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10	VIRGINIA DUNCAN, e	et al.,	Case No: 17	-cv-1017-BEN	J-JLB
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CHAPTER TWO

AN EXPERIMENT IN REPEATING FIREARMS

Among the many individuals who contributed to the mechanism that was eventually incorporated in the early Winchester repeating rifles was Walter Hunt. Born in 1796, Hunt learned the machinist's trade in his home town of Martinsburg, New York. In 1826 he moved to New York City where he set himself up as an inventor and mechanic. From that date until his death in 1859, Hunt turned out a remarkable number of inventions, including such diverse items as a flax-spinning machine, a heating stove, an iceboat, a nail-making machine, a fountain pen, and the safety pin. Despite his originality Hunt seems to have had no mind for business and was never able to capitalize on his inventions. This is illustrated in the case of the lock-stitch needle which he perfected between 1832 and 1834, but which he failed to patent. Some twelve years later Elias Howe received a patent for a similar needle and Hunt lost his chance at a fortune and general recognition as the inventor of the sewing machine.¹

It is not astonishing that such a prolific inventor should turn his attention to firearms. His first move was to devise a loaded bullet for which he received a patent in August 1848 (US 5701) and which he described as a hollow-based, conical projectile, filled with powder and with the base closed by a cork wad having a hole in its center to admit the flame from an independent priming unit.²

Hunt's next step was to design a gun that would utilize his ammunition, and in August 1849 he was granted a patent (US 6663) for a repeating frearm with a tubular magazine under the barrel, which he called the "Volitional Repeater." In many respects this gun was a brilliant achievement. It had a straight drive, spiral-spring-driven firing pin that was well ahead of the time, and the tubular magazine under the barrel was to become an integral part of the Winchester repeaters. But the repeating mechanism was far too complicated for practical use.

Not having sufficient funds to promote his inventions, Hunt assigned his patents to a fellow New Yorker, George A. Arrowsmith. Arrowsmith was a modelmaker and machinist, who had in his employ Lewis Jennings, a skilled inventor and mechanic in his own right. Jennings was put to work on the problem of improving Hunt's rifle, and within a few months had succeeded in simplifying the lock and repeating mechanism which was patented in December 1849 (US 6973).

At this point Arrowsmith interested a New York capitalist, Courtlandt C. Palmer, in the possibilities of the new firearm. Palmer, one-time president of the Stonington & Providence Railroad, and a leading hardware merchant in New The Development of a Repeating Firearm



Hunt Cartridge Patented 1848

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Hunt Rifle Patented 1849

The Smith & Wesson Partnership

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York, bought the Hunt and Jennings patents from Arrowsmith with the idea of manufacturing the gun. In 1850 he contracted with the already famous firm of Robbins & Lawrence, of Windsor, Vermont, to have 5,000 Jennings Patent Rifles produced. It was in connection with this contract that Palmer became associated with Horace Smith and Daniel B. Wesson, who were later to found the well-known firm that bears their names.

While Smith and Wesson made their lasting reputation as revolver producers, they played an important role in the development of the repeating rifle that, had circumstances worked out a little differently, might have carried their names instead of Winchester's.

Daniel B. Wesson, who in 1850 was working at Robbins & Lawrence, was already an experienced gunsmith, having learned his trade in the shop of his older brother, Frank Wesson, of Worcester, Massachusetts. He became interested in the Jennings gun and began some experimental work on the mechanism for Palmer. About the same time, Palmer engaged Horace Smith to make further experiments with the gun. Smith was also an experienced gunsmith. After working for various arms producers, he set up shop for himself in 1846 at Norwich, Connecticut. For the next eight years he experimented with and produced various types of firearms. Of special interest is the fact that during 1851 and 1852 he was manufacturing the small-caliber .22 Flobert pistol which had been developed in France a few years before.³

While this pistol was practically a toy and could be used safely for target practice within the confines of the drawing room, it was a breech-loading firearm and used a metallic cartridge, called a BB cap, containing a charge of fulminate in the head which was the only propellant of the lead ball. Smith's early acquaintance with this type of ammunition was an important link in the development of metallic cartridges in the United States.

In 1851 Smith took out a patent (US 8317) for an improvement of the Jennings rifle and Palmer had hopes that the weapon would be successful. Despite improvements, the gun remained too complicated and not powerful enough for a practical firearm and its production was abandoned in 1852.

The association of the three men continued, however, with Palmer apparently furnishing funds for further developmental work. Out of this experimentation came a new patent (US 10,535) granted to Smith & Wesson in February 1854. The most important feature of this rifle was the mechanism that moved the bolt and locked it in position with its head supporting the cartridge. It was a simple mechanism and, for cartridges of medium power, a highly satisfactory method of obtaining reciprocal movement in the carrier and locking the block in its forward position. This improvement, added to the tubular magazine and the rising breech block of earlier models, completed the essential mechanical features that were subsequently incorporated in the early Winchester rifles.

Encouraged by the possibilities of the improved repeating action, Smith, Wesson, and Palmer formed a limited partnership on June 20, 1854, under the partnership name of Smith & Wesson. Manufacturing was carried on in Norwich, Connecticut, apparently at the same location previously owned by Smith. The firm's principal assets included the Hunt, Jennings, Smith, and Smith & Wesson patents already described. In addition, the partners signed an agreement that the partnership was to receive the benefit of any improvements in firearms or ammunition that Palmer or his representatives or Smith & Wesson might patent or acquire.

Production was concentrated primarily on pistols, using the mechanism patented by Smith & Wesson in February 1854.⁴ The ammunition used in these arms, which was also produced by the firm, consisted of a cylindro-conical bullet weighing about 115 grains with a deep cavity in the back, filled with a priming mixture. It was sealed off with a copper washer having a cork disk in the center and was discharged by the impact of the hammer on the breech or firing pin. Except for the substitution of priming mixture for compressed powder, this ammunition was almost identical in form with that described by Hunt in his patent taken out in 1848.

For reasons to be noted presently, this type of ammunition was not very effective. Wesson, in particular, appears to have been dissatisfied with its performance, for in August 1854 he was granted a patent (US 11,496) which was assigned to the firm for an inside-primed, centerfire, metallic cartridge, apparently to be used in the arms being produced by the firm. For some inexplicable reason, this ammunition was not utilized or developed further at this time, even though it held the key to the satisfactory operation of the type of firearms under production.

The partnership had been in operation about a year when it was decided to change the nature of the organization. Just why this change was decided upon is not clear. In any event, when a group of New Haven and New York capitalists made a proposition to form a corporation to take over the business, the partners agreed to sell to the new concern.

With some imagination the sponsors of the newly formed corporation called it the Volcanic Repeating Arms Company. Incorporated in Connecticut in June 1855, the organization was capitalized at \$150,000 (6,000 shares of common stock at \$25 par value per share). The backers, numbering forty in all, were chiefly from New Haven and nearby towns, although four lived or had their businesses in New York City. Their occupations give an interesting sample of the kinds of business enterprises that were capable of supplying venture capital to new undertakings. Included were seven clock-makers, three carriage-makers, two bakers, two grocers, as well as representatives of shipping, merchandising, shoe manufacture and similar types of business. Of particular interest is the fact that Oliver F. Winchester, then engaged in the manufacture of shirts in New Haven, subscribed to 80 shares of stock. (The list of stockholders is shown in Appendix E.)

In July 1855, Smith, Wesson and Palmer sold, transferred or assigned their various assets to the new corporation, including an agreement made by Smith and Wesson that ". . . it shall have the exclusive use and control of all patents and patent rights which the said Smith and the said Wesson or either of them can or may hereafter obtain or acquire for inventions or improvements in firearms or ammunition or upon the matters already patented as aforesaid, including all power of granting licenses, conveying shares and rights, receiving rents and royalties, and recovering and collecting damages for infringements." ⁵ The partners received \$65,000 in cash paid in three instalments, plus 2,800 shares of stock, for their assets. In addition, Smith and Wesson were given an undisclosed sum for machinery at the Norwich plant.

The Volcanic Repeating Arms Company

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Horace Smith and Daniel B. Wesson

With the formation of the Volcanic corporation the former partners withdrew from active participation. Smith and Wesson went on to form their famous pistol company while Palmer appears to have withdrawn entirely from the firearms business. Although Palmer, at least, held a substantial block of stock, neither he, Wesson, nor Smith appears to have served as an officer or a member of the board of directors.⁶ Smith did act as plant manager for a short time during the latter part of 1855, but when the factory was moved to New Haven, early in 1856, he left the company's employment.

Initially the leading personality in the new management seems to have been Nelson B. Gaston of New Haven. Gaston had for a number of years been engaged in mining and processing barytes, a mineral used in paint. Around 1854 he shifted his principal business interests to shipping, and in 1855 became one of the largest stockholders and president of the Volcanic Company.⁷ Oliver F. Winchester, although holding only a few shares of stock, apparently became more active in the management during the latter part of the concern's short existence and, when Gaston died, in December 1856, succeeded him as president.

The withdrawal of Smith and Wesson had left no one in the organization with any experience in the manufacture and improvement of firearms. William C. Hicks was picked to succeed Wesson as plant manager. Little is known of Hicks's early life and training, but he appears to have been an experienced mechanic.⁸ There is nothing, however, to indicate that he knew very much about guns.

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Manufacturing was started in New Haven under Hicks's direction in Feb-

ruary 1856, in a small building located near the corner of Orange and Grove Streets. Compared with the Colt and the Robbins & Lawrence establishments at Hartford, operations were on a relatively modest scale. At the same time the labor force which numbered some fifty employees, including four girls making ammunition, and the amount of machinery used, made this plant well above the average size for the industry.

No description of the factory's operations at this time is available, but an inventory made when the Volcanic Company was liquidated gives some indication of the processes used. Included in the inventory were such standard types of machine tools as lathes, millers, drills, reamers, broachers, screw cutters, and the like. More specialized equipment was used in barrel-making and rifling. All of the machinery was apparently purchased from contemporary tool builders.

The machinery on hand was sufficient to permit the fabrication of parts that were reasonably interchangeable. Samples of the pistols and carbines show a considerable amount of file work, but this process was carried only to the point necessary to smooth off machined surfaces so that a more accurate fit was possible. The Company depended upon outside suppliers for frames and receivers, made of brass castings, drilled gun barrels of mild steel, and rough gun stocks.⁹ Otherwise the quantity and variety of machinery on hand was extensive enough to have produced practically all of the parts that went into the finished products, plus the making of gauges, jigs, and fixtures.

An examination of the names that appear on the payrolls of the Company indicates that almost all of the labor force was of English or Scottish background. The work-day and the work-week were probably typical for the period in the arms industry; that is, six days per week and ten hours per day. There is evidence of the beginnings of the contract system being utilized in the organization, under which agreements were made with individuals to assume responsibility for the production of specific items within the plant of the Volcanic Company. These early contractors were drawn from the more highly paid men already employed, or from outside the firm. Different individuals assumed contractual obligations from time to time, resuming their status as regular employees after the contract had been filled. It was not uncommon for a man to take on such an obligation in addition to his regular employment.¹⁰ As will be noted subsequently, the contract system became a very important feature of the organization of manufacturing under the Winchester Repeating Arms Company.

The Volcanic Company continued to produce the same types of firearms and ammunition begun by the Smith & Wesson partnership. The principal change was the addition of carbines to the line which used the same repeating action as the pistols. An advertisement in the form of a circular, issued in 1856, lists the following models, all of which were caliber .36:

Туре	Length of Barrel	Load	
Navy Pistol	6 inches	8 balls	
Navy Pistol	8 inches	10 balls	
Carbine	16 inches	20 balls	
Carbine	20 inches	25 balls	
Carbine	24 inches	30 balls	

Volcanic Rifle

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Exhibit 27 00449

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Office of the Volcanic Repeating Arms Company, New Haven

The Volcanic Company's products received favorable comments from several sources. The New Haven *Journal-Courier* reported on February 9, 1856: "We find in the N.Y. Tribune's notices of new inventions, the following account of two articles manufactured in this city. The Volcanic pistol and rifle seem to be the very perfection of firearms, and must be favorites with the public when they are fully known. We understand that orders crowd in upon the Company from all quarters." There followed a lengthy description of both the firearms and ammunition, and a statement that "about 70 men are now employed in the manufactory."

On November 17, 1856, the same paper, under the headline "Tall Pistol Shooting," noted: "The N.Y. Tribune gives the following account of practice with the Volcanic pistols made by the Volcanic Repeating Arms Co. of New Haven. It shows that they are a wonderful weapon, and that the shooter is an accomplished marksman. Col. Hay of the British Army, tried his hand with the Volcanic Repeating Pistol, a Yankee invention made at New Haven. The pistol used on the occasion was an 8 inch barrel, which discharged 9 balls in rapid succession. The Colonel fired shots which would do credit to a rifleman. He first fired at an 8 inch diameter target at 100 yards, putting 9 balls inside the ring. He then moved back to a distance of 200 yards further, a distance of 300 yards from the mark, and placed 5 of the 9 balls inside the ring, and hitting the bull's eye twice. The man who beats that may brag."

