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UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA

STEVEN RUPP, et al.,

Plaintiffs,

vs.

ROB BONTA, in his official capacity as Attorney General of the State of California,

Defendant.

Case No.: 8:17-cv-00746-JLS-JDE

DECLARATION OF SEAN A. BRADY IN SUPPORT OF PLAINTIFFS' OPPOSITION TO DEFENDANT'S MOTION FOR SUMMARY JUDGMENT

Hearing Date: July 28, 2023
Hearing Time: 10:30 a.m.
Courtroom: 8A
Judge: Josephine L. Staton

[Filed concurrently with Memorandum of Points and Authorities in Opposition to Defendant's Motion for Summary Judgment; Plaintiff's Disagreements with Defendant's Survey of Relevant Statutes; and Response to Defendant's Statement of Uncontroverted Facts and Conclusions of Law]

DECLARATION OF SEAN A. BRADY

I, Sean A. Brady, am an attorney at the law firm Michel & Associates, P.C., attorneys of record for Plaintiffs in this action. I am licensed to practice law before the United States Court for the Central District of California. I am also admitted to practice before the Eastern, Northern, and Southern Districts of California, the courts of the state of California, and the Ninth Circuit Court of Appeals. I have personal knowledge of the facts set forth herein and, if called and sworn as a witness, I could and would testify competently to the truth of the matters set forth herein.

1. I recently submitted a declaration in support of Plaintiffs' motion for summary judgment. Dkt. No. 150-12. That declaration had attached Exhibits 1-64. To ease the burden on this Court, Plaintiffs will not resubmit the same documents again to oppose the State's simultaneous motion for summary judgment. They are incorporated here in full by reference. This additional declaration is intended simply to add a few more exhibits to rebut some of the State's assertions.

2. A true and correct copy of *Here Are All The Problems With California's Expert Witness Testimony In Gun Ban Case* by Mark Overstreet, https://thefederalist.com/2023/03/16/here-are-all-the-problems-with-californias-expert-witness-testimony-in-gun-ban-case/ (last visited June 23, 2023) is attached as **Exhibit 65**.

3. A true and correct copy of *How powerful are AR rifles?* by David Kopel, https://reason.com/volokh/2023/02/27/how-powerful-are-ar-rifles/ (last visited June 23, 2023) is attached as **Exhibit 66**.

4. A true and correct copy of *What is a Bump Stock and How Does it Work?* The New York Times, https://www.nytimes.com/interactive/2017/10/04/us/bump-stock-las-vegas-gun.html (last visited June 23, 2023) is attached as **Exhibit 67**.

5. A true and correct copy of *Flash Suppressors, Muzzle Brakes & Compensators – Just the Tip of the Barrel* by Dennis Ideue,

https://www.recoilweb.com/preview-flash-suppressors-muzzle-brakes-compensators-tip-barrel-5927.html (last visited June 23, 2023) is attached as **Exhibit 68**.

6. A true and correct copy of *Gun-ownership in America is diversifying, because of safety fears,* The Economist, https://www.economist.com/united-states/2022/01/22/gun-ownership-in-america-is-diversifying-because-of-safety-fears (last visited June 23, 2023) is attached as **Exhibit 69**.

7. A true and correct copy of *Public Mass Shootings: Database Amasses Details of a Half Century of U.S. Mass Shootings with Firearms, Generating Psychosocial Histories*, National Institute for Justice, https://nij.ojp.gov/topics/articles/public-mass-shootings-database-amasses-details-half-century-us-mass-shootings (last visited June 23, 2023), is attached as **Exhibit 70**.

8. A true and correct copy of *Wilson's Creek National Battlefield Foundation Purchases Rare Henry Repeating Rifle for Museum Collection*, National Parks Service, https://www.nps.gov/wicr/learn/news/20-15.htm (last visited June 23, 2023) is attached as **Exhibit 71**.

9. A true and correct copy of *The History of the Legendary Winchester Rifle*, Popular Mechanics, https://web.archive.org/web/20230105015635/https://www.popularmechanics.com/military/weapons/a23149/winchester-rifle/ (last visited June 23, 2023) is attached as **Exhibit 72**.

10. A true and correct copy of *American Firearms and Their Makers: A Research Guide*, Library of Congress, https://guides.loc.gov/american-firearms/gunmakers/winchester (last visited June 23, 2023) is attached as **Exhibit 73**.

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I declare under penalty of perjury that the foregoing is true and correct. Executed within the United States on June 23, 2023.

/s/Sean A. Brady
Sean A. Brady
Declarant

CERTIFICATE OF SERVICE
IN THE UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA

Case Name: *Rupp, et al. v. Bonta*
Case No.: 8:17-cv-00746-JLS-JDE

IT IS HEREBY CERTIFIED THAT:

I, the undersigned, am a citizen of the United States and am at least eighteen years of age. My business address is 180 East Ocean Boulevard, Suite 200, Long Beach, California 90802.

I am not a party to the above-entitled action. I have caused service of:

DECLARATION OF SEAN A. BRADY IN SUPPORT OF PLAINTIFFS' OPPOSITION TO DEFENDANT'S MOTION FOR SUMMARY JUDGMENT

on the following party by electronically filing the foregoing with the Clerk of the District Court using its ECF System, which electronically notifies them.

Anna Ferrari
Deputy Attorney General
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455 Golden Gate Ave., Suite 11000
San Francisco, CA 94102
Attorneys for Defendant

I declare under penalty of perjury that the foregoing is true and correct.

Executed June 23, 2023.

Christina Castron
Christina Castron

EXHIBIT “65”

What California's Expert Witness In Gun Ban Case Gets Wrong

thefederalist.com/2023/03/16/here-are-all-the-problems-with-californias-expert-witness-testimony-in-gun-ban-case/

March 16, 2023

Image CreditMitch Barrie / Flickr / CC BY-SA 2.0

Second Amendment

Here Are All The Problems With California's Expert Witness Testimony In Gun Ban Case

By: Mark Overstreet
March 16, 2023

9 min read

If the judge in Rupp v. Bonta follows the Supreme Court's Bruen decision, she will overturn California's ban.

Mark Overstreet

More Articles

Eventually, the Supreme Court may hear one or more challenges to Democrat-state laws that ban rifles Americans most commonly acquire for legitimate purposes, including self- and collective defense. *Rupp v. Bonta*, which challenges California's ban, is moving as we speak, and its outcome may depend on which veterans of the United States Marine Corps the federal judge handling the case believes.

The Ninth Circuit has remanded the case to Judge Josephine Staton, of the U.S. District Court for the Central District of California (Western Division), for consideration in light of the Supreme Court's ruling, in *New York State Rifle & Pistol Association v. Bruen* (2022), that firearm-related restrictions are unconstitutional if they're inconsistent with the nation's history and tradition of restrictions, an argument made by then-Judge (now Supreme Court Justice) Brett Kavanaugh in his dissent in *Heller v. District of Columbia* (2011).

If Judge Staton follows *Bruen*, she will overturn California's ban. It's simple. The ban focuses mostly on semi-automatic rifles that use detachable ammunition magazines. Such firearms have existed for more than a century. The Remington Model 8, primarily intended for hunting but also used for battle (two were used by law enforcement officers in the famous ambush of Bonnie and Clyde) was introduced in 1905. Americans own countless M1 Carbines, introduced in 1942.

The most commonly owned rifle of the type today — the AR-15 — was introduced in 1963. But California, the first state to impose a ban, did not do so until 1989, only eight other states have done so since, and these nine states account for only one-third of the U.S. population.

Congress imposed a ban, of a sort, from 1994 to 2004, but it was far less restrictive than California's ban, in that it allowed "banned" firearms to be made in slightly modified form, such as shown below. Six months after the "ban" took effect, in a CBS "60 Minutes"

segment titled “What Assault Weapons Ban?” reporter Leslie Stahl noted that “assault weapons are still … sold by the thousands,” and called 1994 “the best year for the sales of assault weapons ever.”

An AR-15 made to comply with the federal “ban” of 1994-2004. Notably, more than 738,000 AR-15s were made during the “ban” in this configuration—with a “pistol grip,” a feature anti-gun activists now characterize as a threat to civilization, as global warming activists do fossil fuel. Photo provided by author.

California’s ban will also fail if Judge Staton follows the guidance of the Supreme Court in two other cases. In *United States v. Miller* (1939), the court indicated that the right to keep and bear arms includes weapons that can be used to “contribute to the common defense.” And in *District of Columbia v. Heller* (2008), the court opined that *Miller* also recognized the right to “weapons … in common use.” Since 1990 alone, Americans have acquired an estimated 24,446,000 AR-15s and other semi-automatic rifles that use detachable ammunition magazines and are otherwise of the same style and configuration.

However, as David Kopel, of the Independence Institute and Cato Institute, pointed out recently, five U.S. Courts of Appeals have ignored or mischaracterized those Supreme Court decisions, and upheld “assault weapon” bans on the basis of anti-gun activists’ false

characterizations of the guns' rates of fire and power.

Supporters of California's ban are hoping for the same result when Judge Staton reconsiders *Rupp*. To that end, California enlisted retired Marine Corps Col. Craig Tucker, who's associated with Michael Bloomberg's anti-gun activist group, Everytown, to provide testimony, in which he contends that AR-15s are almost identical to M16 and M4 rifles used by the military for defensive purposes, but, despite this similarity, are not useful for defensive purposes in the hands of the American people.

I critiqued Tucker's testimony here. But some things beg for more attention. He claimed to have carried an M4 in Iraq, but said the rifle is designed to use .223 Remington ammunition, when it's instead designed to use 5.56x45mm ammunition. He claimed that a standard combat load in the military is 120 rounds and four magazines, when it's 210 rounds and seven magazines. He claimed an M4 has a "folding stock," when it instead has a telescoping stock, the length of which can be adjusted to the user.

Tucker also implied that the M4 is used by only helicopter, tank, and Bradley Fighting Vehicle crews, when it's instead the standard-issue rifle for the entire U.S. Army. He made several nonsensical claims that the M4's grip, which an AR-15 also has, improves marksmanship, but his resume includes no marksmanship instructor certifications. And in a second filing with the court, he disparaged the testimony of Buford Boone, who for 15 years served as the supervisory special agent of the FBI's Ballistic Research Facility, and who is recognized as a world-class expert in his field.

So, I spoke to two Marine Corps veteran friends of many years, of whose experience I'm certain, and one of them introduced me to another Marine, whose credentials are also unassailable. The three are:

Chief Warrant Officer 5 Jeffrey L. Eby – 28 years in the Marines, 11 as a Marine Gunner. Combat veteran in Iraq. Officer-in-Charge of the USMC Small Arms Instructor Course, which developed the USMC Combat Marksmanship Program.

Chief Warrant Officer 5 Mike Musselman – Infantryman for 25 years of his 30 years with the Corps. Marine Gunner and Infantry Weapons Officer. Three combat deployments to Iraq, one to Afghanistan.

CWO5 Musselman (third from left) and CWO5 Eby (fourth from left) in Sadr City, Iraq, after 57 days of continuous combat. Used with permission.

Staff Sergeant Jack Leuba – Infantry Rifleman, Marksmanship and Small Arms Weapons Instructor, combat veteran in Iraq and Afghanistan, Staff Non-Commissioned Officer-in-Charge and Chief Instructor, USMC Small Arms Weapons Instructor School.

Staff Sgt. Leuba (right). Used with permission.

These Marines' responses to Tucker's claims are below.

Rate of Fire

By way of background, in 1989, when "assault weapon" legislation was introduced in California and Congress, the media began trying to trick the American people into thinking that semi-automatic rifles were machine guns used by the military.

This video shows CBS, in 1989, broadcasting footage of government personnel firing machine guns in a story about legislation to ban semi-automatic rifles, followed by NBC doing the same thing in 1993, before the Senate voted on "assault weapon" legislation introduced by Dianne Feinstein, D-Calif., and again in 1994, before the House of Representatives voted on the same legislation.

Watch Video At: https://youtu.be/ad9u3QK6Kr0

In 2003, after more than a decade of complaints about the media's machine gun lie, an anti-gun activist group claimed that semi-automatic rifles are *more* useful than automatic rifles in combat.

Tucker: "The only difference [between an AR-15 and a military M4] is the AR-15 cannot fire on full-auto," "a picayune difference," and "semiautomatic rifles [are] more lethal and most useful in combat settings."

CWO5 Musselman: "The difference between semi-automatics and fully-automatics is significant and often decisive. The military is replacing the M16 and M4 with rifles of a newer design, and the newer rifles are capable of fully-automatic fire."

Note: The military doesn't use AR-15s or other rifles California considers an "assault weapon."

Tucker: "Changing [30-round] magazines during intense combat is the most important individual skill taught to Marines."

Staff Sgt. Leuba: "False. The most important rifle skill taught to Marines is hitting the target. The USMC Combat Marksmanship Program allocates hundreds of hours of training specific to that, with barely a handful allocated to tasks such as reloading."

Tucker: "[T]he pistol grip allows the rifleman to pull the rifle into her (sic) shoulder with each shot" and "functions as a hand rest to reduce hand/finger fatigue during long combat engagements."

Staff Sgt. Leuba: “To the contrary, hooking the thumb of the firing hand over a traditional stock [see the photo below] provides for less fatigue when keeping the hand near the controls and trigger.”

The author shoulders an M1 one-handed. An M1 weighs much more than an AR-15, is front-heavy, and does not have an AR-15 type “pistol grip,” which Tucker claims is necessary to achieve aim. Photo provided by author.

Tucker: “Absent any pistol grip, a semi-automatic rifle would be difficult to operate when fired rapidly, as the rifle barrel would seesaw up and down with each shot fired in succession.”

CWO5 Musselman: “No. It’s a matter of physics. When the rifle is fired, it imparts upward movement of the barrel. It’s the forward hand, not the hand on the pistol grip, that controls that impulse.” This video illustrates Musselman’s point.

Watch Video At: https://youtu.be/qrnUctU4Lrg

Power of the Bullets

Tucker: “AR-15 and M4 … [ammunition] is capable of severing the upper body from the lower body, or decapitation.”

Not according to an NBC News report in 2008, which stated “M855 rounds continue to be a weak spot in the American arsenal. They are not lethal enough to bring down an enemy decisively, and that puts troops at risk, according to Associated Press interviews. … Fired at short range, the M855 round is prone to pass through a body like a needle through fabric.”

Staff Sgt. Leuba: “Standard ballistics gelatin tests prove that 5.56x45mm NATO projectiles are not capable of ‘severing the upper body from the lower body, or decapitation.’”

CWO5 Musselman: “In my combat experience, I never saw a 5.56mm projectile cause the damage Col. Tucker claims.”

CWO5 Eby: “The Marine Corps abandoned the M16/M4 ammunition used in Afghanistan and Iraq, due in part to its failure to perform against enemy personnel in short-range combat engagements.”

Note: Ammunition for AR-15s is the lowest-powered among the 13 most popular centerfire rifle cartridges in America.

