades of rather large size” in exchange for jewelry); J. SIMPSON AFRICA, HISTORY OF HUNTINGDON AND BLAIR COUNTIES, PENNSYLVANIA 489 (1883) (listing James Dillon as a nineteenth-century silversmith); *Bedford County Guns Win Renown Throughout the United States*, BEDFORD CNTY. PRESS, Feb. 14, 1958, at 11 (listing James Dillon as a renowned gun maker from Bedford County, Pennsylvania).

Duncan Beard of Delaware was a silversmith set up a manufactory to make gun locks during the Revolutionary War. WHISKER, *supra* note 76, at 150.

183. Eighteenth-century examples include David Dickey of Pennsylvania and John Doddridge of Virginia, WHISKER, *supra* note 76, at 126, 145–46, as well as Jacob Saylor who made firearms during the Revolutionary War, *id.* at 134–35.

184. Eighteenth-century examples include Thomas Floyd of South Carolina, Robert McCormick of Virginia, and Frederick Solliday, and Joel Bailey of Pennsylvania. KAUFFMAN, *supra* note 178, at 31; WHISKER, *supra* note 76, at 70, 147–48; JAMES W. GIBBS, PENNSYLVANIA CLOCKS AND WATCHES: ANTIQUE TIMEPIECES AND THEIR MAKERS 114–15 (1984).

Nineteenth-century examples include Christian Plants, David Morton, Samuel Quest, Isaiah Lukens, and James Dillon of Pennsylvania. WHISKER, *supra* note 76, at 147, 149.

Benjamin Rittenhouse (David’s younger brother) was a clockmaker who both built firearms privately and superintended the Pennsylvania State Gun Factory during the Revolutionary War (until he was wounded in battle and taken prisoner). BROWN, *supra* note 67, at 314; WHISKER, *supra* note 76, at 149, 224. Duncan Beard, who made gun locks during the war for the Delaware Council of Safety, was also a clockmaker. WHISKER, *supra* note 76, at 150.

185. Nineteenth-century examples include Godfrey Wilkin and John Wilkin of Virginia, as well as Alfred Marion Cone of Pennsylvania. *Id.* at 156–57.

186. A nineteenth-century example is Christian Plants of Pennsylvania. *Id.* at 149–50.

187. Eighteenth-century examples include Jacob Buchanan and Walter Dick of South Carolina. KAUFFMAN, *supra* note 178, at 15, 24.

188. Nineteenth-century examples include Elias Brey and Christian Plants of Pennsylvania. *Id.* at 12; WHISKER, *supra* note 76, at 149–50.

189. An eighteenth-century example is Joseph Parkinson of Virginia. WHISKER, *supra* note 76, at 136–37.

A nineteenth-century example is Andrew Saupp of Pennsylvania. *Id.* at 155.

attorney¹⁹⁰ offered gunsmithing services.¹⁹¹ Even after technological advancements at the federal armories in the mid-nineteenth century made the mass production of high-quality firearms possible,¹⁹² “Many later craftsmen made guns in small shops as a source of additional income, out of respect for the craft, or as a way to augment their incomes from other trades.”¹⁹³

2. Western Expansion

For pioneers, mountain men, and other explorers essential to the expansion of the American empire from sea to shining sea, the ability to make and repair firearms was a necessity. Firearms retailers and gunsmiths were often hundreds of miles away, and not a realistic option for these adventurers who depended on functional firearms for their food and safety virtually every moment of the day. They had to know how to build and repair arms themselves to survive.

190. In the year 1800, Ignatius Leitner published the following advertisement in the York Recorder:

Ignatius Leitner. Removed to the house next to Jacob Shaffer[']s store and nearly opposite to Abram Miller's Tavern in York Boro—Where he continues to draw deeds, mortgages, Power of Attorney, apprentice indentures, Bills, Notes, State executor and administrators accounts. He will as usual clerk at vendues and take inventories and all other instruments of writing done on shortest notice. N. B. He continues and keeps hands at work in his former branches as making rifles, still cocks, casting rivets, gun mountings, etc. at the lowest prices.

KAUFFMAN, *supra* note 178, at 61.

191. To be sure, men were not the only ones capable of building arms. For example, Fredericka Worner carried on her husband's gunsmithing business after his death. *See* WHISKER, *supra* note 76, at 20. Louisa Wirth had her own gunsmith business, and her sister Wilhelmina Wirth also practiced the gunsmith trade. *See id.*

192. *See, e.g.*, DAVID R. MEYER, NETWORKED MACHINISTS: HIGH-TECHNOLOGY INDUSTRIES IN ANTEBELLUM AMERICA 81–84, 252–62, 279–80 (2006) (describing the individuals and their technological discoveries that transformed the gun manufacturing industry).

193. WHISKER, *supra* note 76, at viii. The process of making firearms has not changed dramatically throughout American history. Firearms historian W.W. Greener described manufacturing prior to the nineteenth century as follows:

The other processes of gun-making in past periods call for no special comment; the work done depended upon the skill of the artisan with hammer, file, drill, and burin, and the methods are so closely allied to the modern practice that the description of modern methods will apply equally to those of other times, due allowance being made for the improvements in tools, and the aid which machinery has lent to do quickly what formerly was accomplished only by the expenditure of much time and labour.