This was indeed Tall Pistol Shooting, so tall in fact that there is a strong suspicion that the reporter drew heavily on his imagination and not on fact. An analysis of the accuracy and velocity of the Volcanic ammunition made by the ballistic department of the Winchester Repeating Arms Company shows that Colo-

nel Hay's chances against putting nine out of nine balls into an eight-inch target at 100 yards were about eleven to one. The odds against his score at 200 yards were on the order of seventy to one; while he had about one chance out of 7,140 of making his score at 300 yards.¹¹

In fact, the Volcanic firearms were subject to the limitations, previously noted, that affected all breech-loading arms before the perfection of metallic ammunition: the impossibility of sealing off the breech sufficiently to prevent the escape of gas at the moment of firing. Furthermore, the Volcanic ammunition itself was seriously deficient. As one authority has noted: "The self-propelling bullet had many defects. The hollow base could not possibly hold a charge of powder adequate to produce effective velocities and energies. Proper obturation was impossible, and the projectiles [with their heavy charges of fulminate] had the unfortunate tendency to go off, a whole magazine load at a time, at moments most unpropitious. A fine mechanism had been evolved [in the Volcanic arm] but faulty ammunition caused it to fall dismally short of developing its potentialities to the fullest." ¹²

Subsequent events showed that the poor performance of the ammunition made it almost impossible to market the Volcanic products in competition with other firearms. This technical limitation appears to have been obscured by the immediate financial and management difficulties that were affecting the concern. The chief basis for this conclusion is that Oliver F. Winchester and a number of the Volcanic stockholders were willing to furnish additional capital to form a new organization to manufacture the same type of firearms and ammunition.

The proximate causes for the failure of the Volcanic Repeating Arms Company seem to have come from difficulties in connection with manufacturing and from a lack of working capital. The exact nature of the production problem is not known, but a letter written May 18, 1857, stated: "The settlement of the affairs of the Volcanic Repeating Arms Co. is now being delayed by claims at law . . . occasioned by the inferior quality of the workmanship of the arms sent Messrs. Post and Wheeler during the last summer and autumn." Something over \$11,000 was involved in this controversy, which must have represented a fairly large percentage of the organization's total sales for the period of operation.

The difficulty in collecting this account undoubtedly added to the financial stringency felt by the management during the latter part of 1856. At best the Volcanic Company could not have had any very large amount of working-capital, especially after the last instalment of the total \$65,000 cash was paid to Smith, Wesson and Palmer in April of the same year. Of the original 6,000 shares, 2,800 had been turned over to the three partners. On the assumption that the remaining 3,200 shares were fully paid in at their par value of \$25, the total subscribed capital would have been \$80,000. After deducting the \$65,000 already noted, plus an undisclosed amount to Smith and Wesson for machinery, the organization would have left only a small balance.

Whatever the amount, it seems to have been insufficient to carry the organization for more than a short time after April 1, 1856. Additional funds were borrowed from banks and by discounting notes, but the chief suppliers of capital were Gaston and Winchester, whose advances to the Company had amounted to something over \$25,000 by August 1856. On the 26th of that month the Company





Volcanic Cartridge

Failure of Volcanic Repeating Arms Company issued a mortgage to Winchester and Gaston for the amount of their loans, pledging the principal assets of the organization as security. Another \$10,000 was borrowed from the Tradesman's Bank of New Haven, the payment of which seems to have been guaranteed by Winchester and Gaston.

Even with these funds, the Company experienced increasing financial difficulties and in early February 1857 was unable to pay several notes which fell due at that time. Upon petition of the Tradesman's Bank of New Haven, the Volcanic Repeating Arms Company was declared insolvent on February 18, 1857, and Samuel Talcott and R. B. Bennett were made trustees. Eli Whitney, Jr., Henry Newson, and Charles Ball were appointed by the probate court to make an inventory and an appraisal of the assets of the Company.

Sometime within the succeeding few weeks Winchester made arrangements with the heirs of Gaston, who had died during the preceding December, and the Tradesman's Bank, to take over their claims. On March 15, 1857, by order of the court, the entire assets of the Volcanic Company were assigned to him for a figure slightly in excess of \$39,000, which was just about sufficient to cover the secured claims against the organization, now held by Winchester. As a result the stock-holders received nothing from their investment.

Thus the pioneer attempt to manufacture repeating firearms utilizing the action developed by Hunt, Jennings, Smith, and Wesson, failed because of immediate financial and managerial difficulties and because of the more basic problem of getting a satisfactory ammunition.



Pair of Ivory-Handled Engraved Volcanics Made for Oliver F. Winchester

Exhibit 27 00452

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GAINING A FOOTHOLD



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CHAPTER THREE

CRISIS AND TRIAL

It is doubtful whether Oliver F. Winchester had any intention of becoming an active gun and ammunition manufacturer at the time he purchased his eighty shares of Volcanic stock in 1855. As a partner in a flourishing business he was well known at the time as a capitalist and this investment was apparently only one of several that gave promise of financial success. The fact that he subsequently lent considerable money to the concern and took over as president, suggests that he soon became very much interested in firearms. Even before he had completed arrangements to acquire the assets of the defunct Volcanic concern, he had organized a new corporation, the New Haven Arms Company of New Haven, to carry on production under his general management.

Forty-six years old at the time he took over the management of the New Haven Arms Company, Winchester had already achieved a substantial business success. This he had accomplished largely through his own efforts, as he began life with few material advantages. He and his twin brother, Samuel C. Winchester, were born on November 10, 1810, in Boston, Massachusetts, the youngest in a family of five children. Oliver's mother was the third wife of his father, Samuel, who had ten children by his previous two marriages.

This branch of the Winchester family had long resided in Massachusetts, being directly descended from John Winchester, who had migrated from England at the age of nineteen and settled in the Boston area in 1635. The family genealogist has noted of the Winchesters: "Looking back . . . I do not find that they were men of note or known for their great deeds to mankind, but I do realize that they were men of strong character, earnest purpose, and deep religious convictions, upright and useful citizens, holding many offices of trust in the communities of which they were members, and helpful in building up the towns they selected for their homes, showing both ability and public spirit."¹

There is no information about the occupation of Samuel Winchester, Senior, but it appears that most likely he was engaged in farming near Boston. In any case, when he died a year after Oliver and his brother were born, his wife was left with very little with which to raise and educate her children. The limited resources of the family made it necessary for young Oliver, at the age of seven, to go to work on a farm. During the winter months, when the work was slack, he attended school. When he was fourteen he was apprenticed to a carpenter and six years later became a master builder.

Having completed his apprenticeship in 1830, he moved to Baltimore, where, in spite of his youth, he became a building contractor for the succeeding three

Oliver Fisher Winchester

years. He is credited, among other projects, with having constructed a church in that city. In 1833 he decided to change his vocation and went to work in a local commission store which handled dry goods and men's furnishings. The following year he married Jane Ellen Hope, originally of Portland, Maine, and at that time went into business for himself, opening a small retail store selling men's furnishings in Baltimore.

Three years later he decided to expand operations and opened a downtown store in Baltimore, handling the same type of merchandise. Although this new venture began in the panic year of 1837, it was successful, and for the next ten years he continued in this line of business. It was while Winchester was living in Baltimore that his three children were born: Ann Rebecca, William Wirt, and Hannah Jane.

Some time before the end of 1847, Winchester became interested in improving the construction of men's dress shirts. During the latter part of that year he applied for a patent on his ideas. In his application he pointed out, "The methods of cutting shirts heretofore and at present practiced are accompanied with a disadvantage which all have more or less experienced, *viz*: that of the pull on the neckband."

After reviewing the attempts that others had made to correct this fault, he continued: "The object of my invention is to remedy this evil, and this I effect by making a curved seam on top of and corresponding with the curve of that part of the shoulder which extends from the arm to the neck so that the shirt shall be supported on the shoulder and thereby avoid a pull on the neckband. The bosom is also curved out on each side which aids the effect produced by so cutting the shirt and also serves to make it fit better." 2

It is interesting to speculate whether Winchester himself had suffered from ill-fitting shirts or whether he was struck by the complaints of the customers who patronized his store. In any case, he was sufficiently impressed by the possibilities of producing and marketing an improved product to sell his business in Baltimore and move to New Haven, where he began the production of shirts in a small building on State Street, a few months before his patent (US 5421) was granted in February 1848.

In placing his product on the market, Winchester had made the acquaintance of John M. Davies, a leading importer and jobber of men's furnishings in New York City, and in 1849 the two men formed a partnership known as Winchester & Davies. The following year the manufacture was moved into a new building which the partners had built on nearby Court Street. Winchester seems to have supervised the production end of the business while Davies handled the marketing and distribution with headquarters in New York.

Initially the manufacture was conducted on what is known as the "puttingout system." The various parts of the shirt were cut out in the New Haven plant and distributed to the homes of workers for hand sewing. At one time the firm is said to have had eight hundred employees in the New Haven plant and another five thousand scattered throughout western Massachusetts, Connecticut, and Long Island.³

The advent of the sewing machine made it possible to eliminate much of the hand sewing and to change the production system to the factory form.⁴ Some time around 1853 the partners enlarged their plant, installed a number of sewing

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machines, and increased the number of workers in the factory. The firm's operations were conducted on an impressive scale. According to the Census of 1860, the firm of Winchester & Davies had an invested capital of \$400,000 and used 1,500,000 yards of cotton cloth, 400,000 yards of linen cloth, 25,000 spools of thread, 25,000 gross of buttons, 50,000 pounds of starch, and 18,00 pounds of soap. Some 500 foot-pedal sewing machines were utilized, and the average monthly employment included 40 male and 1,500 female workers. The payroll was reported to have been \$17,000 per month-\$2,000 for the men and \$15,000 for the women. The annual output came to around 40,000 dozen shirts, valued at \$600,000.⁵

The shirt business was undoubtedly profitable, and by 1855, when he invested in the stock of the Volcanic Arms Company, Winchester was already well-to-do, if not a wealthy man.⁶ With the formation of the New Haven Arms Company he divided his attention between the gun and ammunition business and shirt manufacture. He continued his interest with Davies until 1866, at which time he sold out to his partner and devoted full time and energies to firearms.

Winchester represented a new type of *entrepreneur* in the firearms industry. Up to this time the prominent figures, such as Eli Whitney, Eliphalet Remington, and Samuel Colt, had typically been inventors and skilled machinists, who also had a flair for business. Smith and Wesson carried on this tradition, but Winchester's background and experience had been completely foreign to his new interest. His promotion and early administration of the New Haven Arms Company show he knew rather little about the mechanics of firearms and ammunition. His ability lay in his skill as a salesman, his grasp of financial matters, and his choice of subordinates who could advise him on technical matters. In spite of his ability, the New Haven Arms Company barely managed to survive the first four years of its existence. Winchester learned by experience, and after an uncertain start his administration of the Company began to show increasingly favorable results.

The new company was formally organized under the Articles of Association which were signed April 3, 1857. The authorized capital was fixed at \$50,000, divided into 2,000 shares with a par value of \$25 per share. It is a tribute to Winchester's reputation as a business man and his powers of persuasion that eleven individuals joined him in investing in the new company, seven of whom had been shareholders in the Volcanic Repeating Arms Company. Winchester himself was the largest single stockholder, holding 800 shares, and he became president and treasurer and active head of the organization.

The New Haven Arms Company officially began on May 1, 1857, with the purchase from Winchester of the assets he had acquired from the trustees of Volcanic. He was paid \$25,000 for the tools, equipment and fixtures and an additional \$15,000 for the right to manufacture firearms and ammunition, under the patents which had been assigned to him and the ownership of which he appears to have retained.⁷ This sum, it may be noted, was the approximate value of the claims Winchester had held against the Volcanic Repeating Arms Company. His 800 shares in the new company took half this amount, leaving him \$20,000 in cash plus the ownership of the patents.

Besides these patents, Winchester held the beneficial interest in the covenant

Organization and Control of the New Haven Arms Company

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signed by Smith and Wesson in 1855. It was not until ten years later that he turned over these rights to the newly formed Winchester Repeating Arms Company in return for a substantial block of stock.

The following letter, written on the first day of business, reports the progress that had been made in collecting the subscriptions to the capital stock and the optimism of the management for the future success of the venture.

> New Haven, Conn. May 1, 1857

CHARLES J. HARRIS, ESQ. NEW YORK

Dear Sir:

Your valued favor of the 29th inst. came directly to hand last evening. In reference to your question concerning the installments called for and payable this day, I would say that already over 33,000 has been paid *in full*; and that by Monday hope for quite a large portion of the balance. It is proposed, in order to accommodate and suit the convenience of all, that such as may prefer can pay 20% cash and balance by note at not to exceed in all ninety days (interest added), from this date.

It is not the purpose of the Treasurer to use the credits of the Company at all in bank at present. The Directors aim to start the wheels cautiously and, believing most confidently that in the present company there are unmistakable elements of success, they hope for satisfactory results.

> S. L. TALCOTT Secretary

Benjamin Tyler Henry

Winchester demonstrated his ability to choose personnel by selecting Benjamin Tyler Henry to succeed Hicks as plant manager. Henry, a somewhat neglected figure in the history of firearms, was the grandson of Benjamin Tyler, a pioneer ironmaster and mechanical engineer who lived in the Windsor section of Vermont.⁸ B. Tyler Henry, as he invariably signed his name, was born in Claremont, New Hampshire, on March 22, 1821. After attending school until he was sixteen, he became an apprentice in the gunshop of J. B. Ripley & Company, in the same town.

During his apprenticeship he worked on various firearms and gun models, including the so-called "Waterproof Rifle," an early magazine gun patented in 1839 (US 1084), by R. B. Ripley, Lebbeus Baily, and William B. Smith. While this gun never became popular, it represented an intermediate development between Hall's breech-loader rifle and the Spencer repeating rifle, which came out in 1860, and served to familiarize Henry with the problems connected with breech-loading repeating firearms.

Leaving J. B. Ripley & Company, Henry worked in various gunshops, including Springfield Armory, until some time around 1842 when he was employed by N. Kendall & Company, of Windsor, Vermont. When that organization merged the following year to form the Robbins, Kendall & Lawrence Armory, he continued as their expert on guns. In 1850 when Courtlandt C. Palmer made arrangements with the company (now Robbins & Lawrence) to produce the Jennings rifle, Henry was among those who worked on the improvement of the mechanism. It was in connection with this contract that he met Daniel Wesson, and when the

latter joined with Horace Smith and Palmer to form the Smith & Wesson partnership, Henry went with them to Norwich.