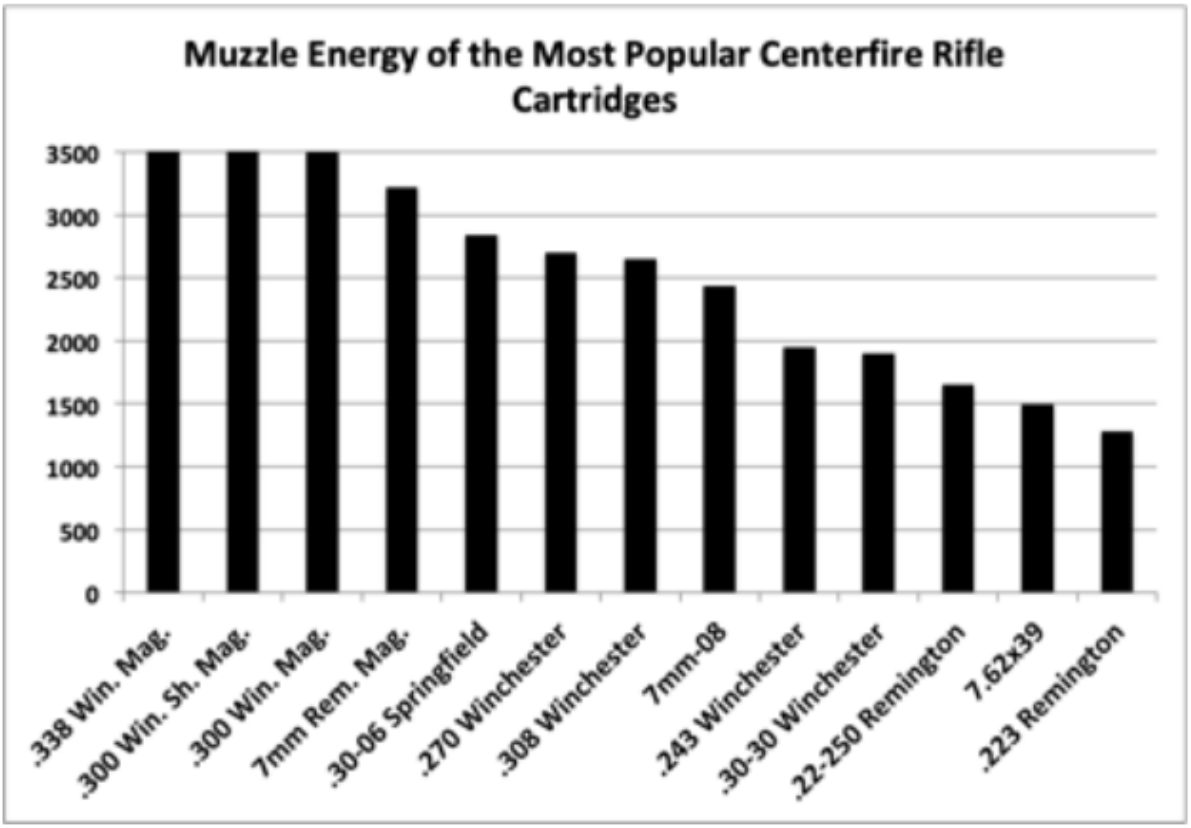

Chart provided by author.

Also, bullets used in 5.56 and .223 cartridges are tiny and only slightly heavier than a dime.

Photo by author.

Finally, Tucker repeatedly insisted that AR-15s, their magazines, and some of their other features are “not needed” for self-defense. American gun owners appear to disagree, and gun owner opinion was a factor the Supreme Court considered decisive in overturning Washington, D.C.’s handgun ban in *Heller*.

Something approaching 100 percent of Americans who attend defensive rifle classes or who participate in defensive-skills-based rifle marksmanship competitions do so with AR-15s or other semi-automatic rifles that use detachable ammunition magazines and that have “pistol grips.” Polls repeatedly find that Americans acquire guns primarily for defense, and government data indicate that Americans acquire several million AR-15s every year, in addition to other firearms that California prohibits as “assault weapons.”

I’ll close with a final observation by Staff Sgt. Leuba:

> Tucker’s most egregious errors are his claims that M4s and AR-15s are not useful for individual self-defense. As a graduate of the USMC Close Quarters Battle Course, with significant experience in military operations in urban terrain and enclosed spaces, I can attest that not only is the M4 (and, therefore, an AR-15) a suitable firearm for use in compressed spaces, it is preferred. It gives a defender—military or private citizen—a greater ability to end a threat at close-range, without endangering others in close proximity.

Mark Overstreet is a firearm instructor and freelance writer in central Texas. He retired in 2016 as the senior research coordinator of the National Rifle Association's Institute for Legislative Action, after 25 years with the organization. He is also retired from the Army Reserve, after 23 years including duty as a combat cameraman in Iraq. His views do not necessarily reflect those of the NRA or the Department of Defense. He can be reached at PanoplyTactical.com.

EXHIBIT “66”

The Volokh Conspiracy
Mostly law professors | Sometimes contrarian | Often libertarian | Always independent

GUNS

How powerful are AR rifles?

About the same as other rifles

DAVID KOPEL | 2.27.2023 2:37 PM

Several federal and state courts are relitigating the constitutionality of "assault weapon" bans after the Supreme Court's decision in *New York State Rifle & Pistol Association v. Bruen*. Under *Bruen*'s text-and-history test, government attorneys have argued that such laws fit within a supposed historical tradition of banning what the government calls "unusually dangerous" arms; the attorneys point to not-really-on-point historical laws about weapons such as Bowie knives or slungshots (a type of flexible hand-held impact weapon).

As detailed in a pair of previous posts, the mainstream historical tradition for controversial arms such Bowie knives and slungshots was to forbid concealed carry, to restrict sales to minors (especially without parental consent), or to impose extra punishment for misuse. But not to prohibit possession or sales for adults. *See* the previous VC posts, The legal history of bans on firearms and Bowie knives before 1900 and Bowie knife statutes 1837-1899. Although the articles are mainly about Bowie knives, many of the quoted statutes also covered slungshots.

"Assault weapons" long have been portrayed as exceptionally powerful firearms that are far more dangerous than other modern firearms and ill-suited for lawful activities like self-defense. When enacting the nation's first "assault weapon" ban in 1989, the California legislature declared that "each firearm has such a high rate of fire and capacity for firepower that its function as a legitimate sports or recreational firearm is substantially outweighed by the danger that it can be used to kill and injure human beings."

Five federal circuit courts relied on the lethality rationale pre-*Bruen* to uphold "assault weapon" bans. The First, Second, and Fourth circuits asserted that "assault weapons" have "a capability for lethality—more wounds, more serious, in more victims—far beyond that of other firearms in general, including other semiautomatic guns." The D.C. Circuit claimed that "assault weapons" like AR rifles are designed "to shoot multiple human targets very rapidly" and "fire almost as rapidly as automatics." The Seventh Circuit asserted that such firearms "enable shooters to fire bullets faster" and their "spray fire" design makes them more dangerous in mass shootings. The Fourth Circuit went so far as to hold that "assault weapons" are not protected arms under the Second Amendment because of their deadly similarity to machine guns. The First Circuit cited medical sources claiming that "assault weapons" cause far more devastating wounds that other firearms and declared that using such firearms for home defense "is tantamount to using a sledgehammer to crack open the shell of a peanut."

Thus, the prohibition argument is based on 1. Rate of fire, and 2. The power of the weapons' bullets.

The rate of fire claim is preposterous. Semiautomatic rifles as a class (including those that are supposedly "assault weapons") fire at essentially the same rate as semiautomatic handguns. These handguns, from companies such as Ruger, Smith & Wesson, Springfield, or Glock, are the most common defensive firearms in the United States; under the Supreme Court's decision in *District of Columbia v. Heller*, they may not be prohibited. As then-Judge Kavanaugh argued in his dissent in *Heller II,* it is irrational to single out semiautomatic rifles for prohibition based on rate of fire, given that semiautomatic handguns are plainly constitutionally protected. *Heller v. District of Columbia*, 670 F.3d 1244 (D.C. Cir. 2011) (Kavanaugh, J., dissenting).

This post will mainly discuss the second argument: that "assault weapon" bullets are much more destructive than bullets from other firearms. This post is co-authored by Campbell University law professor Gregory Wallace, who has published two articles on "assault weapons," the most recent being *"Assault Weapon" Lethality*, 88 Tenn. L. Rev. 1 (2020). Professor Wallace and I are among the co-authors of the law school textbook *Firearms Law and the Second Amendment: Regulation, Rights, and Policy* (3d ed. 2022, Aspen Pub.)

As post-*Bruen* litigation proceeds, more absurd claims are appearing in court filings and opinions about the extreme firepower of "assault weapons" and their unsuitability for self-defense. This post discusses two such examples. The first is from the California Attorney General in *Rupp v. Bonta*, a case challenging California's "assault weapon" ban. It was remanded by the Ninth Circuit for reconsideration in light of *Bruen* and is currently

pending in federal district court in California. The second is from a recent federal district court opinion in *Bevis v. City of Naperville, Illinois,* denying a preliminary injunction against state and local "assault weapon" bans.

The discussion below involves precise description of the wounding effects of different types of ammunition. If you don't want to read such things, that is your reasonable choice. Just don't make decisions about what arms persons under your direct or indirect control can possess if those decisions are based on wounding effects and you refuse to be informed about wounding effects.

I. The names of different rifles

Let's start with some nomenclature for firearms models. The "AR" in AR-15 stands for "ArmaLite Rifle." It was the 15th model invented by the ArmaLite company. The AR-17 (which never went very far) was a shotgun. The AR-15 was an improved version of the AR-10 of 1956. In 1959, ArmaLite sold the AR-15 patents to Colt's Manufacturing Company.

Colt's then produced two firearms lines from the patents. The semiautomatic AR-15 rifle was introduced to the civilian market in 1964. The M16 was an automatic (machine gun) version for military use; it was sold in large quantities to the U.S. military and became a standard infantry weapon during the Vietnam War. The M16 and AR-15 look the same, except that the M16 has a selector switch that allows the user to choose automatic fire. Internally, the M16 has components for automatic fire and the AR-15 does not. Today, the military has adopted an improved version of the M16, namely the M4 carbine. (A carbine is a relatively short rifle.)

Meanwhile, the patents that Colt's had bought from ArmaLite expired in 1977. Today, most rifle manufacturers make a rifle based on the AR platform. However, Colt's still owns the tradename "AR-15." So precisely speaking, none of the firearms from the other manufacturers can be called an "AR-15." This post, except when quoting or summarizing writings that incorrectly use "AR-15" when they mean a broader group of rifles, will simply use the term "AR" for the class of rifles that use the AR platform.

II. Colonel Tucker's expert declaration in *Rupp*

The California AG has served the *Rupp* plaintiffs with an expert report and declaration from retired Colonel Craig Tucker, U.S. Marine Corps, who served as an infantry officer for 25 years and commanded combat units in Iraq. The curriculum vitae attached to his report is impressive and his service appreciated. Colonel (Ret.) Tucker did not disclose in either his report or CV that he is a founding member of the Veterans Advisory Council to Michael Bloomberg's gun-control advocacy group Everytown for Gun Safety.

Describing the purported lethality of the civilian AR-15, the most popular target of "assault weapon" bans, the Tucker report states:

> The AR-15 and M4 are both designed to fire a .223 round that tumbles upon hitting flesh and rips thru the human body. A single round is capable of severing the upper body from the lower body, or decapitation. The round is designed to kill, not wound, and both the AR-15 and M4 contain barrel rifling to make the round tumble upon impact and cause more severe injury. The combination of automatic rifle and .223 round is a very efficient killing system. The same can be said of the AR-15.

These five sentences are a cascade of errors and absurdities.

II.A. "*The AR-15 and M4 are both designed to fire a .223 round . . .*"

The Tucker declaration asserts that the M4 is "designed to fire a .223 round." In fact, the the military's M4 carbine is designed to fire the 5.56mm NATO round, not the civilian .223 Remington round. It is difficult to understand how a Marine colonel with combat infantry experience would think the M4 is designed for the .223 round.

The numbers .223 and 5.56 designate the caliber of the round based on a rough approximation of bullet diameter, which is expressed in thousandths of an inch (.223 caliber) or millimeters (5.56 caliber). The U.S. military uses the NATO designation, measured in millimeters.

While the .223 and 5.56 rounds have the same bullet diameter, there is a difference. The case for the 5.56mm has a .125-inch longer throat and thus can be loaded with additional gun powder, resulting in slightly higher performance. The military M16 and M4 are 5.56mm. Civilian guns on the AR platform are sometimes .223, but the majority are 5.56mm (still able to use .223), or other calibers. Because of the higher pressure created when fired, the 5.56 round should *not* be used in an AR rifle chambered only for the .223 round. The .223 round *can* be used in a 5.56 chamber, but may cause improper cycling (*e.g.*, jams) with shorter barrels.

II.B. "*that tumbles upon hitting flesh and rips thru the human body.*"

To understand why this statement is false requires an explanation of wound ballistics, the study of the effects of a penetrating projectile on living tissue. Dr. Martin Fackler, military trauma surgeon, former director of the Army's Wound Ballistics Laboratory, and the most widely-recognized modern expert on the subject, observed that "[p]robably no scientific field contains more misinformation than wound ballistics."

A firearm bullet is propelled by the expanding gas from a gunpowder explosion. Other things being equal, a bullet fired from a longer barrel will have higher velocity than a bullet fired from a shorter barrel. For example, a bullet that travels through a 16 inch rifle barrel will spend about four times longer being propelled by the expanding gas than will a bullet that travels through a 4 inch handgun barrel.

Bullets from AR rifles, like bullets from most other modern rifles, typically have about three times the muzzle velocity of common handgun bullets. Muzzle velocity is measured at the moment the barrel exits the bullet; as the bullet travels downrange, velocity declines due to air friction.

More velocity does not necessarily mean greater wound severity—a ping-pong ball and a bullet fired at the same muzzle velocity will produce very different effects on the target (*terminal results*).

A starting point in wound ballistics is the kinetic energy of the bullet when it strikes the target. The formula is: KE = 1/2 x mass x (square of the velocity). Other things being equal, a bullet that is twice as heavy as a different bullet will have twice the kinetic energy.

Both velocity and bullet mass contribute to kinetic energy. Rifle bullets in general strike with much higher kinetic energy than do handgun bullets, because the rifle bullets have higher velocity.

But the bullets for the most common AR calibers (.223, followed by 5.56mm) are much smaller than the bullets from many other rifles. Thus, they strike with only about a half to a third of the kinetic energy of larger caliber rifle bullets, such as .270, .30-'06, .308, .338, .444, and so on. The larger bullets not only have a greater width (*i.e.* caliber), they also typically are longer.

If we were in the year 1700, then the wound ballistics analysis would be at an end, since at the time all bullets had the same shape. They were spheres. That is why today a unit of ammunition is still called a "round." However, since the early 1800s, conoidal bullets have been the norm. The shape improves aerodynamic stability, so the bullet can travel further and with less loss of velocity.

Then as now, the location of impact and type of type of tissues disrupted along the bullet's path is more influential than kinetic energy, velocity, or mass. Today, the bullet's shape and construction materials are also very important.

Tissue damage from bullets comes primarily from the permanent *crushing* of tissue in the bullet's path. This is the *permanent cavity* (a/k/a *permanent track*).

Additionally, if the bullet is traveling fast enough, the pressure wave following the bullet can cause temporary *stretching* of tissue surrounding the bullet's path. This is the *temporary cavity* (a/k/a *temporary track*).

The size of the permanent cavity is proportional to the size of the bullet. The size of the temporary cavity can vary greatly, depending on the size and location of the temporary cavity on the bullet's path and the elasticity of the tissue affected.

More elastic tissue can absorb energy more easily, and is therefore much more resistant to injury from temporary cavitation. Such tissue includes muscle, lungs, skin, blood vessels and empty or hollow organs such as the stomach, bladder, or intestines.