W. W. GREENER, THE GUN AND ITS DEVELOPMENT 222, 224 (9th ed. 1910).

The early Pennsylvanian frontiersman John Fraser relied on his ability to build and repair arms throughout much of his career. As a fur trader in the 1740s, Fraser “traded his gunsmith services for the furs and pelts of the Indians who considered his services very valuable to them.”¹⁹⁴ In the 1750s, George Washington and the British army depended on Fraser’s gunsmithing skills. Fraser apparently repaired arms for Washington’s troops as a sutler in 1754 and reported a loss of a “complete set of armour[er]’s tools” at the Battle of Fort Necessity.¹⁹⁵ And the following year, Washington selected Fraser to repair all the firearms at Fort Cumberland.¹⁹⁶

Daniel Boone’s first firearm, a “short rifle gun” he received when he was twelve years old, was believed to be built by his father, Squire Boone.¹⁹⁷ Squire, “besides keeping six looms busy with hired hands, farming, and running his blacksmith shop and mill, was also a gunsmith.”¹⁹⁸ Squire’s “skill at making and repairing guns was passed down to his fourth son,” Daniel, for whom “[i]t would be an essential, lifesaving skill in later years, in the wilderness beyond the mountains.”¹⁹⁹

Meriwether Lewis was “repairing . . . rifles” by “age eighteen.”²⁰⁰ During the Lewis and Clark Expedition, this skill became a necessity for survival. Thus, most men on the Expedition were capable of repairing arms—especially armorer John Shields—and spent many days of the Expedition doing so.²⁰¹ Arguably the most consequential weapon carried on the Expedition was Lewis’s Girandoni Air Rifle—capable of firing

194. Howard Glenn Clark, *John Fraser, Western Pennsylvania Frontiersman, Parts I–II*, 38 W. PA. HIST. MAG. 83, 85 (Fall–Winter 1955).

195. Howard Glenn Clark, *John Fraser, Western Pennsylvania Frontiersman, Part IV*, 39 W. PA. HIST. MAG. 109, 121–22 (Summer 1956).

196. Howard Glenn Clark, *John Fraser, Western Pennsylvania Frontiersman, Part III*, 39 W. PA. HIST. MAG. 35, 35 (Spring 1956).

197. ROBERT MORGAN, *BOONE: A BIOGRAPHY* 14 (2007).

198. *Id.*

199. *Id.* There were many gunsmiths in the Boone family, including Daniel’s nephew Samuel, who managed Maryland’s State Gun Lock Factory during the Revolution, Daniel’s cousin Thomas, a Pennsylvania riflesmith, and Daniel’s brother Squire, Jr, who ran a gunsmithery in Kentucky. BROWN, *supra* note 67, at 314–15.

200. STEPHEN E. AMBROSE, *UNDAUNTED COURAGE: MERIWETHER LEWIS, THOMAS JEFFERSON, AND THE OPENING OF THE AMERICAN WEST* 29 (1996).

201. *See, e.g.*, 6 *THE DEFINITIVE JOURNALS OF LEWIS & CLARK: DOWN THE COLUMBIA TO FORT CLATSOP* 442 (Gary E. Moulton ed., 2002) (Clark’s March 20, 1806 entry, explaining: “[B]ut for . . . the ingenuity of John Shields, most of our guns would at this moment been entirely unfit for use; but fortunate for us I have it in my power here to record that they are in good order, and Complete in every respect[.]”).

twenty-two repeating shots, each powerful enough to take an elk.²⁰² Lewis demonstrated the rifle constantly to illustrate that the undersized group could defend itself against the larger tribes it encountered.²⁰³ The rifle was built by Isaiah Lukens, a Philadelphia clockmaker and inventor who built the original clock at Independence Hall.²⁰⁴

Lewis and Clark were soon succeeded by the mountain men who opened the west. Among them was Hugh Glass, who famously survived a grizzly bear mauling by killing the bear, and after being left for dead by his companions, crawled and scrambled more than 200 miles over six weeks to safety.²⁰⁵ Before heading out west, Glass apprenticed with Pennsylvania gunsmith Henry Wolf and, according to the wanted poster Wolf posted when Glass ran away, became proficient enough to “pass for a gunsmith.”²⁰⁶ “[T]he western fur companies employed gunsmiths or blacksmiths in shops established in the larger and more permanent posts in the back country,” and made sure to hire someone capable of repairing firearms to join larger expeditions.²⁰⁷ It can safely be assumed that Glass found the skill useful for the same reasons the fur companies hired men with the same skill.

One of the most important inventions that enabled western expansion was the steamboat.²⁰⁸ Its inventor, John Fitch, manufactured firearms during the Revolutionary War. A man of “great mechanical ingenuity,”²⁰⁹

202. JIM SUPICA ET AL., TREASURES OF THE NRA NATIONAL FIREARMS MUSEUM 31 (2013).

203. See generally THE DEFINITIVE JOURNALS OF LEWIS & CLARK (Gary E. Moulton ed., 2002) (containing numerous accounts of when the air rifle was used during the Lewis & Clark expedition).

204. WHISKER, *supra* note 76, at 149 (1992).

205. *Id.* at 38.