Henry's name does not appear on the payrolls of the Volcanic Repeating Arms Company, and he apparently returned to Windsor during the period of that concern's operation, because he came directly from Windsor to the New Haven Arms Company. There is no record of how he came to the attention of Winchester. It is said that the two first met when Winchester employed him as an expert mechanic to repair a number of sewing machines used in the shirt factory. It is quite possible that he was also recommended by Smith or Wesson, as their relations with the New Haven Arms Company were friendly. In any event, the choice of B. Tyler Henry was a happy one. He brought to the organization his experience with the improvement and manufacture of repeating firearms and made a major contribution by effecting changes in the Volcanic firearm and ammunition.

Under Henry's supervision, the New Haven Arms Company continued the production of essentially the same firearms and ammunition that had been manufactured by the Volcanic Company. Two small-caliber .30 pistols, one a four-inch and the other a six-inch model, were added to the line, along with the ammunition to fit them. The ammunition itself was unchanged except for substituting black powder for part of the fulminate in the charge.

By the end of 1857, the full line and list prices of the Company's production were as follows:

No. 1	4-inch pistol	\$15.00
No. 2	6-inch Navy pistol	21.00
No. 2	16¼-inch carbine	30.00
No. 2	20-inch carbine	35.00
No. 2	24-inch carbine	40.00
No. 1	balls	11.50 per 1,000
No. 2	balls	12.00 per 1,000

The bore of the No. 1 arm was approximately caliber .30 while the No. 2 was caliber .36.

Manufacturing was carried on in the same rented building that had been used by the Volcanic Company until June 1859, when the New Haven Arms Company moved into newly leased quarters at 9 Artizan Street, a short distance away. There is no information about the size of the plant before 1860, but in the census returns for that year, the Company reported the average number of employees at sixty-eight, forty of whom were men and the rest women. The monthly payroll came to \$1,000, and the annual value of products was stated to be \$25,000.9

Winchester's personal efforts appear to have been directed toward building up a market for the Company's products. Contacts with dealers were made by letter and through personal calls by himself and W. C. Stanton, who was employed as a traveling salesman about the middle of 1857. The Company was interested in opening an office in New York and on March 4, 1858, Winchester wrote Smith & Wesson: "We have in contemplation to open an office on Broadway, N. Y. for the sale of our arms and should perhaps like to make an arrangement with you to sell yours if we can do so in a manner mutually satisfactory. What do you think Early Operations of the New Haven Arms Company

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of it?" Nothing appears to have come from this proposal, but the Company did make an arrangement with J. W. Storrs of New York to act as its agent.

Dealers were given discounts from list prices which varied according to the volume of orders. On firearms they ranged from 20 per cent on amounts over \$100, 25 per cent on sums above \$1,000, and 30 per cent on \$5,000 or more. The discount on ammunition was 20 per cent on any orders above \$100. These discounts applied to settlement by "approved paper" of four months' duration or less, while a cash settlement gave the payer an extra 5 per cent discount. To any interested, responsible party, the Company sold a sample set of its products at regular dealer discounts and stood ready to fill additional orders as they were received. No merchandise was sold on consignment, and Winchester refused several requests of this nature. He was willing and eager to grant exclusive privileges to wholesalers or jobbers and occasionally to large dealers. Even during this early period he was interested in maintaining prices, cautioning one prospect who was interested in becoming a wholesaler, "... in selling to dealers you will please adhere to these prices and in retailing them do so at list price and in all cases for net cash."

In advertising the Company's arms Winchester made an early use of testimonials, which was the common practice of the period. In Winchester's case there was an added reason. Machine-made firearms were still a novelty and it was necessary to overcome the prejudice of users who preferred the products of the gunshops. Testimonials could be effective in breaking down their prejudice. A circular printed in 1859 reproduced the following letters from "among the numerous testimonials" received:

New York, March 10, 1855

Gent:—I consider the Volcanic Repeating pistol the *ne plus ultra* of Repeating or Revolving Arms, and far superior in many respects to Colt's much extolled Revolver. I have fired, myself, over 200 shots from it without even wiping the barrel—this is an advantage which no other arm I know of possesses. I have had the pistol with me at sea for more than eighteen months, on a voyage around the world, and find that, with the most common care, it will keep free from rust far more so than Colt's. I find the Balls as good now as when I left New York. I have shown the pistol to my friends in San Francisco, Hong Kong, Manila, Canton, and Shanghai, and they were much pleased with it.

, C.F. W. BEHM, late of Clipper Ship Stag Hound

New York, 23rd November, 1856

Gent:—I have used a Volcanic Repeating Pistol for some months, on my last voyage to San Francisco, and in all that constitutes a good Pistol or Firearm, it has no equal and excels all others I have ever seen in rapidity, efficiency and certainly of execution. Its peculiar merit for sea service is the nature of the Ball, which contains the Ammunition, is water-proof and cannot be damaged by any change of climate, but is sure fire even after having been loaded for months.

÷ .

FRED K. A. STALL, Commander Ship Star of the Union

In spite of the enthusiasm with which the New Haven Arms Company was begun and the efforts to make it successful, sales remained small. The financial position of the organization steadily deteriorated after 1857, and by 1861 the Company was virtually bankrupt.¹⁰ The basic difficulty with the Volcanic firearms has already been described; it arose from the use of the self-propelled bullet. It is

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The above named Company having purchased all the Patent rights on this Arm and its ammunition, some eight or ten in number,) the inventions of as many of the most ingenious mechanics of the country, who have spent years in bringing this wonderful triumph of genius to perfection, are now prepared to manufacture them in a perfect manner, and offer them for sale as the most powerful and effective weapon of defense ever invented. They are made of all sizes, from a four inch Pocket Pistol, carrying six balls, to a twenty-four inch Rifle, carrying thirty balls. The condition of the protection of the prote

carrying six balls, to a twenty-four incli Rifle carrying thirty balls. The capiddy of carculation of this Arm places it beyond all competition. The thirty shooter can be loaded and fired in less than one minute—a quickness and force of execution which is as much superior to the best revolvers, as they are to the old muzzle loading single shooters. The Announition is rater-prior, hence it can be used in any weather, or loaded and hung up for nonths, or laid under water, and then fired with certainty. Its safely from accidental discharge is a great consideration in its favor; for while the magazine is the running the whole length of the barrel may be filled with balls, and thus the gun, in fact, be

Ta fube rubing the whole length of the barrel may be finde with oals, and this the ghit, in lace, do barled from breech to muzzle, it is yet impossible, from any carelessness in handling, to discharge it. *His construction* is simple and its workmanship nost perfect, hence it is not easily got out of requir. *Its proportions* are light, elegant and compact, and the barrels are all rifled with great exactness. It requires no cap nor priming, no bullet mould nor powder flask. The powder and cap is contained in a baded " minnic" ball of the best form and proportions, and is as sure as the best percession caps. *B shoots with accuracy* and *greater force* than any other Arm can with double the powder used in this. Directions for use accompany each Arm. Balls are packed in tin cases, 200 each.

LIST OF MANUFACTURERS' PRICES.

No. 1.	4 inch Pocket Pistol,	\$12.00.	Plafed	and Engraved.	\$13.50,	Carrying	- 16	Balls.
÷ 1,	6 " for Target Practice,	13.50.	*		15.00.	••	10	
·~ 2.	6 " Navy Pistol.	18,00.	••	- ••	20.00,	•	8	
··· · · · · · · · · · · · · · · · · ·	8	18.00.	4	14	20.00.		10	*
·· - <u>></u> ,	16 " Carbine,	30.00.	•4	4	33,00,	••	20	44
	20 * *	35,00,	•	i	38,00,	÷.	25	•
	24 * . *	40.00.	**		43.00,		30	. in .

Plating and Engraving, from \$2.50 to \$5.00 extra, per Arm.

AMMINIPION.

No. 1 Balls, 130 to the Pound, 810 per M. No. 2 Balls, 66 to the Pound, 812 per M. (No. 1 Arms, require No. 1 Balls. No. 2 Arms, require No. 2 Balls.) The numbers 1 and 2 designate the size of the bore, and the Balls are numbered to correspond.

A liberal discount to the trade.

We select the following from numerous testimonials, as the service to which the Arms were subjected was most severe; from the rapid action of salt water upon all metals.

Ver Turk, 23d Normber, 1856. Gest --I have used a Velcame Repeating Field for some months, on my last voyage to San Francisco, and in all that constitutes a go to be three Arm, it has no equal, and excels all others. I have ever seen in rapidity, efficiency and vertainty of execution. Its peculiar me-ter service in the nature of the Bulk which containing the Amminition, is water-proof, and cannot be damaged by any change of etimal transfer even after having been loaded for months. Signed, FRED'K A. STALL, Commander Ship Star of the Union

All orders may be addressed to

October, 1859.

NEW HAVEN ARMS COMPANY.

New Haven, Conn.

Broadside Advertising Volcanic Repeating Arms

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somewhat ironic that the Company should have continued to use this type of ammunition, when Winchester owned the Smith and Wesson patent covering a metallic cartridge which was the key to the solution of the problem. The failure, initially, to recognize the faults of the Volcanic products is a reflection of Winchester's limited knowledge of firearms in 1857.

As soon as this fault was recognized in 1858, Winchester put B. Tyler Henry to work to correct the difficulty, but nearly three years passed before his efforts began to show favorable results.

It was only the possibility of getting more satisfactory types of ammunition and adapting the Volcanic mechanism to handle them that kept the concern from being liquidated. Winchester's personal confidence in the future of the Company is revealed by the amount of funds he advanced to the business and his acceptance of responsibility as co-signer, along with the other directors, for the concern's notes payable.

It is impossible to credit any single individual with the invention of the metallic cartridge. Ammunition development has always proceeded in a series of small steps. It has involved a delicate balance among several variables, including the form and construction of the projectile, the relationships between the amount of propellant and the weight of the bullet, the strength of the cartridge case, and the kind of priming mixture used. The continuing problem of getting satisfactory performance from the ammunition has prompted changes in allied fields; for example, better control of powders, priming materials, and improvements in metallurgy. In some instances an impetus that has come from the outside has in turn affected ammunition production.

The idea of making metallic ammunition was not new in the decade of the 1850s, but interest tended to lag as long as muzzle-loading weapons were predominant. A few Englishmen and Americans took part in the early development, but French inventors showed the greatest initiative. As early as 1812, Pauley, encouraged by Napoleon, patented a cartridge with a priming base and a charge of powder contained in a metal cylinder that was screwed onto a bullet.¹¹ Between that date and 1860 a number of French patents covering various types of metallic ammunition were granted, including a pinfire cartridge which enjoyed a measure of popularity. This was perfected by Houiller in 1847, who at the same time took a patent for a rimfire cartridge.¹³

With the growing number of breech-loading firearms, more and more attention was given to the development of metallic ammunition. By the late 1850s enough progress had been made to assure its early substitution for the kinds of cartridges currently being used in breech-loading arms. The significance of this development for the history of the industry has been pointed out by W. W. Greener, the famous British authority: "Probably no other invention connected with firearms has wrought such changes in the principle of gun construction as the invention of the expansive cartridge case. It has been used for every description of small firearms, and has been applied with success even to cannon. It has completely revolutionized the art of gun-making and has called into being a new and important industry—that of cartridge manufacture."¹³

The immediate credit for perfecting the rimfire cartridge which brought success to the New Haven Arms Company's weapons, should probably go to Daniel

Metallic Ammunition and the Rimfire Cartridge

B. Wesson of the Smith & Wesson Company. Wesson's interest in metallic cartridges dated back at least to 1854 when, during the original Smith and Wesson partnership, he took out his patent on the construction of a centerfire cartridge. Soon after Smith and Wesson established their pistol business in Springfield, Massachusetts, they acquired a basic revolver patent from Rollin White which covered a revolving cylinder with the chambers bored clear through the cylinder. (The chambers in Colt's revolvers at this time did not extend through the cylinder and were loaded from the fore part of the chambers, usually with loose powder from a flask designed to "throw" the proper charge, and a separate bullet. There was a limited use of paper cartridges with the bullet attached, but these were fragile and hard to get for most persons.)

The White repeating action presented the same problem of checking the escape of gas and fire at the breech that was plaguing the New Haven Arms Company's firearms. Wesson, accordingly, began experimenting with metallic cartridges in the hope of overcoming this difficulty. It will be recalled that Smith, his partner, had manufactured the caliber .22 Flobert pistol which used a metallic cartridge (more accurately a BB cap) containing no powder but propelled by a charge of fulminate in the head. Wesson's initial attempt was to use this type cartridge in the first Smith & Wesson revolver, a caliber .22 model, which was brought out in 1857.¹⁴

The low velocity of this ammunition, plus the tendency of the head to bulge when fired, made the empty shells difficult to extract and led Wesson to further experimentation. By early 1858 he had worked out a cartridge with the priming mixture in the rim of the head and a powder charge as a propellant which worked satisfactorily in the Smith & Wesson pistols. The following extracts from his patent application, made two years later, show something of other attempts that had been made up to that time:

We are aware that a metal cartridge for breech-loading pistols . . . has been made, in which the fulminate is spread in a thin layer over the interior of the base of the cartridge and is held in place by a washer of thin metal or other material.

The explosion of the cartridge [in our type of revolver] from the hammer causes the base to bulge out—by which the cylinder is jammed and prevented from revolving freely.