Less elastic tissue, such as the brain, liver, kidney, and fluid-filled organs (*e.g.*, the heart), are more likely to shatter, rupture, or tear due to temporary cavitation. Bone fractures from temporary cavitation are rare—when a bone is shattered, it usually is due to being struck by the bullet. Injuries to extremities normally come from being hit by the bullet or bullet fragments (or bone fragments if the bone is hit) rather than by temporary cavitation.

Notwithstanding Col. Tucker's claim, the bullets fired from an AR do not "tumble[] upon hitting flesh."

Bullets never "tumble" in the ordinary sense of the word. That is, they do not perform repeated 360 degree rotations horizontally or vertically. In human tissue, an intact bullet can change the angle of penetration by up to 180 degrees, meaning that the back of the bullet is now the front. The most damage occurs when the bullet has rotated 90 degrees. Then, the entire length of the intact, nondeformed bullet disrupts tissue, thus creating a larger permanent wound cavity and a larger temporary cavity.

Changes in bullet angle are called *yaw*. While some ballistics experts distinguish horizontal changes (yaw) from vertical changes (pitch), most use "yaw" for any change in angle.

Below, we will describe how some military ammunition, with which Col. Tucker is presumably familiar, can yaw—that is, change angle by as much as 90 to 180 degrees in human tissue. What Col. Tucker does not understand is that many civilian AR users do not choose the yaw-prone 5.56mm full metal jacket ammunition that the U.S. military uses. In fact, many AR users choose ammunition that is designed *not* to yaw but instead to deform.

A bullet can yaw if it stays physically intact, retaining is shape as it moves though the target. But many bullets, especially those made for self-defense, are designed *not* to stay intact. These bullets are designed to fragment, expand, or deform when they strike a target. For simplicity, we will call such bullets "deforming bullets," because they are designed to lose their original form when they strike.

Why is deforming ammunition often chosen for defensive rifles and handguns of all types? Why do many law enforcement agencies mandate that their deputies and officers use such ammunition? The main reason is safety.

If a bullet stays intact, there can be two results: It can just come to a stop in the body. Or it can continue through the body and exit the other side, creating an *exit wound* (as opposed to an *entry wound*).

This can be a bad result for two reasons: First, the exited bullet could hit another person. For example, when Alec Baldwin shot a victim on a movie set, the bullet entered her chest, killed her, exited, and then struck and injured a second victim. In a law enforcement or self-defense situation, the bullet that exited the criminal's body might hit an innocent victim.

Second, the purpose of shooting another person is to make that person stop doing something immediately, such as perpetrating a violent felony. Therefore, all of the kinetic energy from the bullet should be delivered to the perpetrator, to increase the possibility that the bullet will stop the perpetrator.

Deforming bullets are designed to not exit the body. Instead, they are designed to impart all their kinetic energy to a single target. Because they are made not to stay intact, they do not yaw, or to use Col. Tucker's word, "tumble."

There are many varieties of deforming ammunition, based on shape, materials, and construction. For example, in a hollow-point bullet, the tip opens up like flower petals as its moves through the target. Similarly, a solid soft tip on a bullet might flatten or "mushroom." The expansion by whatever means gives the bullet a larger diameter, which crushes more tissue; it also increases the size of both the permanent and temporary cavities. When the bullet deforms or expands, it becomes blunter and thus more stable, preventing the "tumbling" described by Col. Tucker. Such bullets also can fragment in tissue, with the fragments spreading out and creating their own permanent wound tracks separate from the main wound track. These fragments greatly increase the permanent cavity size as they tear and detach tissue displaced by the temporary cavity. A deforming or fragmenting bullet from a powerful handgun can produce similar effects to tissue, resembling those from a much faster rifle bullet.

Thus, in most situations of lawful defense of self or others, deforming/expanding bullets do the best job of increasing the likelihood that the imminent or ongoing attack will be stopped, *and* of reducing the risk that an exited bullet could injure a bystander.

Most rules have exceptions. One of the situations when deforming/expanding bullets might not a preferred choice for self-defense is in bear country. Some people say that a flat-nosed, non-deforming bullet is the one with the best chance of making its way through an attacking bear's massive rib cage.

Col. Tucker's declaration provides no indication that he has any familiarity with the above: namely that civilian AR users can and often do choose AR ammunition that is specifically designed *not* to tumble.

Instead, Col. Tucker seems to mistakenly believe that all civilians users of AR rifles use the same ammunition as does the military for the M16 and M4. That ammunition is 5.56mm FMJ (full metal jacket). In a full metal jacket, the lead bullet core is surrounded by a jacket of metal. Lead is a very soft material. On the Moh's Hardness scale of 1-10, lead is 1.5—below a fingernail (2.5), penny (3.5), or diamond (10).

With unjacketed bullets, there is substantial lead abrasion due to friction as the bullet travels down the barrel. *Lead fouling* degrades accuracy. In combat situations, when a soldier might have to fire hundreds or thousands of rounds with no opportunity to clean the gun, preventing lead fouling is important. Because the full metal jacket is made of harder material than lead, much less lead abrasion builds up in the gun barrel. This is one of the reasons why full metal jacket is preferred in a military context.

For bullets that do not deform, tissue damage is (relatively) minimal as long is the bullet travels point-forward. But, as described above, some rifle bullets, such as the military 5.56 round with a full metal jacket, can yaw as much as 180 degrees, increasing wound severity. In contrast, most nondeforming handgun bullets yaw at least a little, but usually not enough to cause significant additional damage.

Nondeforming bullets from any firearm also may fragment due to stress from yawing against gravity, or after striking bone. Fragmentation increases wound severity, as described above.

In short, a nondeforming round, such as the military 5.56mm with a full metal jacket, might travel intact more or less intact through a target and could hit someone else. Or it might fragment or significantly yaw, causing greater damage.

According to the California Attorney General and Col. Tucker, the .223 round begins to instantly tumble "upon hitting flesh." As explained above, many civilian .223 or 5.56mm rounds are designed *not* to "tumble."

Suppose we revise Col. Tucker's declaration so that it applies only to the 5.56mm FMJ rounds with which he is familiar, and not to the plentitude of AR rounds of which he apparently has no knowledge. With a corrective and vastly narrowing construction, is Col Tucker accurate? That is, is it true that the 5.56 FMJ "tumbles upon hitting flesh"? Certainly not.

Dr. Fackler found that about 85% of military 5.56mm FMJ bullets travel point-forward at least five inches before beginning to yaw. The straighter the bullet hits the target, the longer it will take to yaw after it strikes. Thus, a nondeforming full metal jacket rifle bullet can pass completely through a human target without yawing or fragmenting, leaving a small wound channel and relatively mild injury unless it strikes a vital organ, bone, or other critical structure.

The M16 and M4 have always been subjects of military controversy. On the one hand, they are much more accurate, when functioning, than their Soviet counterpart rifles, such as the AK-47 and its lineage. The AK-47 is the automatic (*avtomat* in Russian) rifle invented by Mikael Kalashnikov and first manufactured in 1947. Like the M16 and M4, and unlike ARs, the AK-47 is capable of automatic fire. Compared to the AK-47, American guns are more fragile in adverse conditions, such as sand storms. The Soviet guns were built to looser tolerances (how closely the parts fit together). The result is that American rifles are more accurate when clean and Soviet rifles are less affected by dust and grit.

The modern American infantry weapons have also been controversial for another reason. Compared to the rifle ammunition issued to almost all armies past and present, the 5.56mm FMJ is unusually lightweight. This is an advantage because a soldier can carry more ammunition, and thus continue fighting longer even when resupply is not available. This is same reason that in the 18th century, American long hunters, who might be out on expeditions for months, down-graded their calibers from the standard musket calibers of .60 or .75 to the .46 or .32 of the Pennsylvania/Kentucky rifles. The less the ammunition weighs, the more one can carry.

The disadvantage is the lower the ammunition weight, the less the stopping power. As explained above, any reduction in bullet weight is exactly matched by a reduction in kinetic energy.

There have been numerous reports that the military's 5.56 FMJ round has insufficient terminal effectiveness in combat. Combat veteran and military small arms expert Jim Schatz explains, "The disturbing failure of the 5.56x45mm caliber to consistently offer adequate incapacitation has been known for nearly 20 years." He describes one Special Forces (SF) mission in Afghanistan when an insurgent was shot seven or eight times in the torso with the 5.56 round, got back up, climbed over a wall, and reengaged other SF soldiers, killing a SF medic. The insurgent then was shot another six-to-eight times from about 20-30 yards before finally being killed by a SF soldier with a handgun.

Similarly, Rob Maylor, a former Australian SAS sniper, has "on several occasions witnessed bad guys being hit multiple times by 5.56mm . . . at varying ranges and then continue[] to fight." He explains that while the 5.56 round is designed to yaw and fragment, "[t]his isn't happening all the time and as a result projectiles are passing through the body with minimal damage."

Mark Bowden's bestselling book *Black Hawk Down* gives vivid accounts of less-than-lethal performance of the Army's green-tip 5.56mm bullet (M855) in the Battle of Mogadishu in 1993. He describes one Delta operator's rounds as

> passing right through his targets. When the Sammies were close enough he could see when he hit them. . . . [I]t was like sticking somebody with an ice pick. The bullet made a small, clean hole, and unless hit happened to hit the heart or spine, it wasn't enough to stop a man in his tracks. [The operator] felt like he had to hit a guy five or six times just to get his attention.

These instances are consistent with Dr. Fackler's own findings. He recounts that

> [i]n 1980, I treated a soldier shot accidentally with an M16 M193 bullet from a distance of about ten feet. The bullet entered his left thigh and traveled obliquely upward. It exited after passing through about 11 inches of muscle. The man walked into my clinic with no limp whatsoever: the entrance and exit holes were about 4mm across, and punctate. X-ray films showed intact bones, no bullet fragments, and no evidence of significant tissue disruption caused by the bullet's temporary cavity. The bullet path passed well lateral to the femoral vessels. He was back on duty in a few days. Devastating? Hardly.

Dr. Fackler further notes that "[i]n my experience and research, at least as many M16 users in Vietnam concluded that [the 5.56mm] produced unacceptably minimal, rather than 'massive,' wounds."

Like any firearm, the AR rifle in typical calibers such as .223/5.56mm, can cause serious or lethal wounds, and so can other rifles, shotguns, and handguns. Wound profiles from the Army's Wound Ballistics Laboratory illustrate the permanent and temporary cavities, penetration depth, deformation, and fragmentation of both the deforming (soft-point) .223 caliber bullet, the non-deforming 5.56mm FMJ bullet, and other larger caliber bullets typically used in hunting rifles (e.g., .30-30, .308). A comparison of those profiles shows that the wounding effects of the larger caliber bullets are at least as extensive as the .223/5.56, and typically more so.

According to Dr. Fackler, the .223 Remington is "a 'varmint' cartridge, used effectively for shooting woodchucks, crows, and coyotes." Because of its smaller size, there is an ongoing debate among hunters over whether the .223 round has adequate terminal performance for taking deer or larger game. Some states ban the use of .223 caliber rifles when hunting deer and other animals larger than varmints because their rounds lack sufficient power. The ethos of hunting is to take an animal with a single fatal shot. In the views of some state game commissions, the usual AR calibers of .223 and 5.56mm are too weak; at least a .270 is required for hunting deer, antelope, or anything larger.

II.C. "*A single round is capable of severing the upper body from the lower body, or decapitation.*"

This is the most implausible claim in Col. Tucker's report, which is made under oath and theoretical penalty of perjury. He declares that his report "is based on my own personal knowledge and experience, and, if I am called as a witness, I could and would testify competently to the truth of the matters discussed in this Report."

No one disputes that wounds from an AR rifle, like any firearm, can be fatal. That such wounds can be "capable of severing the upper body from the lower body, or decapitation" is false.

Buford Boone is the former director of the FBI's Ballistic Research Facility for 15 years and one of the world's leading authorities on internal, external, and terminal ballistics. In his expert witness rebuttal report in *Rupp v. Bonta,* he describes this claim as "so ridiculous that it should, and actually does, cast doubt on [Col. Tucker's] qualifications as an expert in the field of firearms, particularly as it relates to wound ballistics."

Col. Tucker offers no examples or authority to support his claim. No doubt he will be asked at deposition or trial whether he has personally witnessed a person being decapitated or having his upper body severed from his lower body by a single .223 or 5.56 round. Mr. Boone explains in his rebuttal report why it is unlikely Colonel Tucker can answer truthfully in the affirmative:

> In almost 26 years of professional involvement in the field of wound ballistics, I have never heard, even anecdotally, of an incident wherein a person was decapitated or their upper body was severed from their lower body as a result of being shot by a single projectile fired from any small arm. ["Small arm" is a term of art to distinguish hand-carried weapons from larger arms, such as naval artillery.] It is notable that the .223/5.56 is on the lower end of terminal performance potential of the vast calibers available in centerfire rifles. In fact, the .223/5.56 is below the allowable minimum cartridges for deer hunting in some states. Additionally, since reading Colonel (Ret.) Tucker's supplemental report, I have shared that statement with many associates in the firearms field. All have questioned the credentials of an "expert" that would make such a claim. It is my opinion that no examples have been provided because such performance has never been witnessed.

Although perhaps never "witnessed," claims that "assault weapons" can decapitate or dismember have appeared in several media reports and at least one court opinion. They can be traced to a U.S. military report from Vietnam in 1962. Derivatively, an NPR report on the Uvalde murders in May 2022 describes the civilian AR as "designed to blow targets apart" and claims that "its bullets travel with such fierce velocity that they can decapitate a person." The NPR article links to an article in *The Intercept* that cites a military report describing how "Viet Cong fighters hit with the weapon were frequently decapitated and dismembered, many looking as though they had 'exploded.'" *The Intercept* article links to a *Gawker* story that quotes extensively from the military report about "how the AR-15, chambered with the same .223 ammunition that it uses today, not only killed VC soldiers but decapitated and dismembered them." In *Kolbe v. Hogan*, the Fourth Circuit cited the same military report to prove the extreme lethality of the civilian AR. Military testing, the court said, found that high-velocity projectiles from the AR caused "[a]mputations of limbs, massive body wounds, and decapitations."

However, as detailed above, the US military in Vietnam never used civilian ARs or .223 ammunition; the military used M16 rifles with 5.56mm ammunition.

The testing of the M16 with 5.56mm cited by the Fourth Circuit and some credulous media was conducted as part of Project AGILE, part of a research program in Southeast Asia initiated by the Department of Defense's Advanced Research Projects Administration (DARPA). At the time, the military was considering whether to replace the M14 (a Korean War gun) with the M16 as its primary combat rifle. Project AGILE supplied M16 rifles to South Vietnamese combat troops for field trials to determine whether the M16 would perform satisfactorily in combat. The subsequent report included claims of massive injuries from the M16's 5.56mm round, including two amputations and a decapitation.

These claims were never confirmed. The Army's Wound Ballistic Laboratory at Edgewood Arsenal tested the lethality of the M16 in gelatin, animals, and cadavers but could not duplicate the "theatrically grotesque wounds" reported by Project AGILE. C.J. Chivers, a Pulitzer Prize winning *New York Times* journalist, extensively researched the testing for his book *The Gun*. "No matter what they did," writes Chivers, "they were unable to reproduce the effects that the participants in Project AGILE claimed to have seen." As Chivers writes:

> even the hollow-points [common for civilian use, but not military] failed to duplicate anything like the spectacular effects recorded by the Vietnamese unit commanders and their American advisors, which had subsequently been taken as fact and much used in the . . . campaign to sell the AR-15. [Recall that the "AR-15" was at first a marketing term for both the automatic M16 and for non-automatic rifles.]