206. *Id.*

207. CARL P. RUSSELL, GUNS ON THE EARLY FRONTIERS: A HISTORY OF FIREARMS FROM COLONIAL TIMES THROUGH THE YEARS OF THE WESTERN FUR TRADE 96 (1957); see also *id.* at 98 (“During the 1820’s and 1830’s the United States maintained government agencies . . . [where] the mending of guns . . . was classed as blacksmithing and the workmen were hired as blacksmiths at the rate of \$500.00 a year.”); cf. BROWN, *supra* note 67, at 248 (“On the frontier and particularly when dealing with the Native Americans, gunsmiths frequently doubled as blacksmiths.”).

208. See *A History of Steamboats*, U.S. ARMY CORPS OF ENG’RS 1–2, <https://www.sam.usace.army.mil/Portals/46/docs/recreation/OP-CO/montgomery/pdfs/10thand11th/ahistoryofsteamboats.pdf> [<https://perma.cc/62CY-HMSN>] (“The years after the Revolutionary War were years of growth in the southeastern United States. At the heart of this westward growth were southern rivers The rivers . . . provided a way for settlers to move west Cities grew along the rivers to make trade and transportation easier.”).

209. HISTORY OF BUCKS COUNTY, PENNSYLVANIA, *supra* note 153, at 500.

Fitch “learned clock making after he was eighteen”²¹⁰ and soon after “established himself as a silversmith”²¹¹ as well as “a proficient surveyor.”²¹² Fitch “was among the first to enlist when the revolution began; but as his services were more valuable as a gunsmith than a soldier he was not permitted to enter the active service.”²¹³ After Fitch’s gunsmith shop was overtaken by the British in 1776, he worked as a silversmith at Jacobus Scout’s shop—the same Scout who killed an English soldier with a 900-yard shot from his own rifle.²¹⁴ Fitch then “engaged in various pursuits until the end of the war,” including clockmaking, silversmithing, and surveying, and was even captured by Indians, before returning to Scout’s shop on New Year’s Day in 1783.²¹⁵ It was then that Fitch “made his model steamboat in ‘Cobe’ Scout’s log-shop,” and soon began testing the real thing with Scout.²¹⁶ “[I]his almost untutored mechanic has the honor of an invention that has revolutionized the commerce and naval warfare of the world.”²¹⁷

III. INNOVATION INSPIRED BY SELF-MADE ARMS

Many of the most important innovations in firearms technology began not in a federal armory or major firearms manufactory, but in private homes and workshops.

In the sixteenth century, the matchlock was the standard ignition system.²¹⁸ The user of a matchlock, by pulling the trigger, connected a slow-burning match to a pan of gunpowder, which ultimately ignited the

210. THE HISTORY OF BUCKS COUNTY, PENNSYLVANIA, FROM THE DISCOVERY OF THE DELAWARE TO THE PRESENT TIME, *supra* note 158, at 220.

211. *Id.*

212. HISTORY OF BUCKS COUNTY, PENNSYLVANIA, *supra* note 153, at 500.

213. *Id.*

214. *Id.*; THE HISTORY OF BUCKS COUNTY, PENNSYLVANIA, FROM THE DISCOVERY OF THE DELAWARE TO THE PRESENT TIME, *supra* note 158, at 222.

215. HISTORY OF BUCKS COUNTY, PENNSYLVANIA, *supra* note 153, at 500; THE HISTORY OF BUCKS COUNTY, PENNSYLVANIA, FROM THE DISCOVERY OF THE DELAWARE TO THE PRESENT TIME, *supra* note 158, at 220.

216. HISTORY OF BUCKS COUNTY, PENNSYLVANIA, *supra* note 153, at 501. In 1787, “Fitch built a 45-foot steamboat that he sailed down the Delaware River while members of the Constitutional Convention watched.” *A History of Steamboats*, *supra* note 208, at 2.

217. THE HISTORY OF BUCKS COUNTY, PENNSYLVANIA, FROM THE DISCOVERY OF THE DELAWARE TO THE PRESENT TIME, *supra* note 158, at 221–22; *see also* HISTORY OF BUCKS COUNTY, PENNSYLVANIA, *supra* note 153, at 501 (“The honor of inventing the steamboat was undoubtedly his.”).

218. NICHOLAS J. JOHNSON ET AL., FIREARMS LAW AND THE SECOND AMENDMENT: REGULATION, RIGHTS, AND POLICY 148 (3d ed. 2022).

main powder charge and fired the weapon.²¹⁹ Around the year 1500, Leonardo da Vinci—one of the world's great polymaths but not a gunsmith—invented the wheellock.²²⁰ As self-igniting weapons, wheellocks were quicker to fire and better in wet conditions—thus making them better suited for self-defense, hunting, and war—in addition to being lighter.²²¹

Wheellocks, however, were expensive and suffered from reliability issues, and were eventually replaced in the early seventeenth century by an improved version, the flintlock.²²² When the user of a flintlock pulls the trigger, it causes a piece of flint to strike a piece of steel, which produces the sparks that ignite the gunpowder.²²³ The flintlock dominated the American market until it was superseded by percussion ignition,²²⁴ thanks to a groundbreaking invention in 1807 by a Reverend named John Forsyth.