Metallic cartridges have also been constructed with a milled washer inserted in their base and the fulminate contained between the projection and depression around the edge of the washer and the interior surface of the cartridge at its base; but these cartridges are not adapted to the cylinder used in our arm.

Metallic cartridges have also been constructed with a hollow flap ged annular base and the fulminate contained in a hollow ring which is inserted in the hollow annular base . . . but this description of cartridge is expensive and the construction dangerous from the difficulty of closing and turning the ring after the fulminate is introduced, without explosion.¹⁵

Wesson proposed to avoid these various difficulties by making a rimfire cartridge with a projecting flange around its base with an annular recess in which the fulminating powder is placed, the fulminate from the central portion of the head being removed.

An important part of Wesson's invention was a loading tool which consisted of a small arm that spun the fulminate into the recess in the flange of the cartridge





Pinfire Cartridge

head. After the fulminate was in place, a wad was inserted in the head of the cartridge and the case filled with gunpowder. A ball of an "elongated conical form" grooved at the rear was in turn put into the mouth of the case and pressed into place. The final step was to put a light pressure on the head to bring the metal into close contact with the fulminate.

Wesson, it may be noted, made no claim to have invented the rimfire metallic cartridge, but he did claim priority in making it in the form and manner described. Actually, he made the first cartridges of this type in January 1858, and they were used in the caliber .22 revolver that his company had introduced the year before.

In testimony given some years later, B. Tyler Henry stated that he began experimenting with metallic ammunition in the fall of 1858.¹⁶ By the end of the year he could produce flanged rimfire cartridges almost identical with those of Wesson's except that they were larger in size. It is possible that he developed this type of ammunition independently, but it seems more likely that he had seen some of Wesson's products and realized their applicability to the problem of the Volcanic firearms. The fact that Henry did not take out a patent on ammunition might be taken as evidence that he recognized Smith & Wesson's prior claim. It appears much more probable that he and Winchester did not believe such a cartridge was patentable, for on April 20, 1863, the latter wrote Smith & Wesson:

Gentlemen:

After I saw you on Friday last, I saw Mr. Leete and, in course of the conversation, he asked me if you had said anything to me about your patent on cartridges. I replied that you had not, that I was not aware that you had one, and if you had I presumed you would not say anything to me about it for the reason that by virtue of certain agreements with the Volcanic Arms Company to which I fell heir, you would doubtless consider me entitled to make them. On this subject, however, it is best we should have a fair understanding, to this end please give me the facts and your views.

> Yours Respectfully, O. F. WINCHESTER

In any event, at the time the letter to Smith & Wesson was written, the New Haven Arms Company had been turning out caliber .44 rimfire cartridges in some quantity for well over a year and a half. Stamped on the head with the letter H, in honor of Henry, these cartridges carried a pointed, conical, spherical bullet weighing 216 grains and a powder charge of about 26 grains. About a year later the Company brought out a cartridge with a flat-nosed bullet, designed to lessen the danger of explosion in the magazine. These cartridges became known as the Henry .44 Flat. Some measure of their superiority over the Volcanic ammunition is indicated by the fact that they developed a muzzle velocity of about 1,200 feet per second compared with the maximum of 500 feet per second for the former.

As soon as he had produced a satisfactory cartridge, Henry turned his attention to adapting the Volcanic repeating mechanism to the use of the new ammunition. Specifically, his improvements consisted in adapting the bolt and firing pin to loading, firing, and extracting the rimfire cartridge. A special feature was the design of the firing pin, which was divided at the fore end so that it indented both sides of the rim of the cartridge head and reduced the possibility of misfires. There was no question as to the patentability of these improvements, and in Octo-

The Henry Rimfire Cartridge





44 Flat Rimfire Cartridge

The Henry Rifle

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ber 1860 Henry was granted US Patent 3446, which he assigned to the New Haven Arms Company.

These changes were incorporated in a new model rifle, bearing Henry's name, which in external appearance showed its relationship to the Volcanic. The magazine was the same, consisting of a slotted metal tube under the barrel, parallel with it, and holding fifteen cartridges. A section of the magazine, near the muzzle, which swung to one side to permit loading, contained a spiral spring that forced the ammunition to the rear against the carrier block. The barrel was twenty-four inches long with a bore of caliber .44. Complete, the gun weighed about ten pounds.

The choice of the caliber .44 bore for the new rifle raises an interesting question. While not an uncommon size, this bore was smaller than the standard military arms which were all above caliber .50. At the same time, it was larger than the Volcanic caliber .36 rifle and, therefore, its manufacture required the use of new equipment. It seems most probable that the Company adopted the larger bore in an attempt to tap the military market, but could not go beyond the caliber .44 without redesigning the repeating action to handle the longer ammunition. Even if this had been possible or practicable in 1861, it would have made the arm heavier and would have cut down on the amount of ammunition that could be carried in the magazine.¹⁷

Some evidence of the significance of Henry's contributions to the New Haven Arms Company is contained in a brief submitted for an extension of his patent to the Patent Office in September 1874. According to this document

In 1860 the Volcanic arm as fully shown by all the witnesses for applicant, had become a failure, and the company insolvent, which state of affairs led applicant to make the improvements in the arm.

That the invention was of great value and importance is clearly shown by each and all of the witnesses on the part of the applicant.

It is impossible to estimate the real value of the invention made by the applicant.

The Mechanism of the arm remains the same as the original arm, the patents for that mechanism are the foundation of all subsequent improvements, and to those patents, in this arm, applicant's patent was and still is subservient. The arm was a failure till the applicant's improvements, but it would be folly to say that the value of the arm made successful by such improvements is the real value or ascertained value of the invention of the applicant.

The witness, Winchester, fully explains the difficulties of estimating the real value of the invention . . . and fixes one dollar per gun as the money value of an improvement of that kind, and he stated that one hundred forty thousand arms have been made and sold to 1874, hence one hundred and forty thousand dollars is a reasonable estimate of the real value of the invention to the manufacturer, some portion of which should properly be credited to the inventor.

The Winchester Repeating Arms Company have agreed to pay the applicant for the patent for the extended term, the sum of twelve thousand five hundred dollars.¹⁸

The same document gives the details of the way in which Henry was compensated for his improvements:

Applicant's salary as superintendent was fifteen hundred dollars per year, and as in all manufactures, his ingenuity and talent were expected to be exercised for the good of Importance of Henry's Contribution

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his employer without special agreement to that effect, leaving the question of the right of any patentable invention that he may make open, to be settled between the inventor and Company that employed him as they can agree.

Rather than pay Henry a cash settlement or royalty, Winchester, on behalf of the New Haven Arms Company, gave him a contract to manufacture five thousand arms "but in this contract no extra price was allowed applicant, above what other parties would have received from the same." (This is an example of the inside contract system, which will be discussed in some detail in Chapters Seven and Twelve. In brief, under this arrangement Henry was to produce the guns in the New Haven Company's factory, using the fixed plant and equipment and raw materials supplied by the Company. He was to employ, supervise and pay the workers himself. The difference between his costs and the contract price to the New Haven Arms Company was his income.) Furthermore, under this contract, although Henry continued to act as superintendent, his pay was discontinued. The arrangement ran for five years during which time Henry made some \$15,000, or more by \$7,500 than he would have received from his salary as superintendent.

In view of the importance attached to Henry's improvements, that amount does not appear to be overly generous. As the brief relates, if a deduction is made from Henry's income of a reasonable allowance for his attention and services under the contract, little or nothing remains as compensation for his invention which made a complete success of the arm and which, but for his improvement, was a failure.

This statement was made in an attempt to get a renewal of the patent and after the new gun had proved itself. In 1861, when the future of the rifle was still uncertain, Winchester's unwillingness to make a cash payment to Henry is understandable. Evidence is lacking as to whether the question of a royalty payment was raised, but it is significant to note that Winchester and his successors in general followed a rule of never granting royalties on inventions they acquired.

"Gentlemen's Agreement" With the introduction of the Henry improvements, the New Haven Arms Company dropped the production of pistols and concentrated on the manufacture of rifles. The fact that the New Haven Arms Company and its successor, the Winchester Repeating Arms Company, never again manufactured pistols or revolvers, has given rise to an interesting speculation about an agreement between Winchester and Smith & Wesson. Chinn and Hardin, in their book on American hand arms, state, without documentation, that when Winchester and Smith & Wesson came to terms about the patents, they entered a gentlemen's agreement

. . . that was verbal, but has never been violated by either company in their many years of active existence. Oliver Winchester pledged that his company would never compete in the revolver business by manufacturing them; likewise the Smith and Wesson Company agreed never to produce rifles. And this agreement has been recognized by each succeeding generation having proved more binding than lots of contracts have that were legally perfect and elaborately drawn.¹⁹

Such an agreement may have been entered into, and, being a "gentlemen's agreement," might not have been made a matter of record. There is, however, no mention of such an arrangement in the existing documents of either Smith & Wes-

son or the Winchester Repeating Arms Company, although the latter company did make a similar agreement with another concern.

Furthermore, the timing of the alleged agreement is wrong, because the patents were transferred to the Volcanic Company in 1855 and that company continued to produce pistols until almost 1860, several years after Smith & Wesson had started operations. In any case, the decision to specialize after 1860 can be accounted for largely on other grounds. If Smith & Wesson had wished to produce repeating rifles, it would have been necessary for them to develop an action not covered by the patents turned over to the Volcanic Repeating Arms Company and now held by Winchester. Moreover, any such invention would have reverted to Winchester under the covenant signed by the two at the same time. The Rollin White patent acquired by Smith & Wesson did not fall within the covenant although Winchester seems to have had his lawyers explore the possibility.

Of course, Winchester could have continued the manufacture of pistols using the toggle-link action. But at this time the revolving action popularized by Colt was well known and liked by shooters. This was largely because the revolver was easier to manipulate than the finger-lever action of the Volcanic which required both hands. As the Rollin White patent covered the revolving mechanism with the chambers bored through, in which metallic ammunition could be used, it would have been extremely difficult for the New Haven Arms Company to develop a patentable revolving action during the life of the Rollin White patents.

Whatever may have been Winchester's inclination toward the production of pistols, there is no doubt that by the middle of 1862 the prospects for the future of the New Haven Arms Company looked promising. The improvements in the rifle had been completed and the organization was tooled up and ready for production. The Civil War had begun the year before, and the tremendous demand for military supplies of all kinds offered the prospect of a substantial market for the New Haven Arms Company's new rifle.

Henry Rifle



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CHAPTER FOUR

LAYING THE FOUNDATION

Attempt at Military Adoption The Henry improvements marked a turning point in the history of the New Haven Arms Company and in the career of Winchester himself as a gun and ammunition producer. The latter had stated in a communication of October 17, 1862, that the new rifle would "if pressed with vigor retrieve [the Company's] past losses." Actually, this claim was too modest. Production of the new firearm not only enabled the New Haven Arms Company to recover its previous losses, but to develop into a profitable organization during the succeeding four years. In this accomplishment, the management was considerably aided by external conditions, but even so, no small amount of energy had to be expended before success was achieved. It was to this task that Winchester devoted an increasing amount of his attention after 1861.



Trade Card of New Haven Arms Company

Like every other gun and ammunition manufacturer at the time, Winchester was interested in supplying the military demand. With the firing on Fort Sumter in April 1861, the Nation had plunged into its grim civil conflict. At the outset neither side was adequately prepared to supply its armed forces with military equipment. This was especially true in regard to small firearms. So great was the need that all types, ancient and modern, foreign and domestic, were pressed into service. This demand for firearms, coupled with the fact that the arms and ammunition themselves were undergoing extensive modification, resulted in the use of a

greater variety of guns during the Civil War than in any other major conflict in history.

In the new gun the New Haven Arms Company had a product that might be expected to sell readily, and Winchester made early arrangements to have the Henry rifle tested by the military authorities. The results of one such trial made by an officer of the United States Navy, in May 1862, give a good impression of the gun's performance. During the test, 187 shots were fired in 216 seconds, which did not, however, include the time spent in reloading the magazine. For comparison with the rapidity of fire of other rifles, 120 rounds were fired in an elapsed time of 340 seconds, including reloading, or an average of 1 shot every 2.9 seconds. Compared with the best performance of the muzzle-loader of around 20 seconds per shot, and the single-shot breech-loader, which could be fired once every 10 or 12 seconds, this was a substantial improvement. The Henry was shot for accuracy and range, and in the hands of a relatively inexperienced shooter placed 14 out of 15 shots in a target 18 inches square at a distance of 348 feet. The rifle was also tested for endurance, and after being fired 1,040 times without cleaning, developed no mechanical difficulties, although the barrel was considerably leaded and very foul.1

In spite of the need for firearms, the reaction of the United States military authorities to the use of a repeating firearm was not enthusiastic. The following extract from a letter written by Brigadier General James W. Ripley, Chief of Ordnance, to Secretary of War Simon Cameron on December 9, 1861, illustrates the official attitude. Referring to tests that had been made of the Henry and the Spencer rifles, he admitted that both guns had performed well, but continued: "... it is impossible, except when arms are defective in principle, to decide with confidence, in advance of practical trials, on their value, or otherwise, as military weapons. I regard the weight of the arms with the loaded magazine as objectionable, and also the requirement of special ammunition, rendering it impossible to use the arms with ordinary cartridges or with powder and ball. It remains to be shown by practical trial what will be the effect on the cartridges in the magazine of carrying them on horseback, when they will be exposed to being crushed or marred possibly to such an extent as to interfere with their passage into the barrel, and whether they will be safe for transportation with the fulminate in the cartridge; also, what will be the effect on the spiral spring of long use and exposure in the field. I do not discover any important advantage of these arms over several other breech loaders, as the rapidity of fire with these latter is sufficiently great for useful purposes without the objection to increased weight from the charges in the arm itself, while the multiplication of arms and ammunition of different kinds and patterns, and working on different principles, is decidedly objectionable, and should, in my opinion, be stopped by the refusal to introduce any more unless upon the most full and complete evidence of their great superiority. In view of the foregoing, of the very high prices asked for these arms, and of the fact that the government is already pledged on orders and contracts for nearly 73,000 breech-loading rifles and carbines, to the amount of \$2,250,000, I do not consider it advisable to entertain either of the propositions for purchasing these arms."²

Apparently General Ripley's attitude remained unchanged until sometime in June 1863, when he authorized a Government order for some 250 Henry rifles.