The Wound Ballistic Laboratory's lethality study was kept secret for more than four decades, Chivers explains, with the result that "at the most important time, during the early and mid-1960s, the Project AGILE report, with its suspicious observations and false conclusions, remained uncontested." The M16 "continued to rise, boosted by a reputation for lethality and reliability that it did not deserve."

In other words, the military wanted to switch to the M16, notwithstanding complaints from many soldiers that it is underpowered. The military used the sensational Project Agile claims, including two purported instances of limb amputations and one of a decapitation, to counter the complaints about the M16's weak firepower. The military in fact knew that the claims from Project AGILE could not be true, because extensive testing by the Army's Wound Ballistic Laboratory had proven that the Project AGILE claims were not true. Nevertheless, the military insisted on adopting the M16 and suppressed the true facts reported by the Wound Ballistic Laboratory.

Dr. Fackler recounts that there were other claims in the 1960s and 70s that the M16's high velocity bullets caused "massive" and "devastating" injuries, but these claims were disproven or contradicted by other reports. Delegates to war surgery conferences in the early 1970s "reported no unusual problems associated with 'high-velocity' bullet wounds in Vietnam. There were no reports of rifle bullet wounds causing traumatic amputations of an extremity."

Combat veterans have rejected claims that .223 or 5.56 rounds are capable of beheading people. Delta operator Bob Keller said he has never seen anyone decapitated by an AR round and called the claim "bullshit." Rob O'Neill, the Navy SEAL who killed Osama bin Laden, said the claim is "100% inaccurate" and "there is no way, no way" that a .223 or 5.56 round can decapitate someone. "As a former Navy SEAL who has shot people up close with something similar to an AR-15, you don't blow their head off, it's not how it works." O'Neill added, "I shot bin Laden three times in the head up close with the same caliber and it didn't decapitate him."

In sum, Col Tucker's "expert" claim that a .223 round can cut a body in half is incorrect.

II.D. "*The round is designed to kill, not wound . . .*"

Every ordinary round—whether fired from a handgun, rifle, or shotgun—fairly can be described as "designed to kill." Some specialized rounds are marketed as "less than lethal"—*e.g.*, rubber bullets, beanbag rounds; they typically injure and sometimes kill. No normal lead ammunition is specifically "designed to wound" and not kill. All defensive ammunition is designed to take the adversary out of the fight, and for no other purpose. The purpose can be accomplished either by killing or with a wound severe enough to incapacitate the adversary.

II.E. "*and both the AR-15 and M4 contain barrel rifling to make the round tumble upon impact and cause more severe injury.*"

Here, Col. Tucker's claims become bizarre. Rifling is spiral grooves or other features on the inside surface (bore) of the barrel that spin the bullet on its longitudinal axis as it travels down the barrel. Within the bore, the raised parts are the *lands* and the flat parts are the *grooves*. By definition, every rifle contains rifling. So do almost all handguns. Rifling makes the bullet spin on its long axis, and improves aerodynamic stability. Rifling is not a feature unique to the AR; every rifle has rifling.

The purpose of rifling is to stabilize the bullet in flight, not to make the bullet tumble when it strikes. Tumbling (rotating end over end) is the opposite of stability. The higher the barrel's "twist" rate—how many inches a bullet must travel down the barrel to rotate one full turn—the more aerodynamically stable the bullet will be. Think of a football: the tighter the spiral, the faster, farther, and more accurately it will travel.

What of the M16? Very early select fire models of the AR-15 (before it became the M16) had a slow twist rate of 1:14; that is, in a 14 inch barrel, a bullet would rotate once. In a longer barrel, such as 24 inches, the bullet would still rotate less than twice. Due to Swedish objections about the slow twist rate, the first M16s put into service has a twist of 1:12. A misconception arose bullets with the 1:12 twist would yaw or tumble in flight. Dr. Fackler explains:

> The notion that a common cause of increased wounding is the bullet's striking at large yaw angles (angle between the bullet's long axis and line of flight), or even sideways due to "tumbling" in flight is clearly fallacious. Anyone who has ever shot a rifle and observed the holes made by the bullet recognizes that they are round, not oblong, as would be the case if they yawed or tumbled in flight. This misconception seems attributable in large measure to misinterpretation of a report published, in 1967, by Hopkinson and Marshall. These authors presented diagrams of the yaw angles and patterns made by the bullet tip in flight. The angles on their drawings were exaggerated for clarity, showing 25 to 30 degrees rather than the 1 to 3 degrees that actually occur for properly designed bullets of small arms. . . . Thus bullet yaw in tissue, an important consideration, has been confused with bullet yaw in flight, which is, in most cases, of negligible consequence.

Dr. Fackler was describing what every target shooter knows from observation. Whether shooting near or far, and no matter what the gun, the holes in paper targets will be circles. Perhaps imperfect circles, with one side three degrees greater than the other. At whatever distance, a bullet through air only slightly deviates from a perfectly straight path, accounting for wind effects and gravity over distance.

During the 1960s, the fairly low twist rate of 1:12 did often result in yawing and fragmentation upon impact. These days, the military M4 has been improved with a 1:7 twist. (So in a 21 inch barrel, the bullet would rotate on is long axis three times before exiting the muzzle.) Civilian ARs today typically have twist of 1:7 to 1:9. Overall, there is no significant bullet yaw or pitch during flight, regardless of gun. If any occurs after penetration, that is due to the matter encountered, rather than the rifling of the gun.

Finally, Col. Tucker claims that the rifles he is denouncing (AR-15, M4) are designed for offensive combat, not self-defense:

> I carried my M4 for offensive combat and a handgun for self-defense. Defensive combat is generally up close and very personal. At that range, it is very difficult to use a rifle as a defensive weapon, except as a blunt force instrument.

This will come as great surprise to the many millions of Americans who have relied on a rifle as their primary home defense arm. Granted, rifles are less maneuverable than handguns at very close quarters; even so, rifles are more accurate because they are easier to aim, more stable when held, and have longer barrels. The AR in particular has low recoil, making it easier for users with limited upper body strength to control. As explained in a pro/con article by Guncraft Training Academy, one of the advantages of an AR rifle compared to a handgun is that the AR bullet is much smaller than typical defensive handgun rounds. Hence, the bullet loses velocity sooner than does a bigger bullet when it strikes the target. Therefore, the AR bullet is less likely to *over-penetrate*—that is, to exit the criminal's body and thereby endanger other people.

III. The *Bevis v. City of Naperville* opinion

The federal district court opinion in *Bevis v. Naperville* offers a preview of how *Bruen*-defying lower courts will uphold "assault weapon" bans. The *Bevis* Judge, Virginia M. Kendall, had previously held that Chicago's ban on all public firing ranges in the city did not violate the Second Amendment. *Ezell v. City of Chicago*, 2010 WL 3998104 (N.D. Ill., Oct. 12, 2010). That decision was later reversed by the Seventh Circuit. 651 F.3d 684 (7th Cir. 2011).

In *Bevis*, Judge Kendall declared that "[a]ssault weapons pose an exceptional danger, more so than standard self-defense weapons such as handguns." She cited in support the Second Circuit's pre-*Bruen* assertion in *New York State Rifle & Pistol Ass'n v. Cuomo* that "these weapons tend to result in more numerous wounds, more serious wounds, and more victims." These claims are incorrect.

III.A. Rate of fire: "more numerous wounds . . . more victims"

Like the pre-*Bruen* circuit courts, the Judge Kendall first addressed the banned firearms' rate of fire; they "fire quickly," she said. Civilian semiautomatic-only "assault weapons" are not machine guns; they fire only one round for each pull of the trigger. While Judge Kendall initially claimed that an "assault weapon" can empty a 30-round magazine in six seconds, she conceded that a more realistic rate of fire is one round per second. At that rate, however, "assault weapons" are no more dangerous than handguns, from which an average shooter typically can fire two or three rounds a second.

III.B. Terminal effects: "more serious wounds"

Judge Kendall then described the supposedly massive wounds that "assault weapons" produce when their bullets strike, something also emphasized in the pre-*Bruen* circuit court decisions. She briefly addressed two factors—muzzle velocity and bullet penetration—to show that "assault weapons" produce more devastating wounds than other firearms. Their bullets "hit fast and penetrate deep into the body," she said.

III.B.1. Muzzle velocity

To support the first factor, the Judge Kendall claimed the muzzle velocity of an "assault weapon" is "four-times higher than a high-powered semiautomatic firearm." That claim is untrue, unsupported by the cited authority, and nonsensical. Of course rifles in general have higher velocity than handguns in general, because rifles definitionally have much longer barrels. Most handgun barrels are six inches or less; rifle barrels are, by federal law, at least 16 inches. (Rifles with shorter barrels require special registration and taxation by the Bureau of Alcohol, Tobacco, Firearms, and Explosives, pursuant to the National Firearms Act of 1934).

To say that a given rifle has greater velocity than handguns is true, but this is not in any way unique to AR rifles.

The muzzle velocity of a 55-grain .223/5.56 round from an AR is around 3200 feet-per-second (fps), while larger-caliber rounds used in hunting and other types of rifles have muzzle velocities from 2500-3000 fps. Popular 9mm, .40, and .45 caliber handgun rounds typically have muzzle velocities from 1000-1200 fps. So do most 40-grain .22 caliber rimfire long rifle (LR) rounds. (The puny .22LR is popular for both rifles and handguns; its low power makes it an excellent choice as a child's first firearm.)

At most, the muzzle velocity of an "assault weapon" is three times that of lower-velocity semiautomatic handgun round.

Judge Kendall cited an article by Dr. Peter Rhee et al. to support the "four-times higher" claim. Muzzle velocities of various firearms do not appear on the cited page (855), but do in two charts on the next page (856). Nothing in the charts or the text states or supports the "four-times higher" claim; in fact, the muzzle velocities in the article reflect those set out above. It is unclear where the judge came up with the "four-times higher" figure.

Not only is Judge Kendall's claim wrong and unsupported, it is nonsensical. She declares that the banned weapons fire four-times faster than a "high-powered semiautomatic firearm." Ban advocates and the media often refer to semiautomatic "assault weapons" as "high-powered." In target rifle competitions, all calibers above the diminutive .22 are called "high power." So competitors using a .22 rifle would compete in one class, and competitors with larger rifles would compete in a different class.

The Rhee article defines "high-velocity" bullets as those with a velocity of at least 2500 fps, while "low-velocity" bullets travel at 1200 fps or less. If an "assault weapon" and a "high-powered semiautomatic firearm" are one in the same, any comparison between the two is nonsensical.

Judge Kendall's reliance on bullet velocity to prove "assault weapons" are exceptionally dangerous misunderstands the fundamentals of wound ballistics. Her claim is really just an observation that rifles in general are more powerful than handguns in general.

II.B.2. Wound damage

While "assault weapon" bullets typically "penetrate deep into the body," Judge Kendall accurately noted, so do handgun bullets. FBI testing shows that to be reliably effective, handgun bullets must penetrate soft body tissue 12-to-18 inches, a range necessary to reach and disrupt a vital organ in a human target.

Judge Kendall offered a description of the wounding effects of "assault weapon" bullets to depict them as highly dangerous. Rather than citing scholarly articles on wound ballistics or quoting wound ballistics experts or military trauma surgeons who regularly treat rifle wounds, she relied on an NPR report and an opinion article in *The Atlantic*.

The NPR report was published following the Uvalde, Texas, murders. Judge Kendall quoted one doctor from the article who describes bullets from "assault weapons" as causing "cavitation" in which the projectile creates a "large cavity." But both handgun and rifle rounds can cause large temporary cavities. Dr. Fackler notes that "[t]emporary cavitation is not a modern phenomenon associated exclusively with projectiles of high velocity." He describes the temporary cavitation caused by common handgun rounds. All centerfire rifle bullets (that is, every modern round bigger than above the .22 rimfire) and large handgun bullets often cause a large temporary cavity. The size of the cavity can vary considerably, depending on the tissue in which it forms. The *NPR* doctor's quote describes a common characteristic of handgun and rifle wounds; it does not describe anything exceptional about "assault weapons."

Judge Kendall also quoted an op-ed in *The Atlantic* by a radiologist who viewed AR wounds from the Parkland shooting from her computer screen. Supposedly, the bullet "does not actually have to hit an artery to damage it and cause catastrophic bleeding."

While it is not impossible for the temporary cavity to tear a hole in an artery, it is rare. Dr. Fackler explains that "[b]lood vessels are usually simply pushed aside and are almost never disrupted by temporary cavitation." He observed one case in which the temporary cavity created by an expanding *handgun* bullet tore a hole in the aorta at its junction with the right renal artery. He writes, "*I must emphasize the extreme rarity of this case.* I never published it, however, not wishing to add to the widespread wildly exaggerated effects attributed to the temporary cavity by many" (original emphasis).

The Atlantic writer further claimed that "[e]xit wounds can be the size of an orange."

Assertions that .223/5.56 rounds create huge exit wounds often appear in media accounts. One radiologist calling for "common sense gun reform" claimed that "exit wounds associated with AR-15 firearms are often the size of grapefruits." Rep. Lucy McBath (D-Ga) declared on Twitter that "[w]ith assault rifles, exit wounds can be a foot wide," as did a trauma surgeon with military experience quoted in the *New York Times.* That same doctor offered this hyperbolic description in another media interview:

> [A]s they travel through the body, [AR bullets] will destroy all the organs in the region of where they're traveling, and that's really due to the kinetic energy that those bullets impart. So, any centrally-fired weapon, if it hits anywhere in the central portion of the body, will blow a huge hole in a human being, particularly the exit wound, and it'll almost always be lethal. . . .

The average size of a navel orange, the most popular orange in the U.S., is three inches across, although some can grow as big as 4.5 inches in diameter. The average size of a grapefruit is four-to-six inches.

Studies have measured exit holes of .223/5.56 rounds in both gelatin testing and actual autopsy analysis. One study, using ballistic gelatin, found that the size and position of the temporary cavity influenced the size of the exit wound for 5.56mm NATO FMJ round. Testing showed that the exit hole reaches its maximum size if the bullet exits when the temporary cavity is at its maximum. The average size of the exit hole when the temporary cavity was maximized was 2.4 inches.

Another study examined 27 forensic autopsy records from persons shot with 5.56mm ammunition during dispersion of a mass protest in Bangkok in 2010. Twenty-three had typical entrance wounds. Exit wounds were various sizes and shapes, depending on the degree of bullet yaw and whether the bullet exited during the largest part of the temporary cavity. The six largest exit wounds in this group were two stellate (star) shape in the skull measuring 2.4 x 1.8 inches (6 x 4.5 cm) and 1.9 x 1.2 inches (5 x 3 cm), one stellate shape entering the back and exiting the abdomen measuring 1.2 x 1 inches (3 x 2.5 cm), one oval shape in the abdomen exiting in the lower back measuring 0.8 x 0.4 inches (2 x 1 cm), one oval shaped entering the back and exiting the chest measuring 0.8 x 0.4 inches (2 x 1 cm), and one stellate shape in the face exiting the neck measuring 0.6 x 0.4 inches (1.5 x1 cm). The remaining 17 bullets in this group either exited the body without yaw, fragmented, or left no exit wounds at all. Exit wounds were small round or oval shapes measuring less than 0.4 in (1 cm).