Forsyth, an avid bird hunter, noticed that the sparks created by the flintlock mechanism alerted the birds before his shot.²²⁵ The Reverend invented a formula in which fulminate was used as the priming powder that ignited the gunpowder, creating an instantaneous ignition that allowed the firearm to fire immediately so that a bird could not react.²²⁶ While Forsyth stayed focused on preaching, other inventors—the first likely being Joshua Shaw, a respected artist and scientist who lived in Philadelphia at the time²²⁷—applied Forsyth's invention to create percussion caps—small cups filled with fulminate that ignited when the firearm's hammer struck them.²²⁸ “The percussion cap made the flintlock obsolete, so many flintlocks were retrofitted to use percussion caps.”²²⁹

Within a few decades, Samuel Colt would lead another firearms transformation. Colt began experimenting with firearms and explosives as

219. *See id.* (describing the operation of a matchlock ignition system).

220. Vernard Foley, *Leonardo and the Invention of the Wheellock*, SCI. AM., Jan. 1998, at 97–98.

221. *See* JOHNSON, *supra* note 218, at 148 (detailing the characteristics of the wheellock ignition system).

222. *Id.*

223. *Id.* at 148–49.

224. *Id.* at 435.

225. ALEXANDER ROSE, *AMERICAN RIFLE: A BIOGRAPHY* 94 (2008).

226. *Id.* at 94–95.

227. JEFF KINARD, *PISTOLS: AN ILLUSTRATED HISTORY OF THEIR IMPACT* 52 (2003).

228. *See* JOHNSON, *supra* note 218, at 435 (describing the mechanics of the percussion ignition system).

229. *Id.*

a child.²³⁰ After an “unfortunate pyrotechnics display” at school, Colt’s father sent him off to become a seaman.²³¹ On a voyage to Calcutta, inspired by the windlass, Colt whittled a wooden pepperbox pistol with a rotating cylinder, which ultimately led to Colt’s repeating revolvers, some of the most consequential firearms ever.²³² Mass-produced for both the military and civilian market, Colt’s revolver ushered in an era of repeating arms.²³³

Naturally, the next great innovation came in the form of repeating rifles. This largely started with Walter Hunt, “best known . . . as being the inventor of the safety pin” and “builder of America’s first sewing machine,” who also “came up with a fountain pen, a streetcar bell, a heating stove, a knife sharpener, [and] a road sweeper”²³⁴ Hunt first invented the “Rocket Ball” in 1848—an improved type of ammunition cartridge that “was actually a hollowed-out conical bullet containing powder whose open rear end was stopped up by a cork wad with a small hole in the center.” He followed this invention with a rifle to fire the “Rocket Ball,” his “Volition Repeater.”²³⁵ The Volition Repeater “featured a tubular magazine with a lever mechanism located in front of the trigger, which, when pulled, would push one Rocket Ball from the cylinder to the next position and cock the hidden hammer.”²³⁶ Hunt made only one Volition Repeater before assigning the rights to New York machinist George Arrowsmith, who had his employee Lewis Jennings make improvements before selling the rights himself to Cortlandt Palmer.²³⁷ Palmer asked Horace Smith to work on the rifle, who sought assistance from Daniel Wesson and Benjamin Tyler Henry.²³⁸ While working on the rifle, Smith and Wesson’s frustrations with Hunt’s Rocket Ball ultimately led to their invention of a metallic cartridge, “the forerunner of those used today.”²³⁹ Meanwhile, Henry continued to work

230. ROSE, *supra* note 225, at 126.

231. *Id.*

232. *Id.* at 126–27; *see also* WILLIAM B. EDWARDS, THE STORY OF COLT’S REVOLVER 23 (1957).

233. *See id.* at 127 (reporting on the transformative introduction of the revolver to the American firearms landscape).

234. *Id.* at 122.

235. *Id.*

236. HARSANYI, *supra* note 97, at 118.

237. ROSE, *supra* note 225, at 123.

238. *Id.* at 123, 128.

239. *Id.* at 125.

on the still-evolving rifle, finally producing in 1860 Winchester's historic Henry Rifle, "the world's first dependable '16-shooter.'"²⁴⁰

The Henry's main competitor was the Spencer Rifle.²⁴¹ The Spencer rifle's inventor, Christopher Spencer, learned gunsmithing from his ninety-year-old grandfather, a Revolutionary War veteran.²⁴² Spencer apprenticed at the Cheney Brother's silk mill, where he began designing machines for businesses.²⁴³ But while Spencer was "patenting labeling and thread-spooling machines, but in his off time he engineered guns."²⁴⁴ During his off time, he invented the Spencer Rifle.²⁴⁵ Like the Henry, the Spencer Rifle became a favorite among the soldiers in the Civil War, and Christopher Spencer even earned an invitation to the White House, where he outshot President Lincoln in a contest at Treasury Park.²⁴⁶ "The president liked [the rifle] so much he went out the next evening and fired off many more rounds."²⁴⁷

Once repeating arms began to dominate the market in the late nineteenth century, the next major advancement was the detachable magazine, which allowed for more rapid reloading than the tubular magazines used by most repeating rifles of the time.²⁴⁸ James Paris Lee, a jeweler who "worked on his beloved rifles in his spare time," invented a series of firearms before inventing some of the first detachable box magazines in 1879 and 1882.²⁴⁹ The Lee-Remington rifle was the first mass-produced detachable-box-magazine rifle, and its successor, the Lee-Enfield bolt-action magazine rifle, was the standard firearm for the British military for over sixty years (1895–1957) and "its genes are present in even today's small arms."²⁵⁰ Indeed, modern magazines, of which Americans own hundreds of millions, are descendants of Lee's.