In a letter to General Ripley dated June 24, 1863, Winchester took the occasion to point out the virtues of the Henry rifle and to bring a little pressure on the Ordnance Department by concluding: "If these arms are used as efficiently by the men who are to receive them as they have been by our Union friends in Kentucky the country will have no cause to regret the expenditure. We are having many more orders than we can fill, those from Europe are the most profitable owing to the Exchange, but prefer and anxiously desire that they may be used against the Rebellion, but cannot afford to refuse other orders upon an uncertainty. We trust, therefore, that the Government may find its interest in using them and place orders with us early that we may be able to meet them in time."

At this point Winchester determined to make a strong bid for the Government orders. He wrote Messrs. W. G. Woodman, of New York City, in 1863: "We are preparing to make Rifles and Carbines on the principle adapted especially to Infantry and Cavalry using the same size cartridges and one with a barrel 30 inches long and the other 20 or 22 inches carrying a ball nearly twice the weight of the one sent, the bore to be 50/100. Many experiments have been recently made by gun men in this country and by the English Government all which result in establishing the fact that a rifle with a small bore of 46/ to 50/100 of an inch carries with more accuracy and greater effect than the larger ones heretofore in use of 56/ to 60/100 inches or more in the bore. Other incidental advantages also arise from the use of the smallest practicable size bore in the diminished cost and weight of the ammunition both of which increase in a rapid ratio with the increase of size."

Sometime within the next few months he opened negotiations directly with Assistant Secretary of War R. C. Watson, suggesting that the New Haven Arms Company be given a contract. Winchester's hopes were temporarily dashed when he learned that the armory he proposed to rent from Wheeler & Wilson, in Bridgeport, was already spoken for. He wrote Watson that it would take longer to make sizable deliveries than he had anticipated because at least eighteen months would be needed to construct a new building and get production under way. A further investigation, however, revealed that Colt's Patent Firearms Company at Hartford had sufficient idle capacity to take care of his needs. At the same time the Wheeler & Wilson armory was also offered to him. With these plants available Winchester reopened negotiations with Assistant Secretary Watson and offered to deliver as many as forty thousand Henry carbines in about eight months at \$26 each.³

But Winchester was doomed to disappointment. Assistant Secretary Watson apparently presented his proposals to the Ordnance Department. While the new head, Brigadier General George D. Ramsay, was more favorably inclined to the repeating rifle than his predecessor, General Ripley, had been, he was not impressed with the Henry rifle. In a report to Assistant Secretary Watson, dated April 5, 1864, he stated: "Repeating arms are the greatest favorite with the Army, and could they be supplied in quantities to meet all requisitions, I am sure that no other arm would be used. Colt's and Henry's rifles and the Spencer carbines and rifles are the only arms of this class in the service. Colt's is both expensive and a dangerous weapon to the user. Henry's expensive and too delicate for service in its present form, while Spencer's is at the same time the cheapest, most durable, and most efficient of any of these arms." 4

General Ramsay's report apparently caused Assistant Secretary Watson to limit severely the orders for the Henry rifle. Ordnance Department records show a contract for eight hundred was made with the Company on December 30, 1863.⁵ This order was followed over a year later by a second contract for eight hundred Henrys on April 7, 1865, and by a third for an additional 127 rifles on May 18 the same year.⁶ These contracts, plus sales made earlier, made the total number of Henry rifles supplied to the U.S. Government during the war come to 1,731. The total amount collected from the Government for these arms came to \$63,953.26, or an average of a little less than \$37 per rifle.⁷

Government purchases of Henry ammunition amounted to 4,610,400 cartridges and cost \$107,352.05, or an average of something over \$23 per thousand.⁸ This amount was much larger than the Government orders of Henry rifles would warrant. It is accounted for chiefly by the fact that so many of the Henry rifles were bought by individuals in the services, who were supplied with ammunition by the Ordnance Department.

His failure to obtain a Government contract forced Winchester to seek other outlets for the Company's products. While he was successful in selling the Company's guns and ammunition to customers outside the U.S. Government, directly and indirectly the demand was closely related to the war. A number of sales were made directly to individual officers and men of the Volunteer and State Militia forces which made up such an important part of the Union armies. Some rifles were purchased by officers attached to the Regular Army and Navy, but the bulk went to civilians living principally in Kentucky and the neighboring states of Ohio, Indiana, Illinois, and Missouri. On one occasion Winchester wrote, "There are few in this neighborhood who have tested the rifle or know of its existence. Yet the border states give us more than we can do."

The Company depended chiefly on dealers for distribution. In general, the arrangements were similar to those developed prior to 1861. Discounts were scaled according to the amount of the orders and an extra commission was given to wholesalers. The list price of the rifle in October 1862 was \$42, and ammunition was quoted at \$10 per thousand. The discounts on the rifle were set so as to return the Company a minimum of \$34, while the ammunition returned \$8. In spite of rising costs, the list price of the rifle did not change, and discounts remained practically the same. On ammunition, however, there were several price increases, and by the latter part of 1863 the figure quoted was \$17.50 per thousand, although it should be noted that this was the improved ammunition using compressed powder.

Contacts with dealers came from inquiries directed to the Company and from the personal efforts of Winchester, who wrote to likely prospects and made frequent trips into the Kentucky area as did Stanton, who continued as the organization's travelling representative.

In general, Winchester took care to give his dealers equal terms and to protect them against price cuts and unfair competition. This was not always easy. There was the case of George D. Prentice, of Louisville, Kentucky, who ordered some \$10,000 worth of rifles and ammunition in September 1862. Soon after this shipment arrived a sudden scare that the city might be attacked caused Prentice to sell his order to individuals at prices less than what it had cost him. This action produced a strong protest from the other dealers in the region, which caused Winchester considerable embarrassment. Under the extenuating circumstances he kept



This Rifle can be discharged 16 times without loading or taking down from the shoulder, or even loosing aim. It is also slung in such a manner, that either on horse or on foot, it can be **Instantly Used**, without taking the strap from the shoulder.

For a House or Sporting Arm, it has no Equal; IT IS ALWAYS LOADED AND ALWAYS READY.

The size now made is 44-100 inch bore, 24 inch barrel, and carries a conical ball 32 to the pound. The penetration at 100 yards is 8 inches; at 400 yards 5 inches; and it carries with force sufficient to kill at 1,000 yards.

A resolute man, armed with one of these Rifles, particularly if on horseback, CANNOT BE CAPTURED.

"We particularly commend it for ARMY USES, as the most effective arm for picket and vidette duty, and to all our citizens in secluded places, as a protection against guerilla attacks and robberies. A man armed with one of these Rifles, can load and discharge one shot every second, so that he is equal to a company every minute, a regiment every ten minutes, a brigade every half hour, and a division every hour."-Louisville Journal.

JNO. W. BROWN, Gen'l Ag't., Columbus, Ohio,

36, 38 and 40 North High Street, Columbus, Ohlo.

At Rail Road Building, near the Depot.

Advertisement for Henry Rifles

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Address

B. NEVING' Steam Pr

Case 3:17-cv-01017-BEN-JLB Document 50-12 Filed 03/05/18 PageID.5050 Page 38 of 67



Cover of 1863 New Haven Arms Company Catalogue

Prentice on as a dealer, but in the letters written subsequently, Winchester was careful to admonish Prentice not to sell below the established price.

In another instance rifles were sold to Messrs. B. Kittredge & Company of Cincinnati, Ohio, who, according to reports received by the New Haven Arms Company, not only resold the guns below the established prices, but made disparaging remarks about their performance as well. Winchester attempted to stop this practice by refusing to sell to Kittredge & Company. He was not immediately successful and a few months later he asked one of his dealers to go around to the latter's place of business, buy up the stock of Henry rifles, and find who was supplying them. Kittredge & Company was pushing the Frank Wesson rifle at this time, and during the course of correspondence insisted that it was a better gun than the Henry. Winchester offered to wager "not less than \$5,000 nor more than \$10,000" that in a competition between the two guns, the Henry would prove the better performer, a challenge that seems to have ended this episode.

Winchester aided his dealers by doing a certain amount of advertising in newspapers in the chief marketing areas.⁹ Early in 1863 he began gathering material for the first catalog to be published by the company. He asked A. A. Vanwormer, a dealer in St. Louis, to make tests of the accuracy of the Henry rifle at various distances from the target, explaining: "We have no expert nor anyone in this vicinity who has tested the rifle as you have. In fact few in this vicinity know even of the existence of the weapon. While the demands from the border states have been and still are beyond our means to supply and used so far away from us that we have no means of getting exact results, as we desire to publish."

He also solicited personal accounts of combat performances of the rifle, explaining that the "Romance of War as a matter of history should be preserved."

Late in 1863 the Company issued a small catalog which included a number of testimonials concerning the effectiveness of the Henry rifle as a combat weapon, in addition to a description of the gun and ammunition. This catalog appears to have been distributed quite widely. It was translated and sent to prospective dealers in France and Germany. Shortly thereafter some orders began to come in from Prussia, which were especially welcome because exchange rates happened to be favorable.

One of the most exciting of the personal experiences published in the 1863 catalog concerned James M. Wilson, later to become a captain in the Kentucky Cavalry. The account of his adventure, which was reproduced in Cleveland's well known book, *Hints to Riflemen*, tells how Wilson, "an unconditional Union man, living in a strongly disloyal section of Kentucky," had been threatened by his neighbors.

In consequence of this, Capt. Wilson had fitted up a log crib across the road from his front door as a sort of arsenal, where he had his Henry Rifle, Colt's Revolver, etc. One day, while at home dining with his family, seven mounted guerillas rode up, dismounted and burst into his dining room and commenced firing upon him with revolvers. The attack was so sudden that the first shot struck a glass of water his wife was raising to her lips, breaking the glass. Several other shots were fired without effect, when Capt. Wilson sprang to his feet, exclaiming, "For God's sake, gentlemen, if you wish to murder me, do not do it at my own table in the presence of my family."

This caused a parley, resulting in their consent that he might go out doors to be shot. The moment he reached his front door he sprang for his cover, and his assailants commenced firing at him. Several shots passed through his hat, and more through his clothing, but none took effect upon his person. He thus reached his cover and seized his Henry Rifle, turned upon his foes, and in five shots killed five of them; the other two sprung for their horses. As the sixth man threw his hand over the pommel of his saddle, the sixth shot took off four of his fingers; notwithstanding this he got into his saddle, but the seventh shot killed him; then starting out, Capt. Wilson killed the seventh man with the eighth shot.

In consequence of this feat the State of Kentucky armed his Company with the Henry Rifle.

One of the most colorful tributes to the effectiveness of the Henry rifle came from the Southern soldiers themselves. Sawyer tells how "Major Claudman of the 1st D.C. Cavalry, in a letter to Mr. Winchester, said that when he was held in Libby Prison he often heard the enemy discuss the merits of the Henry rifles and he heard one of them say, 'Give us anything but that damned Yankee rifle that can be loaded on Sunday and fired all the week.'"¹⁰

In Letters from Lee's Army there is the sober comment: "We never did secure the Winchester [Henry] whose repeating qualities made the enemy's cavalry so formidable towards the end of the war." ¹¹

Operations during the War Period In the absence of large Government contracts, Winchester was unable or unwilling to take the risk of expanding the Company's facilities beyond the physical limit imposed by the location of the plant, which remained at 9 Artizan Street, until after 1865.¹² To John W. Brown, of Columbus, Ohio, who had suggested that the organization might move into larger quarters, Winchester replied on May 4, 1863: "We shall go into an Armory, as you have in your eye, but we must creep a little longer. By and by we hope to walk and then we shall soon be in a position to drive." Eventually he was able to make good his prediction, but not until after the war was over.

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Operations as a result remained on a relatively small scale. The average

\$



Plant of New Haven Arms Company in 1859

Exhibit 27 00474

number of 53 employees during the last half of 1863 was below the figure of 68 reported to the Census of 1860. Employment reached a peak of 72 during the third quarter of 1864, but after the end of the war, which came in April 1865, employment declined abruptly to around 25 workers.

It is possible to make a fairly accurate estimate of the output of rifles during the period. By January 31, 1863, seven months after the first Henry rifles were ready for delivery, about 1,500 had been made and sold. After 1863 production was stepped up approximately twenty-five per cent. Output figures are not available for 1864, but in 1865 some 3,011 rifles were produced and sold. This rate of around 250 per month is consistent with the fact that the Company's total sales between 1862 and the end of 1865 amounted to a little over ten thousand rifles.¹³

Information on ammunition capacity is more scanty. In September 1863 there is a notation in a letter to Messrs. Potter, Gay & Tollman that the Company was using forty to fifty pounds of powder per day. On the assumption that these were avoirdupois pounds, containing 7,000 grains, the 25-grain load in the Henry cartridge would have given a daily output of between 11,000 and 14,000.