Nine persons suffered atypical entrance wounds from bullets that destabilized before hitting the body either by ricochet or hitting an intermediate target, causing the bullets to enter the body either sideways or at an angle. One entered the skull with the resulting exit wound having stellate shape measuring 2.9 x1 inches (7.5 x 5 cm). Another entered the lateral chest and exited the anterior chest with a stellate shape measuring 2.75 x 2.4 inches (7 x 6 cm). Two others hit extremities, one in the forearm and the other in the thigh, both with oval shaped exit wounds measuring 1.5 × 0.8cm (0.6 x .3 cm) and 1.2 x 0.7 cm (0.5 x 0.3 in), respectively. Of the remaining five, two caused head lacerations but did not enter the skull and three had no exit wounds, but retained the bullet or bullet fragments.

None of the exit wounds in either study are the size of oranges or grapefruits.

Such misreporting is nothing new. Thirty-three years ago, Dr. Fackler described how media accounts embellished the injuries suffered by five children murdered in the 1989 elementary school shooting in Stockton, California, one of the first modern mass shootings; the crime created the national "assault weapon" controversy. Dr. Fackler did ballistics testing on the ammunition used in the criminal's semiautomatic AKM-56S rifle, whose rounds

are larger than the .223/5.56mm rounds that are most often used in ARs. Dr. Fackler also reviewed the autopsies of the children killed. He explained:

> Much of the media coverage generated by the Stockton shooting has contained misstatements and exaggerations. The myth of "shock waves" resounding from these "high velocity" bullets "pulverizing bones and exploding organs" (even if they were not hit by the bullet) "like a bomb" going off in the body was repeated by the media, in certain cases even after they were furnished solid evidence that disproved these absurdities. None of the autopsies showed damage beyond the projectile path. One "expert" was quoted as stating that the death rate from "assault weapons . . . approaches 50[%]." Another, reporting on the effects of "high speed" bullets, stated that "most of those hit in an extremity will end up with amputations. If you're hit in the trunk, it becomes a lethal injury. . ." In the Stockton schoolyard, the death rate was 14% and none of the [wounded] victims died later or required extremity amputation.

Judges should think twice about relying on unsworn, anecdotal, and hyperbolic statements gleaned from media articles produced by gun prohibition advocates.

III.B.3. "*the injury along the path of the bullet from an AR-15 is vastly different from a low-velocity handgun injury.*"

This statement is generally correct, but can be misleading without more context. Rifle bullets typically do more damage to tissue than handgun bullets, but not always so, depending on where the bullets strike. A handgun round to the brain, spinal cord, heart, or other vital organ almost always will cause more serious damage than a rifle round to an extremity or other non-vital part of the torso. As Dr. Rhee explains, "[m]ost experienced trauma surgeons will testify that what part of the body is hit by [the] gun is more important than the size of the gun."

To classify a firearm as exceptionally lethal, there must be a baseline for comparison. Ban advocates and some courts attempt to make "assault weapons" like the AR seem unusually dangerous by comparing them to handguns, as seen in the quote above. The AR does fire higher-velocity bullets that impact with much greater force than handguns, but that is true of virtually *all* rifles. That handguns generally are less terminally effective than rifles is nothing new. But comparing the effects of AR bullets to handgun bullets to prove the exceptional lethality of "assault weapons" is like comparing a Prius to a Model T to prove the Prius is much faster than average automobiles.

Media articles that describe massive wounds from "assault weapons"—such as the ones quoted above—almost never describe or compare wounds caused by larger-caliber rifles or shotguns. The AR's wounding power is no more devastating than common hunting rifles, and typically less so (partly because its bullets are smaller). Dr. Fackler observes that at close range "the [twelve-gauge] shotgun (using either buckshot or a rifled slug) is far more likely to incapacitate than is a .223 rifle. The shotgun is simply a far more powerful weapon." Dr. P. K. Stefanopoulos, trauma surgeon and former career military officer who has written extensively on wound ballistics, confirms that at distances of less than ten feet "the shotgun produces the most devastating injuries of all small arms."

We agree that AR rifles, like every firearm, are dangerous when misused. The notion that AR rifles are unusually powerful compared to other rifles is false. Wounds caused by the AR typically are not more serious or lethal than wounds caused by larger-caliber hunting rifles, shotguns, and even some powerful handguns. These are demonstrable facts, supported by genuine firearms and wound ballistics experts.

This post was updated on March 20, 2023, for technical corrections in the last paragraph of II.A. and the history of twist rates in II.E.

NEXT: **Does the First Amendment Bar Public Schools from Removing School Library Books Based on Their Viewpoints?**

DAVID KOPEL is research director at the Independence Institute.

GUNS WEAPONS

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America's Rifle

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4th Circuit Says 'Assault Weapon' Ban Must Pass Strict Scrutiny

EXHIBIT “67”

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What Is a Bump Stock and How Does It Work?

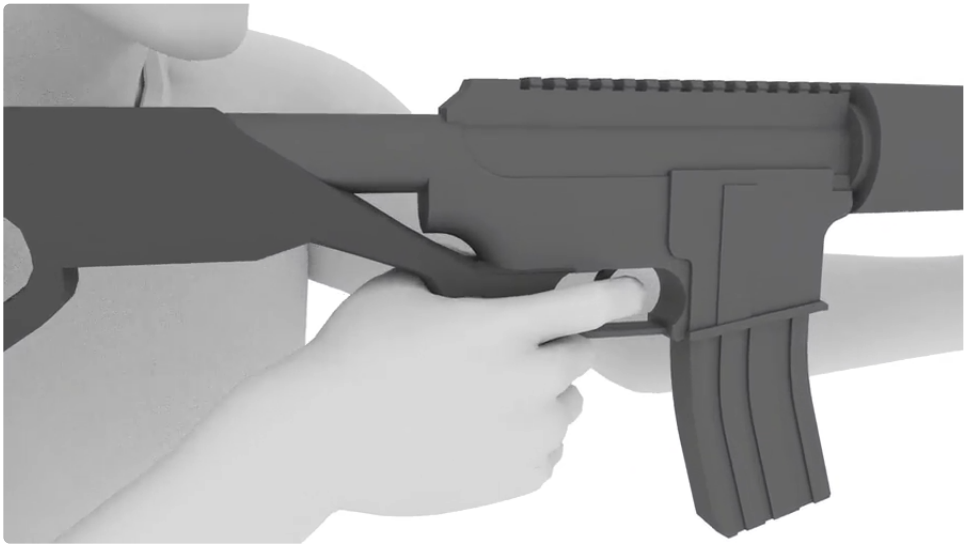
UPDATED MARCH 28, 2019

UPDATE: The Supreme Court refused on Thursday to block a Trump administration ban on bump stocks.

Twelve of the rifles the gunman in the Las Vegas mass shooting had in his 32nd-floor hotel room were each modified with a "bump stock," an attachment that enables a semiautomatic rifle to fire faster.

Within a week after the massacre, the National Rifle Association announced that it would support tighter restrictions on such devices.

A "bump stock" replaces a rifle's standard stock, which is the part held against the shoulder. It frees the weapon to slide back and forth rapidly, harnessing the energy from the kickback shooters feel when the weapon fires.



By The New York Times

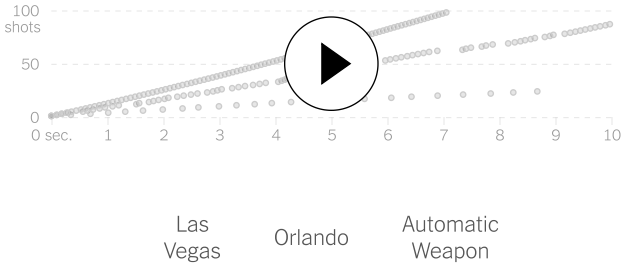
The stock "bumps" back and forth between the shooter's shoulder and trigger finger, causing the rifle to rapidly fire again and again. The shooter holds his or her trigger finger in place, while maintaining forward pressure on the barrel and backward pressure on the pistol grip while firing.

The bump stock is not banned under federal law even though it allows a weapon to fire at nearly the rate of a machine gun without technically converting it to a fully automatic firearm. (It is illegal for private citizens to possess fully automatic firearms

manufactured after May 19, 1986; ownership of earlier models requires a federal license.)

"The classification of these devices depends on whether they mechanically alter the function of the firearm to fire fully automatic," Jill Snyder, a special agent in charge at the Bureau of Alcohol, Tobacco, Firearms and Explosives, said at a news conference in Las Vegas on Tuesday. "Bump-fire stocks, while simulating automatic fire, do not actually alter the firearm to fire automatically, making them legal under current federal law."

How Fast Is a Rifle With a Bump Stock?



Las Vegas | Orlando | Automatic Weapon

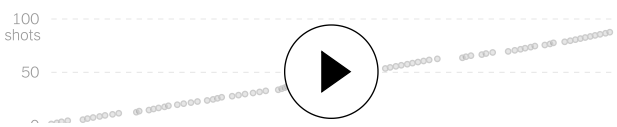
Analysis of video posted on social media suggests that the gunman used rifles with rapid-fire capabilities.

This video shows 15 seconds of the attack, with constant gunshots ringing out.

Source: @spacetrek9 on Twitter

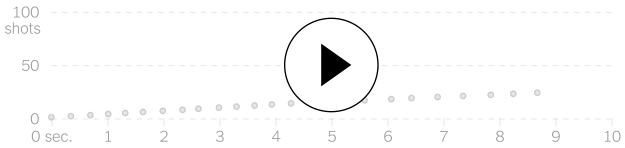
Isolated, the pattern of gunshots looks like this.

Las Vegas About 90 shots in 10 seconds



Compare that with audio extracted from a video of the June 2016 Orlando nightclub shooting, in which 49 people were killed and 53 were wounded. The gunman, Omar Mateen, used at least two guns, including a semiautomatic AR-15-style assault rifle.

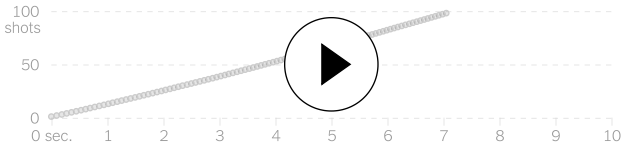
Orlando nightclub 24 shots in 9 seconds



Source: WESH 2 News

In contrast, a fully automatic weapon, like this pre-1986 Colt AR-15A2, sounds different. There are no variations in the firing rate like there was in the Las Vegas shooting.

Fully automatic weapon 98 shots in 7 seconds



Source: YouTube

Additional reporting by C.J. Chivers and Thomas Gibbons-Neff. Note: Audio of firing was analyzed to estimate the number and timing of shots in the graphs above.

By LARRY BUCHANAN, EVAN GROTHJAN, JON HUANG, YULIYA PARSHINA-KOTTAS, ADAM PEARCE and KAREN YOURISH

EXHIBIT “68”

The Ultimate Firearms Destination for the Gun Lifestyle

ISSUE 02

Flash Suppressors, Muzzle Brakes & Compensators – Just the Tip of the Barrel

Dennis Ideue

1 Comments, Join the Conversation

UNDERSTANDING FLASH SUPPRESSORS, MUZZLE BRAKES, AND COMPENSATORS

We often hear the terms flash suppressor, muzzle brake, and compensator used interchangeably, as some people are actually unaware of their separate functions and what they do. We have even heard the question, “What's that funny thing on the end of my barrel?” Well, put your fears aside, it's not an STD, it's there to do an important job. Let's take a look at each component and what it does, and then see some units that combine some of the uses of each one.

What Are Flash Suppressors

The purpose of a flash suppressor, or flash hider, as referred to by some manufacturers, is to **guard the shooter from a significant portion of the visible flash**. In fact, another term for the device is flash guard, although you don't hear that used very often. The military adopted flash suppressors in order to preserve soldiers' night vision. A major misconception is that a flash suppressor will hide the flash from the target you are shooting. Yes, a flash suppressor will reduce the overall flash signature compared to a barrel without one, but light travels in a straight line, and anything completely blocking the flash from what you are aiming at will also block the path of the bullet. Today, there are two primary types of flash suppressors, the duckbill type, with a number of prongs, and the birdcage type that is similar, but has a ring around its end for stability and to prevent the flash suppressor from being “caught up” on surrounding objects.

What Does Muzzle Brakes Do

A **muzzle brake directs gasses to drive the firearm forward**, helping counteract the recoil force back into the shooter. This is much like those reversers you see on jet aircraft when they are landing. Muzzle brakes are extremely important on larger-caliber guns; firing a .50 BMG without one could dislocate your shoulder. An unfortunate side effect of a traditional muzzle brake is that because energy is being directed back at the shooter, the sound levels and concussion forces generated during firing increase dramatically.

What Compensators Are For

A **compensator vents some of the escaping gasses upward**, reducing the rise in the barrel as the weapon is fired. This allows the shooter to more easily and quickly reacquire his target for faster follow-up shots. The majority of compensators available today also feature muzzle brake-style side ports for a combination of reduced recoil and muzzle rise.

Hybrids

There are **muzzle devices that offer a combined reduction in flash signature**, recoil, and muzzle rise; we call them hybrids. For this category of muzzle devices, we are identifying those that are truly designed to achieve a synthesis between the essential elements of the three separate components. A standard A2 flash suppressor, while having vents excluded from the bottom, does offer some of the qualities of a compensator, its primary job is to act as a suppressor, so we don't include it as a hybrid device. The same goes for the BattleComp 1.0 compensator, which will reduce flash, but is primarily designed to be a compensator.

If you are trading out a factory-installed muzzle device for an aftermarket muzzle brake, be sure that the modification does not make your new configuration shorter than the legal, overall length (OAL) requirements of your firearm. Some rifles rely on a rather long muzzle device to reach OAL requirements. Generally, if your muzzle device is pinned onto the barrel, it may have been to allow the manufacturer to legally sell the firearm in your jurisdiction.

When choosing a muzzle device, the first thing to think about is how you're primarily going to use your rifle. For shooting in low light situations, try flash suppressors. In competitive shooting where fast follow-up shots are key, a muzzle brake or compensator may help you win. Hybrids have quickly become popular among both casual and tactical shooters for their balanced, overall performance

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EXHIBIT “69”

United States
Jan 22nd 2022 edition

Changing gun culture

Gun-ownership in America is diversifying, because of safety fears

Concerns over safety lead more women and minorities to arm themselves

Jan 22nd 2022

LOS ANGELES

PICTURE A GUNSLINGER and Annette Evans probably does not spring to mind. She is Chinese-American, lives in the suburbs of Philadelphia and identifies herself as socially liberal—not the archetypal conservative, rural white man. Yet she owns over a dozen rifles, pistols and shotguns ("one for every occasion, like purses or shoes") and teaches self-defence courses to women. Her race and gender put her at risk, she says. "It may be a low chance that I'll run into someone who will kill me, but without a gun, I'll die."

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More gun-owners, especially new ones, look like Ms Evans. Of the 7.5m Americans who bought firearms for the first time between January 2019 and April 2021—as gun-buying surged nationwide—half were female, a fifth black and a fifth Hispanic,

according to a recent study by Matthew Miller of Northeastern University and his co-authors. The share of black adults who joined the gun-owning ranks, 5.3%, was more than twice that of white adults. That is new: in a previous survey, in 2015, new buyers skewed white and male, though they were more politically liberal than long-standing ones. Overall, today's gun-owners are still largely white (73%) and male (63%). But they are diversifying.

Gun culture has broadened its appeal. Decades ago most people bought guns for hunting and recreational shooting. Now they mostly do so for self-defence, which is a universal concern. People who feel vulnerable to crime or hold less faith in the police are more likely to arm themselves.

Rising murder rates in 2020 and 2021 heightened those anxieties (blacks are the likeliest victims). Membership of the National African American Gun Association grew in 2020 by more than 25%, to 40,000. Blacks have a long history of owning guns: Harriet Tubman toted them, Martin Luther King kept them at home. But this tradition was long "surreptitious", says Aqil Qadir, a third-generation shooter who runs a firearms-training centre in Tennessee.