John Browning Sr. began experimenting with firearms inventions as a child. "He became fascinated by firearms at an early age and was a self-

240. *Id.* at 129.

241. *Id.*

242. *Id.* at 130.

243. *Id.*

244. *Id.*

245. *See id.* (elaborating on features of Spencer's rifle differentiating it from others of the era).

246. *See id.* at 147–48 (commenting on success enjoyed by Civil War soldiers who used Spencer's rifle in various skirmishes and battles).

247. *Id.* at 148.

248. *Id.* at 224–25.

249. *Id.*

250. *Id.* at 225.

taught gunsmith by nineteen.”²⁵¹ While moving his family west, first to Mississippi then Illinois and finally Utah, Browning Sr. invented firearms and served his communities by making and repairing arms.²⁵² Browning Sr.’s self-taught gunsmithing skills supported his family while he attempted several other business endeavors, “including a brickyard, a leather tannery, and a sawmill,” as well as working as a blacksmith, in addition to serving in his church and the state legislature.²⁵³ Among his inventions were two notable repeating arms: a harmonica rifle, which allowed five shots to be fired in rapid succession, and a rifle with a revolving cylinder, which operated similarly to Samuel Colt’s famous handgun.²⁵⁴

His son, John Moses Browning, built his first firearm in his father’s blacksmith shop when he was ten years old.²⁵⁵ Nathan Gorenstein describes the process in his biography on Browning:

From the pile of discards John retrieved the old musket barrel and dug out a few feet of wire and a length of scrap wood. He clamped the barrel into a vise and with a fine-toothed saw cut off the damaged muzzle. He set [his younger brother] Matt to work with a file and orders to scrape a strip along the barrel’s top down to clean metal. With a hatchet John hacked out a crude stock. . . . John used a length of wire to fasten the gun barrel to the stock, then bonded them with drops of molten solder. There was no trigger. Near the barrel’s flash hole John screwed on a tin cone. When it came time to fire, gunpowder and lead birdshot would be loaded down the muzzle and finely ground primer powder would be sprinkled into the cone.²⁵⁶

Later that day, John used his self-built rifle to hunt three grouse.²⁵⁷ While sharing the grouse with his father the following morning, John revealed that he shot their breakfast with a gun he built in his father’s shop.²⁵⁸ The unimpressed Browning Sr. remarked, “John Moses, you’re going on eleven; can’t you make a better gun than that?”²⁵⁹ He could,

251. HARSANYI, *supra* note 97, at 174.

252. *Id.* at 174–75.

253. NATHAN GORENSTEIN, THE GUNS OF JOHN MOSES BROWNING 15 (2021).

254. *Id.* at 9, 12, 13.

255. *Id.* at 6, 8.

256. *Id.* at 6.

257. *Id.* at 7–8.

258. *Id.* at 8.

259. *Id.*

indeed—in time his firearms inventions would change the world many times over, and it all started with a self-built firearm he used to hunt grouse.

In 1890, the United States Chief of Ordnance, believing based on “an application made to an officer of the (Ordnance) department more than ten years ago, that smokeless powders originated, like many other inventions, in America, only to be brought to the attention of the world in foreign countries,” sought the public’s assistance in developing smokeless gunpowder.²⁶⁰ He lamented that “[a]ll effort, official or otherwise, to date to obtain a smokeless powder has been abortive, and American powder-makers and chemists have not yet awakened to the lucrative opportunity presented to them.”²⁶¹ “Never before had a senior Ordnance officer been forced to admit openly that private industry could compete with—nay, might even exceed—the best that Springfield had to offer.”²⁶² Ultimately, it was “what might be called the cooperative competition between Ordnance and private enterprise” that created the next breakthroughs in smokeless powder.²⁶³

Like many arms innovators before him, John Garand’s groundbreaking firearms invention also derived from a side-project. Naturally handy with tools and machines, Garand patented a new type of screw at age fourteen, became a machinist by eighteen, was a tool and gauge maker in his twenties, and the foreman and machine designer of the Federal Screw Corporation by thirty.²⁶⁴ In his off time, he developed an interest in motorcycles, and quickly concluded that they could be faster.²⁶⁵ So Garand built his own engine and raced with it, winning nineteen of twenty-one races in 1912.²⁶⁶ In 1916, Garand was working at a micrometer company in New York when he learned that the Army was searching for a machinegun.²⁶⁷ He accepted the challenge and developed a gun. Although the Army did not adopt it, it won him a job at Springfield Armory.²⁶⁸ There, Garand developed the M1

260. *Smokeless Powder. The Subject Discussed by General Benet, Chief of Ordnance*, 34 NAPA WKLY. REP. 7 (1890).

261. *Id.*

262. ROSE, *supra* note 225, at 238.

263. *Id.* at 297.

264. *Id.* at 297.

265. *Id.*

266. *Id.*

267. *Id.*

268. *Id.* at 297–98.