Some months before, Winchester had already begun laying plans for expanding the Company's ammunition production. On April 20, 1863, he wrote Smith & Wesson: "Mr. Leete has been here and hired the man we employed to make tools for our cartridges and I am desirous of securing a competent man to take entire charge of that department, which I propose to perfect and extend to a scale sufficient to meet all demands, for all sizes, and if we succeed in making a perfect article we should be pleased to furnish you at about cost. My purpose is to inquire of you if you know such a man. If Mr. Warner or Mr. Wade are either or both of them calculated to fill this position, if so which is the best, and is he so situated as to make an engagement desirable. By giving these questions your careful consideration and an early reply you will much oblige [me]."

The following October, there is mention made of an order for cartridge machinery that would enable the Company to make twenty thousand cartridges per day.

A few production problems were encountered in ammunition manufacture. One correspondent wrote in complaining about misfires and suggesting the difficulties came from overheating. Winchester's response gives a good example of his interest in suggestions of this sort and the empirical approach that was used to analyze this sort of problem. He reported: "We took fresh made ammunition, 15 cartridges, and set them on end in a hot place for two hours, until all the grease had melted down onto the powder. Of these three misfired and the penetration (of the rest) was less by about one inch than that of 15 others taken from the same box but not warmed. None of the last misfired. This, of course, would indicate some force in your suggestion that the melting of the tallow affects the powder and certainty of firing. We will experiment further in this direction; and if the results confirm this view, we will make the necessary alterations." He concluded by requesting that "you will aid by so far as is in your power, to discover the cause of any defects in the ammunition."

Winchester was able to fix the blame for the difficulty with the lot of ammunition about which the complaint was originally made. "It is due," he wrote, "to the faithlessness of our man employed to put the cartridges together, as he must have put the grease in hot, instead of cold, to save time."

The Company made other experiments with ammunition, and in January 1863 reported "an improved cartridge with the powder compressed, by which the power is much increased."

Rising costs of labor and materials also contributed to management problems. As early as October 1862, Winchester explained an increase in prices: "Lead, copper, and steel have advanced 50% within a short time. Our ammunition *costs* us \$12 per 1,000. We shall stand this for awhile in hopes of a decline; but if costs advance more, or continue on at the present high prices for any considerable length of time, we shall have to advance the price of ammunition. It is very annoying to us, as it must be to others, to be constantly changing prices; but with the state of the market we have no choice, as we are not safe in guaranteeing the price today to be the price tomorrow." The following month he noted "... the immense increase in the costs (gunsmiths to whom we used to pay \$2 per day, are now getting \$4.50), has made it imperative on us to sustain our prices firmly to save us from loss, if not ruin."

Winchester was especially interested in the performance of the Company's products and in correcting any faults that users experienced. The Henry rifle did, in fact, develop two weaknesses. One was a tendency for the firing pin to break, attributed by Winchester to pulling the trigger without ammunition in the chamber; the other defect arose when the magazine became dented. To one captain he wrote: "I regret that the metal in the breech pin should have failed in so many of the guns furnished your company. We have used the greatest care to have them perfect and of the best material. It is the weak point in the rifle, the most important we have yet discovered, but it is easily [corrected] and shall be remedied in the next lot, which we are now commencing." In the same letter he cautioned against pushing up the plunger in the magazine and letting it fly back against the cartridges, as this damaged the magazine and prevented the ammunition from feeding back into the breech.

While Winchester was receptive to suggestions about improving the Company's products, there were limits to the amount of changes that could be undertaken. As he noted to one correspondent, all the improvements the latter had suggested could be made, for example: ". . . increasing the length of the barrel and breech, and adding globe, telescopic or other sights; but all or any of these alterations would require time and expense, which, in the present scarcity of hands, and the hurried demand for our rifle, we can not possibly give in to at present."

In spite of being forced to sell largely to non-Government markets, the New Haven Arms Company emerged from the war period with a greatly improved financial position and prepared to adapt its operations to meet the contingencies of postwar adjustments. Virtually bankrupt in 1860, the net worth of the concern was approximately \$354,000 at the end of 1866 (*see Appendix G-1*). The dealer contacts made during these years gave the Company the nucleus of an established marketing organization to carry on its postwar commercial business. Furthermore, certain of the features of the rifle, such as the smaller caliber and the rapid fire, which had only limited attractions for the military authorities, became increasingly popular among hunters and frontiersmen.

These were important considerations for an arms and ammunition manufac-

Position of the Company in 1866

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Exhibit 27 00476 turer during the postwar years. With the end of hostilities, the industry as a whole was greatly overexpanded. Foreign purchases took up some of the slack in military demand for a few years, until those countries built up their own small-arms production facilities. But this demand was not sufficient to support the entire industry and a large number of firms went into receivership. Those that survived did so by adapting and diversifying their production.¹⁴

The New Haven Arms Company was not immune to the sudden slackening of business that followed the end of the Civil War. Partial sales figures indicate that only 470 guns were sold during the last quarter of 1865 and the first half of 1866. During the same period only 672,000 cartridges were marketed. A continuation of these conditions could have been embarrassing to the Company, for the balance sheet indicates that a considerable portion of the assets was made up of inventory and the cash position was low.

Winchester, however, was not discouraged by the outlook for the future. Over the preceding nine years he had learned a great deal about guns and ammunition and their manufacture. Early in 1865 he began laying plans for expanding operations by applying to the Connecticut Legislature for a new corporate charter. In July of that year the State Assembly granted a charter for the Henry Repeating Arms Company with permission to carry on business either in New Haven or Bridgeport. Capital stock was set at \$500,000 (par value \$100 per share) with a provision that this figure might be increased to \$1,000,000. No attempt was made during 1865 to re-form the organization under the new charter, but in 1866 Winchester sold his share of the shirt business to his partner, John M. Davies, which freed him to devote full attention to firearms production.¹⁵ He also moved to identify the organization with his own name, by getting the Legislature in 1866 to change the title of the new corporation to the Winchester Repeating Arms Company.¹⁶

Meanwhile Winchester's growing stature in the community was reflected in the fact that he served as Lieutenant Governor of Connecticut for the term 1866-1867. Thereafter he was commonly addressed as "Governor Winchester" by his friends and business associates.

The Henry Rifle in the West Two incidents, involving the use of the Henry rifle in 1865 and 1866, offer a prologue to the subsequent tremendous popularity of the Winchester repeaters in the West.

The first of these came late in 1865 and marked one of the earliest experiences of the Indians of the Rocky, Mountains area with the deadly effect of a repeating firearm. For nearly two hundred and fifty years there had been more or less continuous conflict between red and white men armed with single-shot guns. The chief and most effective tactic of the Indians was to maneuver within charging distance of an opponent and tempt him to fire by offering one of their number as a target. The brave involved, unless he was disabled, and his companions would then rush in and overwhelm their white adversary before he could reload his firearm.

How the Blackfoot Indians of Montana tried this same maneuver against two prospectors armed with Henry rifles was told by one of the white participants to Paul B. Jenkins many years later. The two white men were former Union soldiers who had kept the Henry rifles issued to them just before being mustered out. They began mining borax in the heart of the Blackfoot Indian country, knowing

it was only a matter of time before the Indians would attempt to wipe them out. As retold by Jenkins,

One morning the two young ex-soldiers had hardly begun the day's operations when they saw the enemy approaching in force and knew that they were in for it. Some forty warriors dismounted at a distance, approached to nearly gun range, lay down in the grass and began deliberately to creep in, spreading out to surround their supposedly doomed victims. Once in range, some began to expose themselves for an instant, bobbing up in the hope of drawing a desperate bullet, but always doing so two at a time in the hope of getting the guns of both whites empty simultaneously. One of the youths caught the idea from the fact that two Indians always showed themselves at the same instant, and said to his companion: "As soon as they get near enough, we'll fire together. They'll rush us the moment we both fire; and then'll be the time for you and me to do some shooting!"

It happened precisely as he foresaw. With full magazines they agreed to bring on the decisive charge. At the word of one, both fired as two warriors showed themselves above the grass for an instant; and the moment that the two flashes and puffs of smoke were seen simultaneously the whole band of Blackfeet sprang to their feet and dashed yelling in on their supposed temporarily unarmed and helpless victims. But those two guns kept on firing! Shot after shot kept pouring from the guns over the low log breastwork, and to the indescribable horror of the warriors who considered themselves already victorious, man after man of their number fell shrieking or silent in the prairie grass as the deadly and unheard-of continuous firing blazed steadily at them; and that at a range so short, chosen for the final dash to close quarters, that few if any of the young riflemen's bullets missed. To halt, to wheel and dash madly away in any direction to escape the ceaseless fire, were moves of but an instant; but as they fled the guns kept at them, and only a few escaped unhit. Reloading their magazines the youths sprang from their rude barbette and ended the desperate work by leaving alive no wounded victims. Indeed, for the effect of the thing, they riddled every corpse with innumerable bullets and dragged the whole number to a heap at a distance beyond rifle range of their fort, that the survivors might return and contemplate the fatal results of their terrible encounter with weapons that obviously appeared never to need to be reloaded at all.

From that day no other attack was ever made upon that pair. Not only were they thereafter immune, but the one of them I later knew told me that passing Indian bands would make wide detours to avoid even the neighborhood of their cabin; or, on meeting one of them, would rush off to a distance for fear of coming into any proximity with the awful magic of death that they had so terribly exhibited. Once, he told me⁵ meeting an Indian whom he had reason to believe to have been one of the survivors of the fight, the brave, with a face of horror exclaimed, "Spirit guns! Spirit guns!" and was off as fast as his pony could gallop.¹⁷

The second incident involved a brush between "the law" and some stagecoach robbers. Neill C. Wilson, in his book, *Treasure Express: Epic Days of the Wells Fargo*, tells how the stagecoach carrying a large shipment of cash was held up and robbed by three armed bandits near Nevada City one May day in 1866. Steve Venard, the former town marshal of Nevada City, did not join the posse that set out after the robbers but, armed with his Henry rifle, picked up the trail at the point of the robbery and followed it into a steep and rocky canyon to a point where his way was barred by a waterfall. To let Wilson continue the story:

Climbing doggedly with feet, knees, and one hand, Steve Venard reached the top of this fall. A half-shattered log led to the base of the islet. The man-tracker advanced over

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the bridge, stepped ashore around a granite block, and came full on Jack Williams' ghost. The ghost was cocking and leveling a long .44 revolver.

Williams and Venard sighted each other at the same instant. And at the instant, Venard's rifle leaped to his shoulder. Also, at the instant, Venard saw Finn, alias Kerrigan, drawing bead on him from the summit of the islet.

No time to change targets. Venard drilled Jack Williams' ghost directly and speedily through the heart. A flip of trigger-guard and another half-ounce cone of lead was in firing position, just where Tyler Henry had once pledged Mr. Winchester it would be. The second shot, dispatched before echo of the first had caromed off the cliffs, sped upward and spattered on the canyon wall, having entered Finn's skull below the right eye and toured his skull en route. A scramble for the top of the islet proved the third bandit vanished. Venard kicked leaves over the Wells Fargo buckskin bag which lay beside Finn's body, took new bearings on the ravine that still mounted by big, wet terraces in front of him, and set up its eastern face.

Bandit Number Three was doubling and twisting like a hare along the steep brushcovered hillside. Venard's rapid shot all but nipped him. The quarry turned at bay, full of fight, as its dust spurted in his face. The next shot out of the pursuing Henry explored his heart, sent his spirit winging and his person crashing downhill into the canyon.

The rest of the posse found Venard sitting on the buckskin bag, communing with his plain old, well oiled rifle. The odds had been three to one and the three had been under cover while he had advanced in the open; each adversary in that one high-blazing instant had held fair bead on him; yet here they were. Three dead men, two of them still clutching cocked revolvers, and one live deputy. But—four expended bullets. The Henry must be getting old. Steve Venard was regretful.

The stage had been robbed at 4:30 a.m. It now was noon. The treasure was back in express company keeping by two p.m.

The governor of California commissioned Venard a lieutenant colonel of militia "for meritorious services in the field," and the express company made over to him its \$3,000 reward money and, with considerable celerity, a brand new, suitably inscribed sixteenshot Henry. It had become fixed policy with the express management, when a man showed himself adept at gunning bandits, to present him with a fine rifle and its hearty compliments.¹⁸

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EXHIBIT 28

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The Leading Reference for Antique American Arms **FLAYDERNAN'S GUIDE TO ANTIQUE AMERICAN FIREARMS** ... and their values

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EDITION

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ABOUT THE COVER

Representing the newer end of the contents spectrum, the Colt Model 1911 pistol has become a sought-after collectible, and continues in use by military units, law enforcement personnel and private citizens.

The Model 1911 autoloading 45-caliber pistol was adopted in 1911, and Colt's first deliveries were made to Springfield Armory in early January 1912. Subsequently the Model 1911, with numerous modifications, has compiled an enviable service record with total production (to 1970) of over three million units, with most going to military contracts.

Author Norm Flayderman acquired the illustrated M-1911, frames and drawing from the Winchester Gun Museum in the mid-1970s when the museum contents were moved to the Buffalo Bill Museum in Cody, Wyoming. The Flayderman letter documenting the details of the acquisitions appears in the background, as does a letter from the Winchester Gun Museum, and is the sort of provenance that collectors value greatly. (Courtesy Little John's Auction Service)

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Designed by Patsy Howell and Donna Mummery Edited by Ken Ramage

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Exhibit 28 00482 **V-K: Winchester**

Jennings Factory Muzzle-Loading Rifle. Made c. 1852 only. New smaller frame using remaining parts from unsuccessful breechloading models. Ring trigger cut and altered to spur trigger; trigger guard re-formed with an indented bow. Breech of barrel plugged, striker pin on hammer ground flush, percussion nipple fitted on top of frame. Listed in previous editions of this Guide as number 5K-004:

5K-003 Values-Good \$950 Fine \$1,750 Non-Factory Converted Jennings to Muzzle-Loading Rifle. (Not illus.) Made c. 1850s. Encountered usually on the Second Model Jennings (above). Quality of workmanship varies greatly; unlikely any two of these are identical. Barrels plugged in usual



manner with trigger guards, triggers, hammers altered, modified or replaced: 5K-003.5 Values-Good \$500 Fine \$900



5K-004.6 Third Model Smith-Jennings

The Smith-Jennings Rifle. Horace Smith, an experienced gunsmith (and soon after of Smith & Wesson fame) was engaged to improve the Jennings Rifle c. 1851. He was issued a patent August, 1851 for an improved action and Robbins and Lawrence commenced manufacture of the repeater. All took the "Rocket Ball" cartridge and were pill primed. All three models are repeating rifles; all caliber 54. Markings are the same as on the Jennings (see above) retaining the 1849 patent date.