Many of the newer gun-owners see firearms as an equaliser—a remedy for the vulnerability they feel. The Pink Pistols, an LGBT group, proclaims "armed queers don't get bashed". "God made man and woman, but Sam Colt made them equal," goes a markswoman's maxim. Women's gun-ownership has always trailed that among men: women tended to shoot because men in the family did. But Robyn Sandoval, boss of A Girl and a Gun, a shooting group, increasingly sees women buying guns on their own initiative: a third of new joiners to her organisation in 2021 said they were the only shooter in their family.

The broadening tent is good for manufacturers and bad for gun-control advocates. Owners are more politically active around gun issues than non-owners. Already it may have had an effect. According to polling by Gallup, in 2021 support for stricter laws dropped by five percentage points, to its lowest in seven years. ■

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This article appeared in the United States section of the print edition under the headline "Annette gets her guns"

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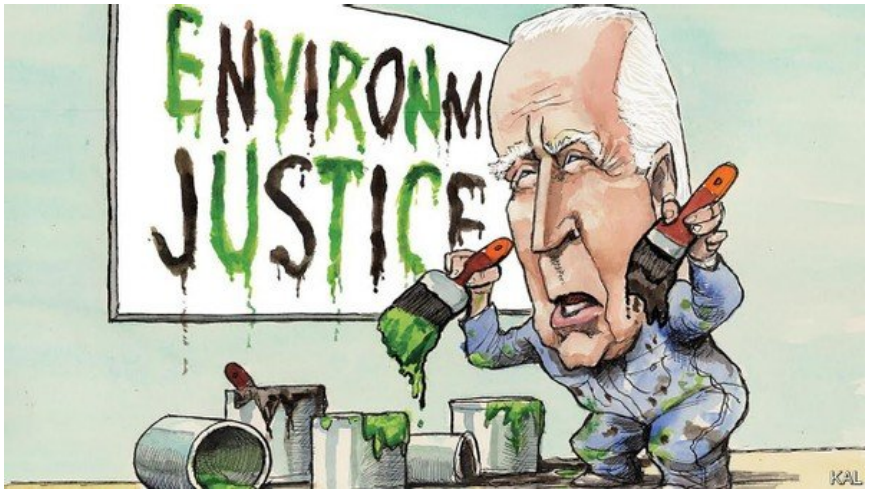

Vacancy on the Supreme Court

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EXHIBIT “70”

Public Mass Shootings: Database Amasses Details of a Half Century of U.S. Mass Shootings with Firearms, Generating Psychosocial Histories

A troubled past and leaked plans are common to those who take part in mass shootings. Most use handguns, NIJ-supported research shows.

February 3, 2022

Persons who committed public mass shootings in the U.S. over the last half century were commonly troubled by personal trauma before their shooting incidents, nearly always in a state of crisis at the time, and, in most cases, engaged in leaking their plans before opening fire. Most were insiders of a targeted institution, such as an employee or student. Except for young school shooters who stole the guns from family members, most used legally obtained handguns in those shootings.

Those are prominent traits of persons who have engaged in public mass shootings – that is, a shooting that kills four or more people[1] – collected in a comprehensive new database of identified U.S. mass shootings from 1966 to 2019. The data on 172 mass public shooters cover more than 150 psychosocial history variables, such as those individuals' mental health history, past trauma, interest in past shootings, and situational triggers.

With support from the National Institute of Justice, The Violence Project database has drawn data exclusively from open sources such as social media sites and online newspapers. The aim is to build a broader understanding on the part of the public, the justice system, and the

research community of who mass shooters are and what motivates their decision to discharge firearms at multiple people.

As part of the project, researchers also separately interviewed persons in prison who had engaged in mass shootings, in part to look for shared traits.

A Troubling Upward Trend

The research examined an era of marked increase in the number and deadly effect of mass shootings in the United States. To summarize that trend:

- The project spanned mass shootings over more than 50 years, yet 20% of the 167 mass shootings in that period occurred in the last five years of the study period.
- More than half occurred after 2000, of which 33% occurred after 2010.
- The years with the highest number of mass shootings were 2018, with nine, and 1999 and 2017, each with seven.
- Sixteen of the 20 deadliest mass shootings in modern history (i.e., from 1966 through 2019), occurred between 1999 and 2019, and eight of those sixteen occurred between 2014 and 2019.
- The death toll has risen sharply, particularly in the last decade. In the 1970s, mass shootings claimed an average of eight lives per year. From 2010 to 2019, the end of the study period, the average was up to 51 deaths per year.

The Study Design

The research adopted a mixed method approach combining objective, or readily quantified, data, to populate the database and the interviews of the small sample of persons in prison who had committed mass shootings. The database, as well as a detailed study methodology and research codebook, are available at www.theviolenceproject.org. Mass shooting cases were identified using several sources, including all existing mass shooting databases, with close examination of each case. Researchers also reviewed source lists of mass shootings from new outlets. Shooters' first-person accounts were scrutinized, and secondary sources, such as documentary films, biographies, newspaper archives, for example, were mined for a variety of relevant mass shooting data points. In all, the research team coded more than 160 variables for database inclusion. Examples of variable ranges include demographics, family background, breakups, and employment trouble, telling others about one's plans to kill ahead of time (known as "leakage"), and firearms use, including whether weapons were purchased

legally or illegally, or stolen. The database includes tabs on more than 370 firearms used in mass shootings and 1,239 people who lost their lives to those weapons, plus 2,020 of those injured.

This project followed a research methodology that has proven effective in terrorism studies, which also are rare events that can result in mass casualties.

Other Key Findings and Applicability

Trauma, Suicidality, and Crisis

Suicidality was found to be a strong predictor of perpetration of mass shootings. Of all mass shooters in the The Violence Project database, 30% were suicidal prior to the shooting. An additional 39% were suicidal during the shooting. Those numbers were significantly higher for younger shooters, with K-12 students who engaged in mass shootings found to be suicidal in 92% of instances and college/university students who engaged in mass shooting suicidal 100% of the time.

In terms of past trauma, 31% of persons who perpetrated mass shootings were found to have experiences of severe childhood trauma, and over 80% were in crisis.

Trauma was a common element of the backgrounds of those committing mass shooting, both in the database and the qualitative studies. Early intervention through school-based services may be a key component of early prevention.

Crisis / Mental Illness

In public discourse, mass shootings are often blamed on mental illness. But the research indicates the role of mental illness in mass shootings is complicated, not clear-cut. Mental health issues were common among those who engaged in mass shootings, with psychosis playing a minor role in nearly one third of the cases, but a primary role 10% of the time.

The data indicate, however, that nearly all persons who engage in mass shootings were in state of crisis in the days or weeks preceding the shooting.

Warning Signs — Leakage

Addressing Trauma

NIJ's CrimeSolutions has rated programs as effective or promising for reducing the impact of trauma on youth. See:

Cognitive Behavioral Intervention for Trauma in Schools (CBITS)

Bounce Back

Enhancing Resiliency Amongst Student Experiencing Stress (ERASE-Stress) in Israel

Nearly half of individuals who engaged in mass shootings (48%) leaked their plans in advance to others, including family members, friends, and colleagues, as well as strangers and law enforcement officers. Legacy tokens, such as manifestos, were left behind by 23.4% of those who committed mass shootings. About 70% of individuals who perpetrated mass shooting knew at least some of their victims. In particular, K-12 school and workplace shooters were "insiders" — current or former students and employees. That finding has implications for physical security measures and the use of active shooter drills.

The fact that leakage is a common occurrence with mass shootings provides an opportunity for intervention. Anonymous reporting systems may increase the likelihood of leakage and is an important area for more research. Threat assessment teams that intervene with a holistic, collaborative approach to intervention are promising.

Firearms

Notably, most individuals who engaged in mass shootings used handguns (77.2%), and 25.1% used assault rifles in the commission of their crimes. Of the known mass shooting cases (32.5% of cases could not be confirmed), 77% of those who engaged in mass shootings purchased at least some of their guns legally, while illegal purchases were made by 13% of those committing mass shootings. In cases involving K-12 school shootings, over 80% of individuals who engaged in shootings stole guns from family members.

The findings support safe storage of guns. Yet, the researchers noted that there are no federal laws requiring safe storage of guns, and no federal standards for firearm locks. The data also support "red flag" laws permitting law enforcement or family members to petition a state court to order temporary removal of a firearm from a person who presents a danger.

Motivation Over Time

Since the 1970s, the only statistically significant change in motivations for mass shootings is the decrease in shootings motivated by employment issues.

Script

The data show that many individuals who engage in mass shootings study past mass shooters — one in five (21.6%) studied other mass shooters, and many are radicalized online.

The researchers recommended media literacy education as a means of helping people critically consume information and counter extremist propaganda that facilitates violence.

Mass Shooting Demographics

Of the 172 individuals who engaged in public mass shootings covered in the database, 97.7% were male. Ages ranged from 11 to 70, with a mean age of 34.1. Those shooting were 52.3% White, 20.9% Black, 8.1% Latino, 6.4% Asian, 4.2% Middle Eastern, and 1.8% Native American.

Most individuals who perpetrated mass shootings had a prior criminal record (64.5%) and a history of violence (62.8%), including domestic violence (27.9%). And 28.5% had a military background. Most died on the scene of the public mass shooting, with 38.4% dying by their own hand and 20.3% killed by law enforcement officers.

Locations of Mass Shootings

Locations of public mass shootings, by percentage of all occurrences in the database, were:

Location	*Percent*
Workplace	30.8
Retail establishment	16.9
Bar or restaurant	13.4
Residential location	8.1
Outdoors	8.1
K-12 school	7.6
Place of worship	6.4
College or university	5.2
Government or place of civic importance	3.5

Interviews

The research team cautioned that the qualitative data, from five interviews, did not lend themselves to generalization, because each individual's story is unique. There was no single profile of a person who engaged in a mass shooting, but the interviewed mass shooters shared the following traits:

- Early childhood trauma and exposure to violence.
- An identifiable grievance or crisis point.
- Validation of beliefs — finding inspiration in past shootings by others.
- The means to carry out an attack.

Other Limitations

The database used open source data, leaving room for bias, the researchers noted, because the source data were originally gathered for different purposes. Media outlets have their own biases, in terms of coverage of different mass shootings. Generally, the report noted, certain categories of mass shootings tended to attract the most coverage. They include bias in favor of coverage of mass shootings related to:

- K-12 schools
- Military bases
- Higher body counts or younger victims
- Assault rifles
- Clustered with other shootings

The researchers cautioned readers to interpret mass shooting trends over time with caution, in light of the fact that mass shootings are extreme and rare events.

About This Article

The research described in this article was funded by NIJ award 2018-75-CX-0023, awarded to Hamline University. This article is based on the grantee report "A Multi-Level, Multi-Method Investigation of the Psycho-Social Life Histories of Mass Shooters," September 2021, by project's Principal Investigator, Jillian Peterson. The Co-Principal Investigator was James Densley.

Notes

[note 1] The Congressional Research Service has defined a public mass shooting as a "a multiple homicide incident in which four or more victims are murdered with firearms", not including the shooter(s), "within one event, and [where] at least some of the murders occurred in a public location or locations in close geographical proximity (e.g., a workplace, school, restaurant, or other public settings), and the murders are not attributable to any other underlying criminal activity or commonplace circumstance (armed robbery, criminal competition, insurance fraud, argument, or romantic triangle)."

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EXHIBIT “71”

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NEWS RELEASE

Wilson's Creek National Battlefield Foundation Purchases Rare Henry Repeating Rifle for Museum Collection

Foundation will present iconic "sixteen shooter" to Wilson's Creek National Battlefield in special ceremony

Engraving of original owner's name on historic Henry rifle
Morphy Auctions

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News Release Date: June 18, 2020

Contact: Kristine Abbey (https://www.nps.gov/common/utilities/sendmail/sendemail.cfm?o=4097D2A889DAA1B9ABBA11ADFC0E8BA3568E088853A0&r=/wicr/learn/news/20-15.htm), 417-732-2662 x231

Republic, Mo. – The Wilson's Creek National Battlefield Foundation has announced its purchase of a rare Henry Rifle, which the group will unveil for the public on June 23 at the park.

The Foundation will present the rifle to Wilson's Creek Acting Superintendent Russ Runge in an outdoor ceremony at **1 p.m. on Tuesday, June 23, at Stop 5** on the battlefield's tour road. The public is invited to the event. The ceremony will include appropriate precautions against COVID-19 including social distancing. Attendees are encouraged to wear masks, but masks are not required. The event is free, as entry fees to park continue to be waived. Visit the **Centers for Disease Control's website (https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/visitors.html)** to learn more about protecting yourself against COVID-19.

The Foundation purchased the rare .44 caliber Model 1860 Henry rifle at auction for the park's permanent collection. While this weapon was made in 1864 and has no connection to the 1861 Battle of Wilson's Creek, the rifle belonged to a Missouri veteran of the Trans-Mississippi Theater of the Civil War. The original owner, Major George W. Fulton, hailed from Edina, Missouri. Fulton served with the **21st Missouri Infantry (https://www.nps.gov/civilwar/search-battle-units-detail.htm?battleUnitCode=UMO0021RI)**, a Union regiment that saw extensive service during the war including at Shiloh, Corinth, Pleasant Hill, Tupelo, and Nashville. Fulton remained with the regiment from July 1861 until his resignation in December 1864. Fulton likely bought the Henry rifle around the time he left military service and entered into a new role – as sheriff of Knox County, Missouri. He also later served as mayor of Kinsley, Kansas, where he died in 1890.

Fulton purchased the rifle for $42 – then a princely sum for a firearm – and paid another $10 to have it engraved. The rifle includes embellishments of crossed flags, shields, oak leaves, a rope border, and the name "G.W. Fulton."

The Henry was the most technologically advanced small arm of the Civil War period. A lever-action repeating rifle, the Henry's 15-round magazine holds self-contained metallic cartridges. This rifle allowed a soldier to fire 15 to 30 shots per minute, while a soldier carrying a single-shot muzzle-loading rifle-musket could fire only two to three shots per minute. It became known as the "sixteen shooter" because one round could be chambered while fifteen rounds sat in the magazine.

According to the **National Museum of American History (https://americanhistory.si.edu/collections/search/object/nmah_881516)**, the New Haven Arms Company presented Abraham Lincoln a Henry rifle featuring gold fittings in 1862 "in an effort to obtain his influence in their purchase for the war effort."

The company made about 14,000 of the rifles between 1860 and 1866, but the U.S. Ordnance Department purchased only about 1,731 or the rifles. However, many soldiers acquired their own Henrys, which were popular in Missouri, Kentucky, Illinois, and Indiana. One Confederate soldier is rumored to have said, "It's a rifle you could load on

Sunday and shoot all week long."

Fulton's Henry rifle will be displayed in the Wilson's Creek National Battlefield's renovated Visitor Center, **tentatively set to reopen in October 2020**. The planned exhibit will highlight the history of Civil War weapons technology and give visitors a greater appreciation of the rapid advance in arms technology during this period. The rifle draws a clear distinction between pre-war single-shot weapons and the repeating rifles that dominated after the war.

Wilson's Creek National Battlefield Foundation (http://wilsonscreek.com/) is the support and fund-raising partner for Wilson's Creek National Battlefield, with the mission of encouraging awareness, appreciation, education, and development of the park, as well as raising funds for various projects not covered by the National Park Service. The Foundation also recently contributed an additional $40,000 to the **visitor center renovation project (https://www.nps.gov/wicr/learn/news/19-1.htm)** to provide content for electronic displays highlighting several aspects of the Battle of Wilson's Creek and the Civil War.