Garand, which became the standard service rifle for the U.S. Military during World War II and the Korean War.²⁶⁹

The most popular rifle in America today is the AR-15, owned in the tens of millions.²⁷⁰ Like so many revolutionary rifles before it, the AR-15's roots are in homebuilding. George Sullivan, “an aeronautical engineer, salesman, and self-described ‘gun nut’” was Lockheed Aircraft Corporation’s chief patent counsel in the 1950s.²⁷¹ Learning from the aviation industry’s recent focus on innovative lightweight materials, Sullivan decided to apply that knowledge and technology to firearms.²⁷² Together with Fairchild Engine and Airplane Corporation’s president and fellow gun enthusiast, Richard Boutelle, Sullivan started a company called ArmaLite “in a building dubbed ‘George’s Backyard Garage,’” “to act not as a manufacturer but as a think tank . . .”²⁷³ When Sullivan was testing an ArmaLite prototype at a shooting range, he saw “a man firing what was obviously a homemade rifle.”²⁷⁴ The man was Eugene Stoner, a former Marine who after World War II worked as a design engineer for an aircraft equipment maker.²⁷⁵ When Sullivan encountered Stoner shooting his homemade rifle, Stoner was making dental plates for work.²⁷⁶ Sullivan was so impressed by Stoner’s homemade rifle that he hired him as ArmaLite’s chief engineer.²⁷⁷ Soon after, in 1955, Stoner designed the innovative AR-10,²⁷⁸ which used fiberglass for its forestock and furniture and lightweight aircraft-grade aluminum for its receiver.²⁷⁹ Stoner continued to improve on the AR-10, and by 1957 introduced a prototype of what became the AR-15.²⁸⁰ While the AR-15 would be adopted by the United States Military in 1963—its

269. *Garand Rifle*, ENCYCLOPAEDIA BRITANNICA (May 20, 2022), <https://www.britannica.com/print/article/225581> [<https://perma.cc/NE83-ZJ8K>].

270. Matthew Loh, *America Has 20 Million AR-15 Style Rifles in Circulation, and More Guns Than People in the Country*, BUS. INSIDER (May 30, 2022), <https://www.businessinsider.com/us-20-million-ar-15-style-rifles-in-circulation-2022-5> [<https://perma.cc/Z2SQ-KWML>].

271. ROSE, *supra* note 225, at 359–60.

272. *Id.* at 360.

273. *Id.*

274. *Id.* at 361.

275. *Id.*

276. *Id.*

277. *Id.* at 362.

278. *Id.*

279. *Id.*

280. *Id.* at 366.

version called the M16²⁸¹—the civilian, semiautomatic version of the AR-15 would become the best-selling rifle in American history.²⁸²

IV. THE HISTORY OF REGULATIONS ON ARMS BUILT FOR PERSONAL USE

As noted *supra*, the *Heller* Court deemed certain firearm regulations presumptively lawful:

Although we do not undertake an exhaustive historical analysis today of the full scope of the Second Amendment, nothing in our opinion should be taken to cast doubt on longstanding prohibitions on the possession of firearms by felons and the mentally ill, or laws forbidding the carrying of firearms in sensitive places such as schools and government buildings, or laws imposing conditions and qualifications on the commercial sale of arms.²⁸³

The Court added in a footnote that “[w]e identify these presumptively lawful regulatory measures only as examples; our list does not purport to be exhaustive.”²⁸⁴ The only indication of what other regulatory measures may be presumptively lawful is that they must be, at a minimum, “longstanding”—which the Court reiterated in its 2010 *McDonald v. City of Chicago* decision.²⁸⁵

Regulations on self-built arms are not longstanding. In fact, there were no restrictions on the manufacture of arms for personal use in America during the seventeenth, eighteenth, or nineteenth centuries. All such restrictions have been enacted within the last decade.²⁸⁶

281. *Id.* at 380.

282. See Jon Schuppe, *America's Rifle: Why So Many People Love the AR-15*, NBC NEWS (Feb. 15, 2008, 7:08 AM), <https://www.nbcnews.com/news/us-news/america-s-rifle-why-so-many-people-love-ar-15-n831171> [<https://perma.cc/F2QS-ERA6>] (“Today, one out of every five firearms purchased in this country is an AR-style rifle Americans now own an estimated 15 million AR-15s . . .”).

283. *District of Columbia v. Heller*, 554 U.S. 570, 626–27 (2008).

284. *Id.* at 627 n.26.

285. *McDonald v. City of Chicago*, 561 U.S. 742, 786 (2010) (quoting *Heller*, 554 U.S. at 626–27) (“We made it clear in *Heller* that our holding did not cast doubt on such longstanding regulatory measures as ‘prohibitions on the possession of firearms by felons and the mentally ill,’ ‘laws forbidding the carrying of firearms in sensitive places such as schools and government buildings, or laws imposing conditions and qualifications on the commercial sale of arms.’ We repeat those assurances here.”).

286. See *infra* pp. 147–48 (discussing the recent state restrictions on self-made arms).

A few colonial laws²⁸⁷ and one during the Revolutionary War²⁸⁸ required gunsmiths to repair militia arms before they could resume work for private clients. But even these extraordinary laws, designed to ensure that the colonies could defend themselves, had no impact on self-built arms.²⁸⁹

Indeed, the building of firearms for any purpose was widely celebrated and virtually never regulated.²⁹⁰ “Making fine guns of great artistic merit was a most respectable and important craft open to anyone who had the requisite skill” throughout American history.²⁹¹ “One need not have [had] a wealthy patron or sponsor, or work for king and nobility, to make