In earlier editions of the Guide, this rifle was termed "Second Model Smith-Jennings" number 5K-003. It is now more correctly listed as follows:

S&W Lever Action Repeating Pistols

Smith & Wesson Lever Action Repeating Pistols. The next Winchester predecessor arms made after the Jennings were the Smith & Wesson repeaters. These were based on a Horace Smith and Daniel B. Wesson patent of 1854, and are historically intriguing due to the fact that the S&W firm today is famous for its success with revolvers.

The S&W Lever Action pistols were made in Norwich, Connecticut, c. 1854-55. The estimated total production was only about 1,700. Featuring the lever action mechanism, they have integral, front loading magazines located beneath the barrel. The self-contained cartridge was a special type, the hollowed out conical bullet containing the powder, and backed by the primer.

An important pioneer arm to both Smith & Wesson and Winchester collectors, the quite limited production total makes these pistols highly prized and difficult to obtain.

approximately 500. Ring type lever-trigger without trigger guard. Front loading tubular cartridge magazine under barrel. ammunition. Flat sided (usually engraved) frame with evenly rounded forward undersection. Most often encountered of the three models 5K-004 Values—Good \$3,500 Fine \$7,000

Second Model Smith-Jennings; made c. 1851-52. Quantity less than 400. Very similar to First Model with improved pill priming system and cartridge carrier position spring. Frame has pronounced bulge on undersection resulting in nickname "pregnant frame Jennings":

5K-004.5 Values-Good \$4,000 Fine \$8,500 Third Model Smith-Jennings; made 1852. Quantity less than 200. Long slender frame with escalloped (hollowed-out or fluted) lower sides of frame. Pill priming system further improved; side loading port changed from a simple swinging plate to one which slid open/closed within two channels: 5K-004.6 Values-Good \$4,500 Fine **\$9,500**



V-K: Winchester

The basic models are:

31 Caliber No. 1 Pistol; 4" barrel, bag shaped varnished wooden grip, all steel construction with engraved frame. The lever with a round finger hole. Blued finish with browned barrels. Serial number usually found beneath the grips. Standard marking on barrel flats: SMITH & WESSON, NORWICH, CT. and PATENTED FEBRUARY 14, 1854 and CAST STEEL Quantity made approximately 1,200: 5K-005 Values-Good \$3,250 Fine \$12,500

41 Caliber No. 2 Pistol; 8" barrel, flat bottomed varnished wooden grip, all steel construction with engraved frame. Note spur on bottom of the round finger hole of the lever. Blued finish with browned barrels. Serial number usually beneath grips. Generally marked on barrel top flat: SMITH & WESSON NORWICH, CT./CAST-STEEL PATENT. Also made with 6" bbl. and worth premium. Quantity made under 500: 5K-006 Values-Good \$5,500 Fine \$15,000

NOTE: Calibers for S&W and Volcanic Arms have been variously listed as 30 and 38 cal. Correct sizes are 31 cal. and 41 cal. as shown.

Volcanic Lever Action Pistols and Carbines



The breakdown of Volcanic arms is presented in the following model listings. All guns were of the same caliber, 41, and fired the patented, specially designed cartridges (though improved) of the Smith & Wesson type; magazines of integral structure, located beneath the barrel. The Volcanics began with serial 1, and have been observed marked in excess of the number 3000. Standard markings of all models, on the barrels: THE VOLCANIC/REPEATING ARMS CO./PATENT NEW HAVEN CONN/FEB 14, 1854. Marking variations are noted in these. Finish: Unfinished brass frames; the barrels blued. (Note: Engraved specimens, cut in a large, open scroll pattern, are often encountered. These arms command an added premium.) Lever Action Navy Pistol; 6" barrel, 41 caliber, brass frame, flatbottomed varnished walnut grip, rounded finger hole in the lever. VOLCANIC barrel markings as noted above. Quantity estimated 1,200: 5K-007 Values-Good \$3,500

5K-011 5K-007 5K-008

Lever Action Navy Pistol; same as above but with 8" barrel. Quantity estimated 1,500:

5K-008 Values-Good \$3,500 Fine \$8,000 (Note: Pistols as above fitted with shoulder stocks demand a premium.)

Lever Action Navy Pistol; as above but with 16" barrel, and attachable shoulder stock. Quantity estimated 300. Rare.

Pistol:

5K-009 Values-Good \$5,000 Fine **\$16,000** Pistol with Stock:

5K-010 Values—Good \$8,500 Fine \$22,500 Lever Action Carbine; 41 caliber, barrel length of 16-1/2' utilizing left-over barrels from Navy Pistol. Long and straight, varnished walnut, buttstocks, with crescent type brass buttplate. VOLCANIC markings as noted above:

16-1/2" barrel: 5K-011 Values-Good \$7,000 Fine \$17,500 21" barrel made only by New Haven Arms Co. (q.v.): 5K-012

25" barrel made only by New Haven Arms Co. (q.v.): 5K-013

Volcanic Lever Action Pistols and Carbines by New Haven Arms Co.

Fine \$8,000

Volcanic Lever Action Repeating Pistols and Carbines, by the New Haven Arms Company. Due to increasing financial pressures, the Volcanic firm was reorganized into the New Haven Arms Company, in April of 1857. However, Volcanic remained as the trade name for the lever action pistols and

carbines. A key means of telling the "Volcanic Volcanics" from the "New Haven Arms Company Volcanics" is the omission of VOLCANIC marks and change to PATENT FEB. 14, 1854/NEW HAVEN, CONN. Marking variations are also noted in these.

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V-K: Winchester



The New Haven Arms Company's Volcanic production lasted from 1857 to 1860, and the breakdown of models is presented below. The cartridge type, magazine, and other basic features remained as on the "Volcanic Volcanics." Total manufactured of the New Haven Volcanics is estimated at about 3,300; serial numbering began with 1. Finish: Unfinished brass frames; the barrels blued. (Note: Engraved specimens, cut in a large, open scroll pattern, are often encountered. These arms command an added premium.) Lever Action No. 1 Pocket Pistol; 3-1/2" and 6" (Target type) barrels (scarce and will bring a premium), 31 caliber, small size brass frame, flat-bottomed varnished walnut grip, round finger hole in the lever. VOLCANIC barrel markings as on Volcanic Arms Company pistols, but including 1854 patent date and New Haven address:

3-1/2" barrel. Quantity estimated 850: **5K-014** Values—Good **\$2,750** Fine **\$5,000**

6" barrel. Quantity estimated 225: **5K-015** Values—Good **\$3,250** Fine **\$6,750** Lever Action No. 2 Navy Pistol; 8" barrel, 41 caliber large size brass frame, flat-bottomed varnished walnut grip, round finger hole in lever. VOLCANIC barrel markings as above, including 1854 patent date and New Haven address. Quantity estimated 1,000: **5K-016** Values—Good **\$3,750** Fine **\$8,000**



No. 2 Navy Pistol identical above with 6" barrel. Quantity estimated 300:

5K-016.5 Values—Good **\$4,250** Fine **\$9,500** Lever Action Navy Pistol; large frame model as above, but with 16" barrel, and attachable shoulder stock. Quantity unknown; extremely limited; very rare. Great caution should be exercised in acquiring this variant:

Pistol:

5K-017 Values—Good **\$5,000** Fine **\$15,000** Pistol with Stock:

5K-018 Values—Good **\$7,500** Fine **\$22,500** Lever Action Carbine; 41 caliber, barrel lengths of 16-1/2", 21", and 25". Large brass frame. Long and straight, varnished walnut, buttstocks with crescent type brass buttplate. Barrel markings as above, including 1854 patent date and New Haven address. Quantity estimated 1,000 for all three lengths:

16-1/2" bar 5K-019	rrel: Values—Good \$7.000	Fine \$17.500
21" barrel: 5K-020	Values—Good \$8,000	Fine \$24.000
25" Barrel: 5K-021	ValuesGood \$9,000	Fine \$27,500



See also Walch Revolver 7A-117

Henry Rifle

Henry Rifle. Made 1860-66; total quantity approximately 14,000. (overlap with model 1866).

44 rimfire caliber. Tubular magazine integral with the barrel, and located beneath it. 15 shots. 24" barrel length standard.

Oil stained walnut stocks. Blued finish; brass frames usually left plain.

Serial numbers overlap the Model 1866. Highest Henry range is about 14000. Major serial number location on the top of breech end of barrel; marked: HENRY'S PATENT. OCT. 16. 1860/ MANUFACT'D BY THE NEW HAVEN ARMS. CO. NEW HAVEN. CT.

The Henry Rifle was developed from the Volcanic, and was built around the new 44 rimfire cartridge. Both the new rifle and the cartridge were designed by B. Tyler Henry. A basic feature of the 44 rimfire was the use of a metallic casing, rather than the undependable self-contained powder, ball and primer bullet of the Volcanic. Loading continued to be from the muzzle end of

Exhibit 28

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V-K: Winchester

the magazine. A distinctive identifying feature of the Henry is the lack of a forend, and the absence of a loading gate on either side of the frame. Made in relatively limited quantities, and a revolutionary weapon in Civil War service, the Henry is one of the major collector's items in the entire Winchester field. The model is difficult to obtain in fine condition and commands premium prices in all its variations. Quite a few company-size Union outfits, especially those from Kentucky, Illinois, Indiana and Missouri purchased at their own expense, and carried, Henry rifles. Much significant information on the development and history of this important rifle, its production, sale and usage by the military during the Civil War is found in *The Historic Henry Rifle* by W. Sword (q.v.).

Iron Frame Model. The most desirable Henry variation, featuring the frame of iron, rather than the standard brass. Rounded type iron buttplate at its heel; no lever latch; sporting style adjustable leaf rear sights. Quantity estimated 275. Serial number range 1 to 400:

5K-022 Values—Good **\$30,000** Fine **\$100,000 Early Brass Frame Model.** As above, but the frame and buttplate of brass. With or without lever latch. Serial numbers overlap iron frames. Total made about 1,500:

5K-023Values—Good \$11,500Fine \$35,000Late Brass Frame Model. As above, but the heel of the brassbuttplate (adopted approx. serial range no. 4,000) has a pointedprofile. Lever latch standard. Serial range primarily above about2500 (overlap with early M1866 brass frame rifles):

5K-024 Values—Good **\$10,000** Fine **\$30,000 U.S. Government Purchased and Issued Henry Rifles.** Total quantity 1,731 acquired between 1862 and 1865. Most in serial range 3000 to 4200. Known issued to 1st Maine and 1st District of Columbia Cavalry Regiments, (more than 200 were captured Sept. 1864 from the 1st D.C. Regiment and issued to the 7th, 11th and 35th Virginia (Confederate) Cavalry); small quantity trial issues to other units. Believed brass frames only. Inspector

Winchester Model 1866 Rifle

Model 1866 Rifle. Manufactured c. 1866-98; total produced approximately 170,101.

44 rimfire caliber. Tubular magazine located beneath the barrel. Distinctive brass frame.

Oil stained walnut stocks. Metal parts finished as follows: Lever and hammer casehardened; barrel browned or blued, magazine tube blued, the brass furniture left a natural finish.

Serial numbering overlaps that of the Henry Rifle, and began at about 12476. Until about the 20000 serial range the number was marked beneath the buttstock on the left side of the upper tang. Thereafter the number could be found on the lower tang and was visible without removing the buttstock.

These arms are not marked "Model 1866," and are easily distinguished by their brass frames with loading gates, and the

5K-022 Iron Frame Henry

5K-023 Early Brass Frame Henry

markings C.G.C. at breech of barrel and stock. Extremely important information about government purchases and serial number ranges of same will be found in *The Historic Henry Rifle* (by W. Sword, q.v.) some of which may add significantly to historic significance and premium values.

5K-025 Values—Good **\$20,000** Fine **\$70,000** Cleaning or wiping rods issued with all Henry rifles. Earliest types were jointed, four-piece hickory wood rods with small iron fittings for assembly. The four sections were stowed in the butt stock through a hinged brass door in buttplate. Later rods were four pieces of steel with brass tip stowed in butt in same manner. However, the aperture and the loading port was narrower in diameter, hence the earlier wooden rod will not fit into that later style! Reported that some earlier wooden rods may bear "CGC" inspector markings to accompany government contract rifles.



Briggs Patent Henry Rifle. Although the King's Patent (May 22, 1866) hinged loading gate adapted to a Henry rifle became the device used to facilitate loading cartridges from the receiver in the M.1866, other methods were experimented with. Best known and most practical is the Briggs Patent of Oct. 16, 1866 which allowed for loading the magazine tube immediately in front of the receiver. Made only experimently, there are a handful of known examples that have come on the market. One method, made without a forearm, had the entire magazine tube slide forward; the other (illus. here) is fitted with a uniquely designed brass forend which slides forward to expose the bottom end of the magazine for ease in loading. Few recorded sales; values minimum in low five figures; upward considerably dependant on condition. **5K-025.5**

presence of forestocks. Winchester Museum serial records are only partially complete on the 1866 production. Popularly known on the frontier as the "Yellow Boy", the Indian also called it "many shots" along with "heap firing" guns. The '66 is the repeating rifle most deserving of the name "The Gun That Won The West."