Administered by the National Park Service, Wilson's Creek National Battlefield preserves the site of the first major battle of the Civil War in the West. The Confederate victory on August 10, 1861, focused greater national attention on the war in Missouri, leading to greater federal military action.

Wilson's Creek Administrative Office is located 10 miles southwest of Springfield, Missouri at 5242 S. State Hwy ZZ, Republic, Missouri 65738.

Tags:

civil war (https://www.nps.gov/aboutus/news/news-releases.htm?q="Civil War"#fq[]=Date_Released%3A[NOW-20YEARS%20TO%20NOW])

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henry rifle (https://www.nps.gov/aboutus/news/news-releases.htm?q="Henry rifle"#fq[]=Date_Released%3A[NOW-20YEARS%20TO%20NOW])

small arms (https://www.nps.gov/aboutus/news/news-releases.htm?q="small arms"#fq[]=Date_Released%3A[NOW-20YEARS%20TO%20NOW])

battlefields (https://www.nps.gov/aboutus/news/news-releases.htm?q="Battlefields"#fq[]=Date_Released%3A[NOW-20YEARS%20TO%20NOW])

Last updated: September 3, 2020

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EXHIBIT “72”

Military > Weapons

The History of the Legendary Winchester Rifle

The Winchester's groundbreaking design made it the favorite of President Teddy Roosevelt, Annie Oakley, and countless others.

BY MATTHEW MOSS PUBLISHED: DEC 19, 2022

Wikimedia Commons

The Winchester rifle was hailed by its manufacturer as “the gun that won the West.” But there’s a lot more to the story than that. The rifle that became the Winchester had a long, tortuous development that involved some of the era’s most influential businessmen and inventors. Its famed lever action fought the American Civil War and many other battles long before the Winchester became a favorite of the likes of Buffalo Bill, sharpshooter Annie Oakley, and even President Teddy Roosevelt.

The Winchester’s Ancestors

The Winchester rifle’s technological family tree runs through the Henry rifle, used during the Civil War, and on back to 1849, when inventor Walter Hunt patented the Volition Repeating Rifle. Hunt’s rifle incorporated the two key features that would define the Winchester: a tube magazine under the barrel and a lever action that loaded rounds into the chamber. Hunt’s original Volition Rifle was ingenious but cumbersome, so he sold the design to a businessman who hired gunsmith Lewis Jennings to improve it. Jennings patented numerous improvements and sold thousands of rifles by 1851. His gun could hold an impressive 24 rounds, though these were small and underpowered.

Theodore Roosevelt in his hunting suit, with a carved Tiffany hunting knife and Winchester rifle.

George Grantham Baine

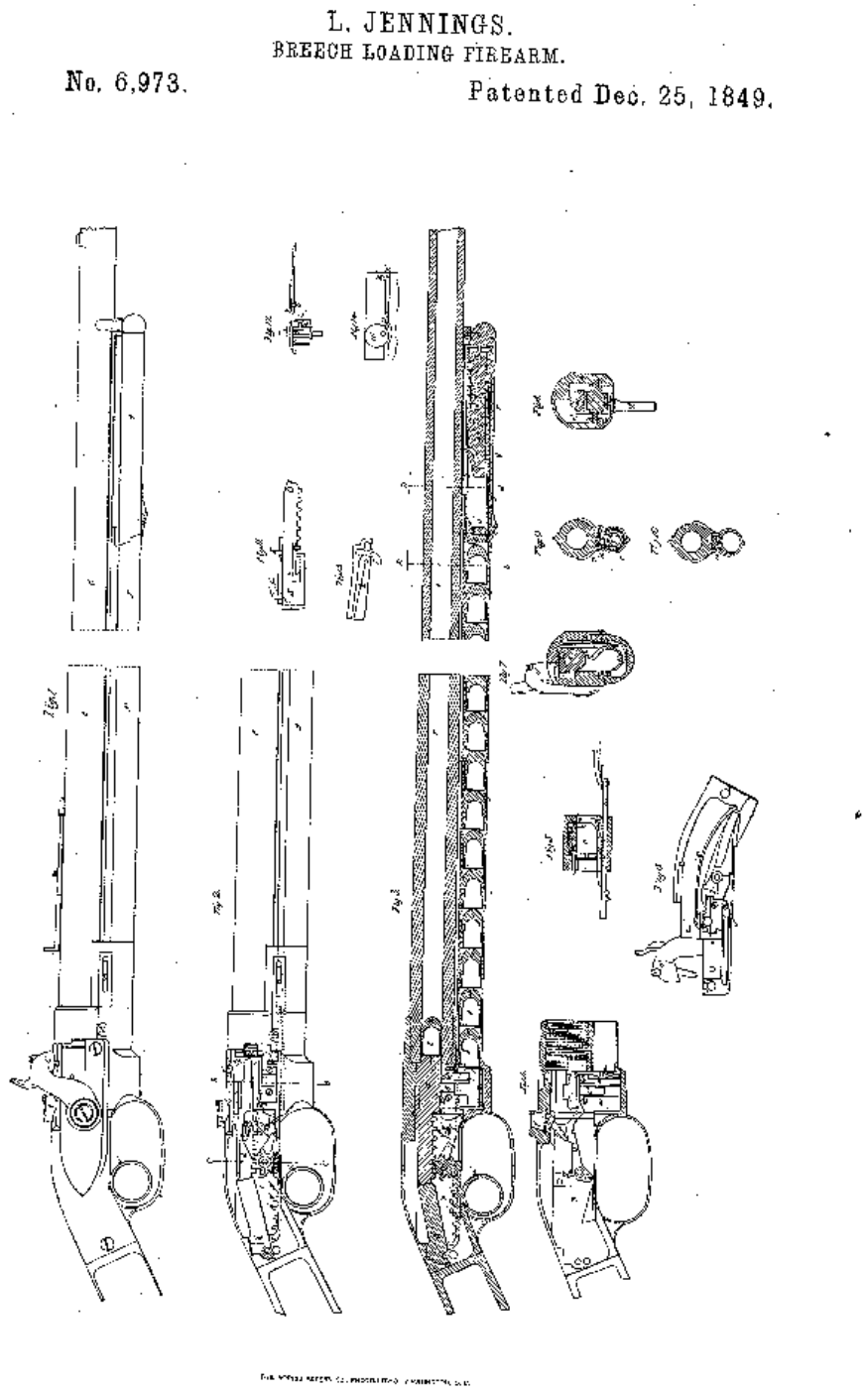
Both rifles used an ingenious form of ammunition called the Volition or rocket ball, which had a propellant charge in its base. These new bullets were fed from a tube magazine under the barrel. Like most rifles of the period, Hunt's and Jenning's guns needed percussion caps to ignite the ammunition. But here the Jennings rifle took a leap forward. He had a magazine of caps built into its receiver, and as the weapons action cycled, a round loaded into the chamber *and* a percussion cap went into position automatically. Only when the trigger ring was pulled fully would the rifle fire. Loading, priming, and firing were accomplished with just one trigger pull—a revolutionary improvement over earlier rifles.

Even so, the gun didn't sell, in part because it was underpowered and expensive to manufacture. But two new investors you may have heard of, Horace Smith and Daniel Wesson, saw promise in the rifle and formed the Volcanic Repeating Arms Company in 1854. This time the rifle took on the iconic appearance of the Winchester, dispensing with the Jennings' trigger ring and introducing the instantly recognizable lever.

The Volcanic was offered as both a pistol and a rifle and enjoyed some limited commercial success. But the Volcanic's rocket ball, which evolved from Hunt's initial ammunition, proved to be the gun's Achilles heel, undermining the Volcanic rifle's promising design. Smith & Wesson would sell off the company in 1855 to a group led by Oliver Winchester before going on to found the legendary revolver company that endures today.

The Blue and the Gray

In 1857, Winchester renamed his new firm the New Haven Arms Company and hired Benjamin Tyler Henry as factory foreman. Henry abandoned the rocket ball ammunition and converted the rifle to fire the more powerful and more reliable .44 caliber rimfire ammo. Henry won a patent for his improvements in October 1860. It was the war to follow that sealed his gun's reputation.


L. JENNINGS.
BREECH LOADING FIREARM.
No. 6,973. Patented Dec. 25, 1849.

Jennings Patent, 1849.

U.S. Patent Office


SIEGE OF CORINTH

Men from the 71st Illinois posing with Henry rifles.

Wikimedia Commons

Troops on both sides of the American Civil War prized the Henry rifle. While it was predominantly Union soldiers who carried the Henry, Confederate President Jefferson Davis armed his bodyguards with captured Henry repeating rifles. The Henry was an expensive weapon, costing $52.50 in the dollars of that day, yet as many as 9,000 rifles were privately purchased. The Union Army officially purchased 1,731 Henry Rifles at $36.95 a piece. Now, this was a tiny number in comparison to the 94,196 Spencer repeaters that the Union bought, but the Henry with its 16-round tubular magazine gained a reputation for firepower. Confederates allegedly declared it "that damn Yankee rifle you can load on Sunday and shoot all week."

In 1865, the Henry rifle played a pivotal role at the Battle of Allatoona Pass when an outnumbered and surrounded Union force beat back Confederate attacks. During one of these skirmishes, one company of the 7th Illinois, made up of just 52 men, crushed an attacking Confederate battalion.

RELATED STORY

The Most Expensive Rifle of the Wild West

After the war, the Henry rifle headed to the Western Frontier. Infamously, the alliance of Lakota, Dakota, Northern Cheyenne, and Arapaho under Crazy Horse defeated elements of Colonel Custer's 7th Cavalry at the Battle of the Little Bighorn using Henry Rifles and Winchester Model 1866s. Archaeological evidence shows that the Native

Americans were armed with as many as 150 or more repeating rifles, which greatly outmatched the single-shot carbines carried by Custer's men.

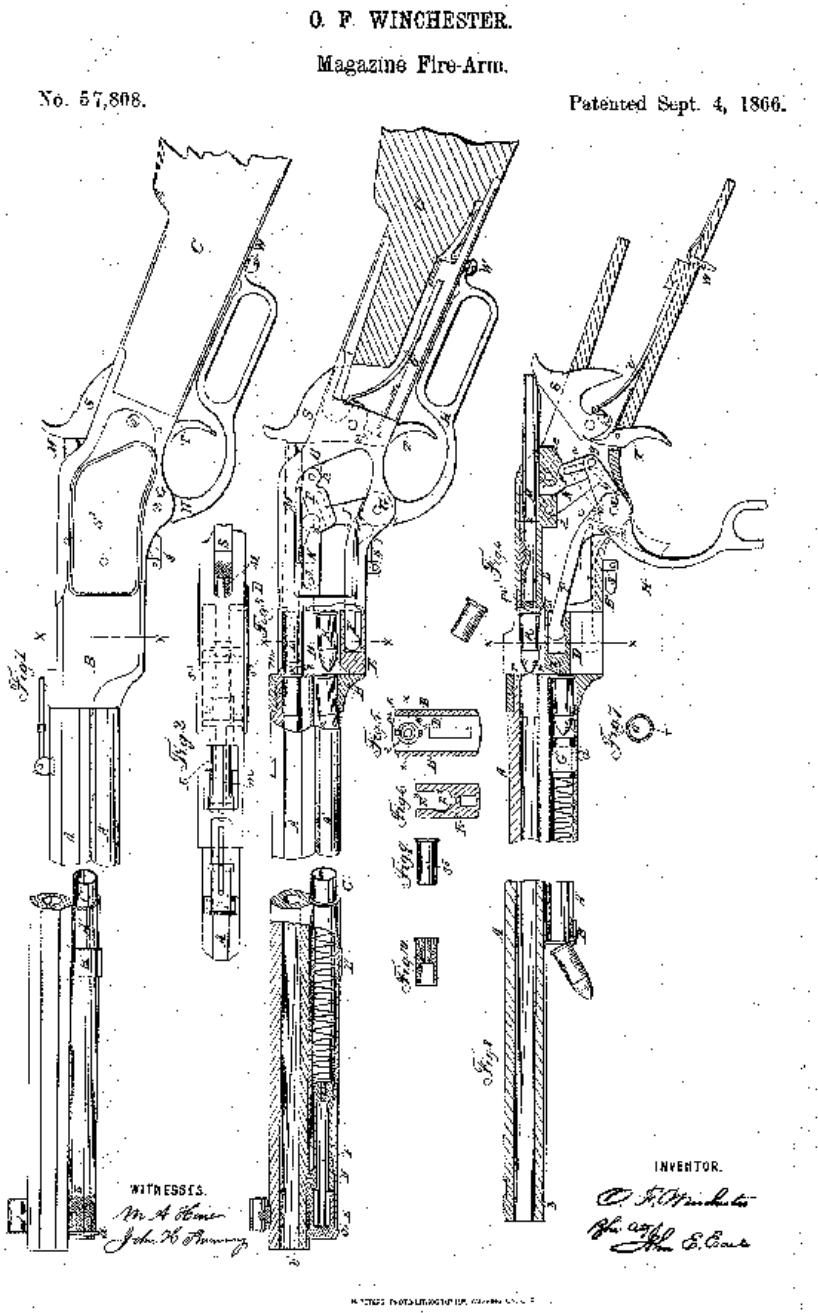
Two Brulé Sioux chiefs who were present at the Battle of the Little Bighorn, holding Henry rifles.

Archive Photos // Getty Images

The Glory Years

The Model 1866 came about after Oliver Winchester once more renamed his company, this time after himself. The Winchester Repeating Arms Company's Model 1866 was a refinement of the Henry rifle that used a new loading gate in the receiver and a wooden hand guard. No longer would the rifle have to be loaded under the muzzle. Plus, the rifleman's hand was now protected from the heat generated in the barrel.

Seven years later, Winchester unveiled Model 1873 that used the same basic toggle-link action as the Henry but was chambered in new center-fire ammunition. It proved to be a huge commercial success. Winchester continued manufacturing it until 1919.



Winchester Model 1866 patent

The Winchester rifle's next big jump came in 1886. Up until then, all Winchesters used a toggle-link action. This means that when the lever is pushed forward, this breaks the toggle and slides the breech block out of battery, extracting the spent case. As the lever continues forward, a new cartridge is lifted into the action. Finally, returning the lever to its original position slides the breech block forward. This chambers the round and cams the toggle joint into the locked position.

This design endured for decades. But as the 19th century came to a close and ammunition became increasingly powerful, Winchester's iconic 1873 lever-action rifle could not withstand the high pressures. That's when John Moses Browning, America's greatest gun designer, entered the Winchester's story. In 1885, Browning was asked if he could design a stronger action that could fire big game hunting ammunition such as the buffalo-stopping .50-110 Winchester cartridge. He designed the Model 1886, which introduced a stronger, vertically sliding, locking-block action to replace the weaker toggle lock.

U.S. Patent Office

Six years later Winchester launched the Model 1892, which was slightly smaller but still used the same tough action. It became an instant hit with over one million made. In total, more than eight million of Browning's lever-action 1886, 1892, and 1894 rifles were made.

Winchester Around the World

While the U.S. military never formally adopted the Winchester, a number of other countries did. The Ottoman Army used the repeaters to great effect against the Russians during the Russo-Turkish War (1877–78). In 1915, the military lever-action had one last hurrah when Winchester sold 300,000 rifles to Imperial Russia, which used them on the Eastern Front against the Germans. Unlike their tube-magazine predecessors, these Model 1895s had a more practical box magazine.