287. Maryland in 1665 required “[t]hat all Smiths which have tooles be forced to fixe armes for the Soldiers . . .” Report of the Council of Maryland (July 26, 1665), *in* 3 ARCHIVES OF MARYLAND 530, 531 (William Hand Browne ed., 1883); Connecticut in 1665 allowed “the Assistants or Commissioners in the respective plantations where any Gunsmith or any other fit to doe such worke doth inhabit, upon just complaint of any souldier or inhabitant in this Colony, to grant, order and to require the said smiths, in their said townships, for a rational consideration for their time and paynes, to be presently paid upon the repaire of the deficient Armes, forthwith to doe what is requisit to be done for fitting the Armes sent to them.” Record of the General Court (Jul. 6, 1665), *in* THE PUBLIC RECORDS OF THE COLONY OF CONNECTICUT, FROM 1665 TO 1678; WITH THE JOURNAL OF THE COUNCIL OF WAR, 1675 TO 1678, at 19, 19 (J. Hammond Trumbull ed., 1852). In 1688, Maryland ordered that public arms be delivered to “William Haimes Gun Maker at Harvey Towne to be fixed and made fit for service and he to doe noe other business in the way of his trade till those be done amended and finished . . .” Report of the Council of Maryland (Mar. 19, 1688), *in* 8 ARCHIVES OF MARYLAND 67, 67 (William Hand Browne ed., 1890).

288.

Resolved, That in case any of the gun-smiths, in the county of Lancaster, upon application made to them by the members of the committees of the respective townships to which they belong, shall refuse to go to work and make their proportion of the firelocks and bayonets required of this county, by the honorable House of Assembly, within two weeks from such application agreeable to the patterns, at the Philadelphia prices, such gun-smiths shall have their names inserted in the minutes of this committee as enemies to their country, and published as such, and the tools of the said gun-smiths so refusing shall be taken from them, and moreover the said gun-smiths shall not be permitted to carry on their trades until they shall engage to go to work as aforesaid, nor shall leave their respective places of residence until the arms are completed.

Committee Report (Nov. 10, 1775), *in* 13 PENNSYLVANIA ARCHIVES, SECOND SERIES 299, 299 (William H. Egle ed., 1887); *see also* Letter from the Committee of Lancaster County to the Committee of Safety (Mar. 16, 1776), *in* 4 PENNSYLVANIA ARCHIVES 717, 717–18 (Samuel Hazard ed., 1853) (“Our Workmen universally complain that the sums already fixed [for muskets] are inadequate to their Labour;—that the Sacrifice they made in quitting their Rifle Business is greater than they can well bear without some Equivalent . . . We are very sensible that their Observations . . . are not without Foundation.”).

289. *See supra* Part II (detailing the lengths the colonists took to manufacture gunpowder and firearms before and during the Revolution).

290. *See* WHISKER, *supra* note 76, at 91 (“In America, in every way, rights were distributive, not elitist and guns were among the properties all might possess, use, and enjoy.”).

291. *Id.*

guns.”²⁹² Thomas Jefferson wrote in 1793 that “[o]ur citizens have always been free to make, vend, and export arms. It is the constant occupation and livelihood of some of them.”²⁹³ While the sale of arms would be subject to regulation during the nineteenth century—typically for quality control or to mitigate the dangers of gunpowder²⁹⁴—the manufacture of arms, for personal use or otherwise, was not.

Today, it is lawful to build arms for personal use under federal law and in forty-four states, with no special restrictions.²⁹⁵ Only six states and the District of Columbia regulate the manufacture of arms for personal use. This is almost identical to the jurisdictional analysis that led the *Caetano* concurrence to conclude that stun guns were protected arms.²⁹⁶

The federal government has never required a license to build a firearm for personal use. The federal restrictions that apply to self-manufactured arms are aimed at firearms generally. For example, federal law forbids any person to manufacture, import, sell, ship, deliver, possess, transfer, or receive any firearm if “after removal of grips, stocks, and magazines, [it] is not as detectable as the Security Exemplar, by walk-through metal detectors calibrated and operated to detect the Security Exemplar,”²⁹⁷ or if “any major component . . . when subjected to inspection by the types of x-ray machines commonly used at airports, does not generate an image that accurately depicts the shape of the component.”²⁹⁸ Federal law also forbids any person to “assemble from imported parts any semiautomatic rifle or any

292. *Id.*; see also *id.* at 6 (“Even those apprentices who had never completed an apprenticeship might enter the trade. No guild, union or government agency attempted to regulate the gun making business. . . . He need not take any examination. He need not present one of his guns to any examining board.”); *id.* at 90 (“Gunsmiths considered it to be their right to make guns without regulation or interference.”).

293. Letter from Secretary of State Thomas Jefferson to British Ambassador to the United States George Hammond (May 15, 1793), in 7 THE WRITINGS OF THOMAS JEFFERSON 325, 326 (Paul Ford ed., 1904).

294. The black powder of the eighteenth century was volatile and particularly hazardous compared to today’s smokeless gunpowder. See COMM. ON SMOKELESS & BLACK POWDER, NAT’L RESEARCH COUNCIL, BLACK AND SMOKELESS POWDERS 20 (1998) (“In the 20th century, smokeless powders have largely replaced black powder in handguns, rifles, and larger-caliber weapons. Smokeless powders are not truly smokeless but, in comparison to black powder, the ‘smoke’ products produced when smokeless powders are used in ammunition are much cleaner.”).

295. See *What Is ATF Doing in Regards to People Making Their Own Firearms?*, ATF (May 14, 2015), <https://www.atf.gov/firearms/qa/what-atf-doing-regards-people-making-their-own-firearms> [<https://perma.cc/EG5K-Z9RJ>] (“An individual may generally make a firearm for personal use.”).

296. *Caetano v. Massachusetts*, 577 U.S. 411, 417–21 (2016) (Alito, J., concurring).

297. 18 U.S.C. § 922(p)(1)(A).

298. *Id.* § 922(p)(1)(B).

shotgun which is identical to any rifle or shotgun prohibited from importation under section 925(d)(3) of this chapter”²⁹⁹ And the making of a firearm that falls within the scope of the National Firearms Act requires advanced approval by the Bureau of Alcohol, Tobacco, Firearms and Explosives, as well as a tax payment.³⁰⁰ But no federal law uniquely targets arms built for personal use.³⁰¹ Only recently, California, New Jersey, Connecticut, Hawaii, Rhode Island, Nevada, and the District of Columbia have regulated self-built firearms.

California became the first state to regulate self-built arms, passing a law in 2016 that took effect in 2018, and was enhanced in 2019.³⁰² Under the law, prior to manufacturing or assembling a firearm, one must apply to the California Department of Justice for a unique serial number and permanently affix it to the firearm.³⁰³

New Jersey has regulated self-built arms since 2018.³⁰⁴ The State punishes anyone unlicensed or unregistered “who, with the purpose to manufacture or otherwise assemble a firearm,” obtains “a firearm frame or firearm receiver which is not imprinted with a serial number registered with a federally licensed manufacturer.”³⁰⁵ It is also illegal to obtain “any combination of parts from which a firearm without a serial number may be readily manufactured or otherwise assembled, but which does not have the capacity to function as a firearm unless manufactured or otherwise assembled.”³⁰⁶

Connecticut’s 2019 law prohibits anyone from completing the manufacture of a firearm without subsequently “obtaining a unique serial number or other mark of identification from the Department of Emergency Services and Public Protection” and “engraving upon or permanently affixing to the firearm such serial number or other mark in a manner that conforms with the requirements imposed on licensed importers and licensed manufacturers of firearms.”³⁰⁷ Additionally, the transfer of an

299. *Id.* § 922(r).

300. 26 U.S.C. § 5822.

301. *See generally* 18 U.S.C. § 922 (excluding the self-manufacturing of firearms for personal use from its prohibitions).

302. CAL. PENAL CODE § 29180 (2018).

303. *Id.* § 29180(b).

304. N.J. STAT. ANN. § 2C:39-9 (West 2019).

305. *Id.* § 2C:39-9(k).

306. *Id.*

307. CONN. GEN. STAT. ANN. § 29-36(a) (West 2022).

unfinished frame or receiver must comply with regulations for transfers of pistols or revolvers.³⁰⁸

Under Hawaii's 2020 law, anyone who is not a licensed dealer or manufacturer of firearms "shall not, for the purpose of assembling a firearm, purchase, produce with a three-dimensional printer, or otherwise obtain separately, or as part of a kit" a firearm receiver lacking a serial number registered with a federally licensed manufacturer.³⁰⁹ It is also illegal to possess "[a]ny combination of parts from which a firearm having no serial number may be readily assembled"³¹⁰

The District of Columbia, since 2020, requires the registration of "ghost guns," which it defines as an "unfinished frame or receiver."³¹¹

As of 2020, Rhode Island forbids anyone to manufacture or possess "any firearm produced by a 3D printing process,"³¹² or any "firearm, including a frame or receiver, that lacks a unique serial number [from] a licensed manufacturer, maker, or importer under federal law."³¹³

In 2021, Nevada passed a law that went into effect in 2022 and forbids anyone other than a licensed importer or manufacturer to possess an unfinished frame or receiver unless it is required by federal law to be imprinted with a serial number and is so imprinted.³¹⁴

In the other forty-four states, there are no special regulations for arms built for personal use. The recently enacted state laws are anomalies and, moreover, inconsistent with centuries of American tradition.

CONCLUSION

Heller established several principles that support the right to build arms for personal use. First, under *Heller*, any analysis must start with the Second Amendment's text, which protects the right to keep and bear arms and provides no reason to believe that people must buy the arms they wish to keep and bear. Second, *Heller* held that the Second Amendment protects the types of weapons that are commonly possessed for lawful purposes, regardless of how those arms are acquired. Third, *Heller* suggested, as lower courts have recognized, that the Second Amendment also protects the right

308. CONN. GEN. STAT. ANN. § 29-36(d) (West 2022).

309. HAW. REV. STAT. ANN. § 134-10.2(a)(1)-(2) (West 2022).

310. *Id.* § 134-10.2(a)(3).

311. D.C. CODE ANN. § 7-2505.01 (West 2021).

312. 11 R.I. GEN. LAWS ANN. § 11-47-8(e) (West 2020).

313. *Id.* § 11-47-2(8).

314. NEV. REV. STAT. ANN. § 202.363(1) (West 2022).

to acquire arms, which includes building them personally. Fourth, history and tradition—which is used to inform the Amendment’s text under *Heller*—reveals that Americans have long enjoyed and depended on the unregulated right to build arms since the colonial days. In sum, the right to build arms for personal use is a right protected by the Second Amendment.