British women of the Auxiliary Territorial Service unload a shipment of Winchester rifles, 1941.

NARA // Wikimedia Commons

Along with the Colt Single Action Army, the Winchester is one of the iconic weapons of 19th century America. It represents the young nation's burgeoning industrial might and its unstoppable march Westwards. Its firepower was unmatched in its day. Like other Western guns, the Winchester grabbed the public's imagination in films like *Winchester '73* starring Jimmy Stewart, or *Stagecoach* and *True Grit* starring John Wayne, to name a few.

Today, Winchester remains a household name, and lever-action guns continue to be popular sporting and hunting rifles, with thousands made every year.

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MATTHEW MOSS

Matthew Moss is a British historian and writer specializing in small arms development, military history and current defence matters. He has written for a variety of publications in both the US and UK he also runs www.historicalfirearms.info, a blog that explores the history, development and use of firearms.

WATCH NEXT

EXHIBIT “73”

American Firearms and Their Makers: A Research Guide

Winchester

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Oliver Winchester and John M. Davies purchased the bankrupt original company of Horace Smith and Daniel B. Wesson in 1856, and reorganized it as the New Haven Arms Company in April 1857. As its plant superintendent, Benjamin Henry continued with development of a new rifle, known as the Henry rifle. In 1866 Oliver Winchester reorganized the company as the **Winchester Repeating Arms Company**, and had the basic design of the Henry rifle completely modified and improved to become the first Winchester rifle, the Model 1866. In 1873 Winchester introduced the Model 1873 that used .44-40 WCF (Winchester Center Fire) cartridges, which became known as the gun that won the West. From 1883 John Moses Browning worked with the Winchester company to design a number of rifles and shotguns. Later the company developed weapons to compete with Browning's designs for other manufacturers, particularly in the area of commercial self-loading arms. Winchester contributed during both World Wars. During World War I, it was a major producer of the .303 Pattern 1914 Enfield rifle for the British and the similar .30-06 M1917 Enfield rifle for the United States. Winchester designed the United States M1 carbine and produced the M1 Garand Rifle used during World War II. In December 1980, Olin Corporation retained Winchester's ammunition business, but sold the New Haven plant to its employees who then incorporated it as the U.S. Repeating Arms Company with a license to make Winchester Arms. After its 1989 bankruptcy, the company was acquired by the Belgian arms maker, FN Herstal, which also owns Browning. The privately owned company continues to manufacture under the Winchester Repeating Arms brand.

George Grantham Bain, photographer. *[Theodore Roosevelt, full-length portrait, standing, facing right, in deer skin hunting suit, holding rifle.* 1885. Bain Collection. Library of Congress Prints and Photographs Division.

The following materials link to fuller bibliographic information in the Library of Congress Online Catalog. Links to online resources are included when available. For additional information, see Winchester Rifle: A Resource Guide.

The Forgotten Winchesters : A History of the Models 1905, 1907, and 1910 Self-Loading Rifles by John Henwood
Call Number: TS536.6.W55 H46 1995
Published/Created: c1995
Published by the author in 1995, this book represents the most comprehensive and authoritative reference for three early models of the Winchester semi-automatic rifle. The

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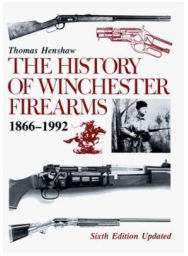
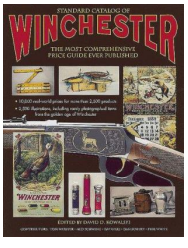
early models of the Winchester semi-automatic rifle. The 1905, the 1907 and the 1910 models were the first semi-automatic rifles commercially offered by the Winchester company. These rifles, as well as the ammunition for them, have been long discontinued. Only 500 copies of this rare, out-of-print reference book, which includes 166 illustrated pages, were printed before the author's death.

The Historic Henry Rifle by Wiley Sword
Call Number: UD395.H46 S95 2006
ISBN: 9781931464017
Published/Created: 2002
The Henry Rifle was one of the most important rifles of the Civil War and the forerunner of the famous line of Winchester Repeating Rifles that won the West. To Confederates armed with muzzle loaders, it was "that damned Yankee rifle that was loaded on Sunday and fired all week." The "sixteen shooter" Henry rifle dramatically changed the nature of combat, because of its key technological innovations, an enhanced self-cocking mechanism that worked in concert with the lever action and its use of modern metallic cartridges that endeavored to integrate the propellant directly into the bullet itself. Despite its legendary status, it was beset with difficulties that impeded its widespread use. This volume includes a color section picturing Henry rifles, extensive serial number data, and a list of identified guns.



History of Winchester Firearms, 1866-1992 by Thomas Henshaw; Duncan Barnes; Thomas E. Hall; Pete Kuhlhoff; James C. Rikhoff; George R. Watrous
Call Number: TS533.2 .H57 1993
ISBN: 0832905038
Published/Created: 1993
The History of Winchester Firearms remains the most complete and authoritative account of Winchester firearms since its first edition by noted firearms authority, George R. Watrous. This classic reference proceeds through Winchester history and treats every model and variation produced by Winchester, including custom and special-order guns, rarities and commemoratives. This sixth edition is updated through 1992 to include sections on the Model 101 O / U Rifle and O / U Rifle Shotgun models plus the Model 94, as well as 22 new commemorative models. A seventh edition by Thomas Henshaw, who edited this sixth edition, was published in 2007.



Standard Catalog of Winchester by David D. Kowalski (Editor)
Call Number: TS534.7 .S74 2000
ISBN: 0873418603
Published/Created: 2000
From 1886 to 1929 the Winchester Repeating Arms Company put its name on everything from garden tools to washing machines, promoting those products as being as good as the gun. This volume is is a

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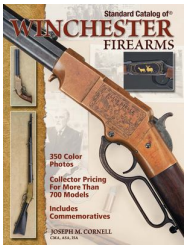
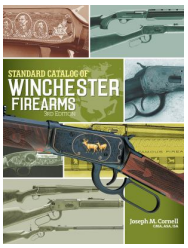
single price and identification guide covering the full gamut of Winchester's products. It identifies and values more than 2,500 collectibles, including firearms, cartridges, shotshells, fishing tackle, sporting goods, tools and pocket knives. It also provides unsurpassed coverage of the company's popular calendars, advertising materials and packaging, posters, and trench art. There are more than 90 large, full color photos and more than 2,500 black and white photos. There are 2,500 major products included and the then current values for more than 10,000 items. The text provides useful information for the Winchester enthusiast on the widest range of Winchester topics ranging from firearms to farm and garden tools to kitchen and household appliances,



Standard Catalog of Winchester Firearms by Joseph Madden Cornell; Paul Goodwin (Photographer)
Call Number: TS536.6.W55 C67 2007
ISBN: 9780896895355
Published/Created: 2007
Standard Catalog of Winchester Firearms guides the reader through the production history of one of America's top firearms manufacturers. Winchester's "Gun that Won the West" is among the most collectible guns in today's secondary market, but Winchester enthusiasts of all interests will benefit from the expertly analyzed prices, 500 color photos, and technical details featured in this reference. It includes: five grades of pricing for Winchester rifles and shotguns manufactured between 1866 and publication, and trend reports for popular models.



Standard Catalog of Winchester Firearms by Joseph M. Cornell
Call Number: TS536.6.W55 C67 2016
ISBN: 9781440246258
Published/Created: 2016
This updated and expanded third edition of the *Standard Catalog of Winchester Firearms* serves as a guide to buying, selling, and collecting Winchester guns from every era. It features hundreds of full-color photographs of popular and obscure Winchester models, detailed and updated model descriptions, and accurate values and market analysis for hundreds of Winchester models. The author also provides expert advice on collecting Winchesters and spotting fakes.

The Story of the Winchester 1 of 1000 and 1 of 100 Rifles by Edmund E. Lewis
Call Number: TS536.4 .L49 2009
ISBN: 9781931464413
Published/Created: 2009
Beginning with a brief history of the Winchester Repeating Arms Company, this book is an exhaustive reference guide for Winchester Premium Rifles. The author discusses specific features of these rifles in detail and provides color photos of the various types of barrel

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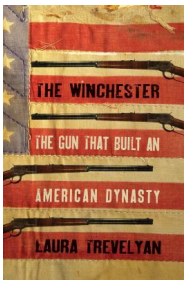
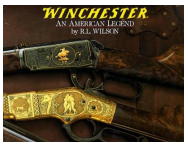
rifles in detail and [illegible] color photos of the various types of barrel inscriptions and engraving. He provides thorough descriptions, history, provenance (when available), and color photos of each of the known model 1873 and 1876 1-1000s and 1-100s and "Engraved-Like" rifles. In addition to more than 500 color photos and serial number tables, there are color and black and white images of original documents and correspondence along with specific information on warehouse ledgers (transcribed in easy-to-read charts) and museum letters on the respective rifles. The book concludes with detailed chapters on ammunition and accoutrements; fakes and other oddities; modern restorations and reproductions; and rarity rankings of the variations.



The Winchester by Laura Trevelyan
Call Number: TS533.2 .T74 2016
ISBN: 9780300223385
Published/Created: 2016
Laura Trevelyan, a descendant of the Winchester family, offers a history of the colorful New England clan responsible for the creation and manufacture of the the Winchester Repeating Rifle, the "Gun that Won the West." Trevelyan chronicles the rise and fortunes of a great American arms dynasty from Oliver Winchester's involvement with the Volcanic Arms Company in 1855 through the turbulent decades of the nineteenth and twentieth centuries. She explores the evolution of an iconic, paradigm-changing weapon that has become a part of American culture; a longtime favorite of collectors and gun enthusiasts; and which has been celebrated in fiction, glorified in Hollywood, and applauded in endorsements from the likes of Annie Oakley, Theodore Roosevelt, Ernest Hemingway, and Native American tribesmen who called it "the spirit gun."

Winchester '73 & '76; The First Repeating Centerfire Rifles by David F. Butler
Call Number: TS536 .B87
ISBN: 0876910150
Published/Created: 1970
This is a book about the first repeating centerfire rifles introduced and manufactured by the Winchester Repeating Arms Company. The '73, famous as "the gun that won the West," was originally chambered as a .44-40, but was later also available as a .38-40 and .32-20. The Winchester 1876, also known as the Centennial Model, had a larger frame suitable for big game hunting. It was originally chambered for .45-75 Winchester Centennial cartridge, but other versions followed.



Winchester : an American legend : the official history of Winchester firearms and ammunition from 1849 to the present by R. L. Wilson
Call Number: TS533.2 .W57 1991
ISBN: 0394585364
Published/Created: 1991

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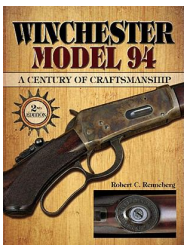
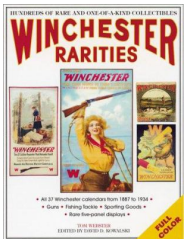
R. L. Wilson's official history of Winchester arms and ammunition was published to celebrate the 125th anniversary of the Winchester marque. It describes virtually every model ever made with particular attention to the major models. In addition the author presents extensive pictorial and textual material on Winchester's wide range of ammunition. The text acknowledges the contributions of gun designers B. Tyler Henry, John Browning, T. C. Johnson, and Marshall Carbine Williams, as well as engravers Gustave Young, L. D. Nimschke, the Ulrich family, and Alvin A. White. The author describes Winchester's contributions to the military in the twentieth century, including development of the M1 carbine's basic design configuration. The volume features several guns from the Winchester Custom Shop in full color. A comprehensive table in the appendix lists serial numbers with related production data.

Winchester Bolt Action Rifles, 1877-1937 by Herbert G. Houze
Call Number: UD395.W7 H68 1998
ISBN: 0917218841
Published/Created: 1998
Herbert Houze covers both civilian and military bolt actions in this guide, beginning with five chapters on the Hotchkiss. He then discusses in detail such other Winchester rifles as the Murata Year 17 Rifle, the Model 1895 Winchester-Lee, the William Mason Straight Pulls, the T.C. Johnson Model A and B Magazine Rifles, the Pattern 1914 Enfields, the Winchester Model C and D Rifles, the Model 1917 U.S. Rifle, the Model 1918 .50 Anti-Tank Rifle, the Model 51 Imperial Sporting Rifle, the Winchester Model 54 and the development of the Model 70. The author provides technical specifications, historical notes, and production details. It is illustrated with 295 photographs.



Winchester Model 94 by Robert C. Renneberg
Call Number: TS536.6.W55 R456 2009
ISBN: 9781440203916
Published/Created: 2009
The Winchester Model 94 (also known as Winchester Model 1894 or Model 94) was the first American commercial repeating rifle to be used with smokeless powder and is the most successful lever-action rifle of all time. This revised and expanded edition of The Winchester Model 94 presents previously unpublished information on the 1894's offspring, the Model 55, introduced in 1924, and the Model 64, introduced in 1933.



Winchester Rarities by Tom Webster; David D. Kowalski (Editor)
Call Number: TS533.2 .W42 2000
ISBN: 087341862X
Published/Created: 2000
Winchester produced thousands of items ranging from guns

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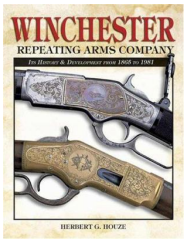
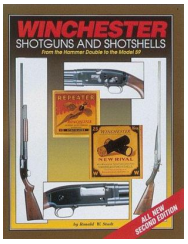
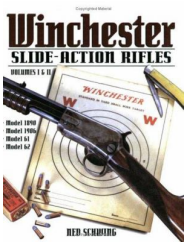
Winchester produced thousands of items ranging from guns to household items during its time as one of the world's leading manufacturers. To guide collectors and enthusiasts, this volume features nearly 800 full color photographs and detailed pricing for the more rare Winchester memorabilia by experts in the field .



Winchester Repeating Arms Company by Herb Houze
Call Number: TS533.2 .H68 2004
ISBN: 0873497864
Published/Created: 2004
Herbert G. Houze, former curator of the Winchester Arms Museum, has written a complete account of the Winchester Repeating Arms Company from the 1856 founding of its predecessor, the New Haven Arms Company, to the sale of the firm by Olin Corporation in 1981. Using corporate records and other new sources, Houze reconstructs many previously unknown aspects of Winchester's company history. He dispels commonly held beliefs about Winchester's growth and operations, such as its orderly corporate succession from the New Haven Arms Company or the reasons for its financial collapse in 1930. The author identifies and fully describes seven new models of Winchester firearms, and sheds new light on the development of more familiar models and the men who designed them.



Winchester Shotguns and Shotshells by Ronald W. Stadt
Call Number: TS536.8 .S73 1995
ISBN: 0873413393
Published/Created: 1995
This definitive illustrated guide for the shotgunner and collector provides descriptions of Winchester guns by grades with dates and details of changes. It traces shotshell development from 1877 with box labels and display samples and provides a bibliography of Winchester printed material from 1867 to 1981. This volume includes photos and text on collectible Winchester shotguns and shotshells manufactured through 1961, as well as extensive coverage on shotshells and their boxes.



Winchester Slide Action Rifles by Ned Schwing
Call Number: TS536.6.W55 S38 2004
ISBN: 0873497902
Published/Created: 2004
Winchester Slide Action Rifles provides thorough detailed information about the receivers, barrels, markings, stocks, stampings, and engravings of the favorite slide-action guns of America. Originally published in two volumes, it includes the Model 1890, Model 1906, Model 61, and Model 62.

Subjects: American History, Business and Management, Company and Industry Information, Early American History

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