Rifles: Standard with 24" barrel, octagonal through about the serial range 100000, at which time round barrels became common. Brass frame, buttplate, and forend cap (steel cap became standard after serial range 135000). The buttplate of the crescent type.

Carbines: Standard with 20" round barrel and two barrel bands. Brass frame and buttplate, the latter of the distinctive curved profile. Saddle ring mounted on the left side of the frame. *Muskets:* Standard with 27" round barrel, 24" magazine, and

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EXHIBIT 29

Exhibit 29 00487

The Guns of 1864

by Joseph Bilby - Monday, May 5, 2014



By mid-July 1864, after two and a half months of desperate fighting, the Confederate Army of Tennessee had been pushed from northern Georgia to the outskirts of Atlanta by Maj. Gen. William T. Sherman's Union forces. In a risky attempt to break the developing siege of the city, Confederate Lt. Gen. John B. Hood withdrew men from Atlanta's defensive lines and launched a series of assaults on Sherman's enveloping army. Hood's July 20 attack at Peach Tree Creek failed, but two days later his gambit seemed on the verge of success, as the Rebels broke through Yankee lines and, in the process, killed Maj. Gen. James B. McPherson. Case 3:17-cv-01017-BEN-JLB Document 50-12 Filed 03/05/18 PageID.5067 Page 55 of 67 When victorious Confederates surged into the Federal rear, however, they encountered stiffening resistance from Union units, including the 66th Illinois Infantry, a regiment JOIN | RENEW | DONATE with a large number of Henry .44-cal. repeating rifles in its ranks. Private Prosper Bowe of the 66th recalled that: "We started our [Henry] sixteen-shooters to work. The first column in front of us nearly all fell a NRA wo chree volleys." The sixteen shooters" helped WHENNE day, driving the Conrederates from the field. The Rebel retreat proved timely for the rapid-firing Yankees, however, since they had begun to run out of ammunition. General Hood ultimately failed in his attempt to lift the siege of Atlanta, arguably at least partially due to the "sixteen shooters." The city was doomed, and with it, the Confederacy.

MILLIS

On Sept. 19, 1864, at Winchester, Va., Union Maj. Gen. Philip Sheridan launched his campaign to drive Confederate Gen. Jubal Early out of the Shenandoah Valley. As Sheridan's army advanced, Brig. Gen. Cullen A. Battle's Alabama brigade counterattacked and, exploiting a gap between two corps, precipitated a retreat all along the Sixth Army Corps front. The First New Jersey Brigade's fighting withdrawal held off the Rebels and then the Jerseymen were relieved by the 37th Massachusetts Infantry, a regiment recently re-armed with seven-shot Spencer repeating rifles, and the Bay State boys let loose a blizzard of bullets, slowing the Confederate advance. This, coupled with confusion caused by the death of Confederate Maj. Gen. Robert Rodes and a flank attack conducted by Brig. Gen. Emory Upton, halted the Rebels. The Massachusetts men, like their Illinois brothers in arms to the west, ran low on ammunition. They took to ground under a heavy fire of Confederate musketry until soldiers from the 2nd Rhode Island Infantry filled their pockets with Spencer .56-56-cal. cartridges and ran the ammunition up to the 37th. The Yankees went on to win the day, and Col. Elisha Hunt Rhodes of the 2nd was so impressed that he carried a Spencer carbine as his personal arm for the rest of the war.

If 1863 was the year of the rifle-musket, when the major armies of North and South were finally completely armed with the standard "modern" infantry arms of the day, 1864 could be called the year of the repeating rifle, as increasing numbers of Spencer and, to a more limited extent, Henry repeaters drew notice in the field. These revolutionary breechloading arms fired self-contained copper rimfire cartridges, with primer, powder and bullet all in one sturdy water-resistant package. The South did not have the industrial capacity to make its own repeaters or ammunition for them, and, although captured Spencers and Henrys began to appear in Rebel ranks as the year wore on, Confederate combat use of captured repeating rifles, unlike rifle-muskets or even Sharps carbines, was dependant on a supply of captured cartridges and Exhibit 29 Case 3:17-cv-01017-BEN-JLB Document 50-12 Filed 03/05/18 PageID.5068 Page 56 of 67 The heavy fighting on all fronts that brought the repeating rifle to the foreground in the summer of 1864 originated in President Abraham Lincoln's promotion of Ulysses S. Grant, the victor at Vicksburg and Chattanooga, to lieutenant general and command of all Union ground forces. Leaders of the North and South realized that 1864 would be a crucial year, as the hopes of the Confederacy were largely pinned on a war-weary Union replacing Lincoln with a president amenable to a negotiated settlement. Such an election outcome would likely depend on the success or failure of federal armies in the field.

That spring Grant ordered a multi-pronged offensive and personally accompanied Maj. Gen. George G. Meade's Army of the Potomac in its drive south on Richmond, while his ablest



lieutenant, "Uncle Billy" Sherman, marched on Atlanta and smaller armies advanced on other fronts. Grant realized that the Confederate ability to transfer forces from Virginia to Georgia was responsible for Gen. Braxton Bragg's victory at Chickamauga the previous September, and he hoped to avoid a repetition by applying pressure at as many points as possible.

In the event, the lesser campaigns did not accomplish much, but the main Union armies were quickly locked in combat with Gen. Robert E. Lee's Army of Northern Virginia and Gen. Joseph E. Johnston's Army of Tennessee. Sherman's task proved somewhat easier as he had more maneuver room in the west than Grant and Meade did in the east, hemmed in between the Blue Ridge Mountains and the sea in the advance on Richmond.

The Union armies of 1864, as well as their Confederate opponents, were better armed than they had been since the beginning of the conflict. Almost all of the infantrymen of the opposing Army of Northern Virginia and Army of the Potomac were equipped with rifled arms, mostly in caliber .58 Springfield or .577 Enfield patterns, although an April ordnance report from Battles' Brigade reveals a number of .54-cal. arms, either Austrian Lorenz imports or older U.S. Model 1841 rifles still in service. There were a few smoothbore muskets in the hands of Union troops, such as the New York regiments of the Irish Brigade and the 12th New Jersey Infantry, but because of preference, not because of a lack of available rifle-muskets. Case 3:17-cv-01017-BEN-JLB Document 50-12 Filed 03/05/18 PageID.5069 Page 57 of 67 Sherman's infantry was also well-armed with rifle-muskets and shouldered more repeating arms, including government-issued Spencer rifles and privately purchased Henrys, than the Army of the Potomac's foot soldiers. Although the eastern Confederate infantry had largely re-armed with rifle-muskets by mid-1863, in January 1864 their western counterparts were still shouldering a disproportionate number of smoothbores, despite capturing around 8,000 rifled arms (including 70 Spencers) at Chickamauga. As spring approached, however, the Army of Tennessee was issued enough imported Austrian Lorenz .54-cal. rifles to re-arm a third of its troops, and the vast majority began the campaign with rifled arms.

More attention appears to have been paid to marksmanship training in the Union army in the spring of 1864 than in previous years, but that instruction continued to be erratic and often lacking in fundamentals. In April, Army of the Potomac Provost Marshal Gen. Marsena Patrick authorized the issue of 10 rounds per man for target practice and ordered all enlisted men to load and fire their arms in the presence of an officer, because "there are men in this army who have been in numerous actions without ever firing their guns, and it is known that muskets taken on the battlefield have been found filled to the muzzle with cartridges."

Shooting instruction was, as in the past, largely left to individual unit commanders. InMarch and April, 1864, the 121st New YorkInfantry fired 10 rounds per man at 200 yardsInfantry fired 10 rounds per man at 200 yardscourtesy of the Emo Phillips collection.and five rounds per man at 300 yards. The 15th

New Jersey Infantry had three successive days of target practice, with each man firing a mere three shots at targets set at 300 yards. In the west, Col. Benjamin F. Scribner of the 38th Illinois Infantry instituted a more rigorous regimen. Scribner's soldiers fired at mansized targets at ranges of 100, 200, 300, 500 and 1,000 yards, marking hits and measuring distances to determine the accuracy of their sights and the trajectory of their shots.

Confederate marksmanship training for line infantrymen was spotty as well, with the exception of Maj. Gen. Patrick Cleburne's division in the Army of Tennessee. Cleburne, an Irish-born British army veteran, had used British techniques to train his men in basic ballistics and range estimation since 1862. In the fall of 1863, Maj. Calhoun Benham, his chief of staff, produced a manual based on Cleburne's work and Capt. Henry Heth's largely

Exhibit 29 00491 Case 3:17-cv-01017-BEN-JLB Document 50-12 Filed 03/05/18 PageID.5070 Page 58 of 67 ignored pre-war translation of a French shooting handbook. General Bragg ordered it printed and distributed throughout the Army of Tennessee, although there is little evidence that it was implemented extensively.

It is doubtful that the minimal infantry marksmanship training at longer ranges conducted in the spring of 1864 made any significant difference in the ensuing campaigns. Engagement ranges, although they had lengthened a bit since 1861, were still usually within 200 yards; historian Paddy Griffith computed an average 1864 engagement range as 141 yards. Later in the campaign, soldiers of the 5th New Jersey Infantry considered firing at the enemy at 200 yards "skirmishing and dueling at long range."

As 1864 ground on, more repeating arms made their way to Union foot soldiers. The percentage of privately owned Henrys in the 7th, 64th, 66th and 86th Illinois Infantry increased, with guns being delivered to units in the field as Sherman's army pushed south. When the men of the 5th and 6th Michigan Cavalry traded in their Spencer rifles for Spencer carbines in the fall of 1864, the rifles were re-issued to various Army of the Potomac infantry brigades for sharpshooter use. The state of Massachusetts bought Spencer rifles, which were issued to the 37th Massachusetts Infantry as the regiment passed through Washington in the summer of 1864, and to a sharpshooter company in the 57th Massachusetts Infantry. Some Spencer cavalry carbines were issued to infantry regiments as well, including, in December 1863, the 7th New Hampshire and 7th Connecticut, then serving in the siege of Charleston. In early 1864, however, the New Hampshire regiment turned over half of its carbines to the 40th Massachusetts Mounted Infantry.

The men of the 7th Connecticut fought well in an ultimately losing cause at Olustee, Fla.,

in February 1864, inflicting heavy casualties on the 64th Georgia Infantry until they were outflanked and their ammunition began to run low. In the end the African-American soldiers of



the 54th Massachusetts Infantry saved the day, firing 20,000 rounds from their Enfield muzzleloaders to cover the federal retreat. In May, the Connecticut and New Hampshire regiments, nicknamed the "77th New England," used their Spencer carbines "to good Case 3:17-cv-01017-BEN-JLB Document 50-12 Filed 03/05/18 PageID.5071 Page 59 of 67 advantage" at Drewry's Bluff, Va., although Maj. Gen. Benjamin Butler's tactical ineptitude led to a retreat. Major Oliver Sanford of the Connecticut regiment said of his men that "with the Spencer carbine [and], plenty of ammunition ... nothing can stand before them."

Sharpshooters could be considered the ultimate Civil War infantrymen, and perhaps the best known such units were Col. Hiram Berdan's 1st and 2nd U.S. Sharpshooter regiments, armed with Sharps single-shot breechloaders with a few telescopic-sighted target rifles in reserve for use in static situations. Although the U.S. Sharpshooters performed well in 1864, both regiments were mustered out of service as their original enlistments expired in August and the following February. Recruits with service time remaining were transferred to line outfits from their respective states, taking their Sharps rifles with them. Sharps rifles were scattered throughout the army in other units, usually for use in skirmishing.

Berdan's regiments were not the only Union units bearing the "Sharpshooter" title. The 66th Illinois, which performed so well at Atlanta, began as "Birge's Western Sharpshooters," armed with civilian target rifles. Several companies of Ohio sharpshooters recruited in 1862 were initially issued rifle-muskets, later replaced by Spencer rifles, which like the Henry, were more suited to skirmishing than long-range work. The 1st Michigan Sharpshooters, recruited in 1862 and 1863, did not enter combat until 1864, and were armed with standard rifle-muskets. The 1st suffered heavy casualties in Virginia in 1864 fighting as line infantry, but there is evidence that some Native Americans from the regiment were allowed to camouflage themselves with cut corn stalks and roam the lines seeking targets of opportunity.

Although effectiveness varied, arguably the best sharpshooter units by 1864 were those in the Army of Northern Virginia, where brigades were authorized to form three to five company sharpshooter battalions. After testing all available arms, those battalions adopted the two-band .577-cal. muzzleloading Enfield rifle, as its five-groove fast rifling twist provided better long-range accuracy, and were issued high quality Britishmanufactured ammunition. They also received extensive marksmanship training and drill in small unit skirmish tactics, based on Heth's manual. These sharpshooter battalions had specific tactical assignments whenever their brigades were in action-to aggressively lead in the advance and provide an effective rear guard in withdrawal.

> Exhibit 29 00493

Case 3:17-cv-01017-BEN-JLB Document 50-12 Filed 03/05/18 PageID.5072 Page 60 of 67 Each sharpshooter battalion company was issued one or two .451-cal. hexagonal-bored,

fast-twist Whitworth rifles. The British Whitworths, some of which were equipped with side-mounted Davidson telescopic sights, weighed about the same as rifle-muskets, and were far more portable than the heavy target rifles used by Federal snipers. Perhaps the most famous long-range kill of 1864 was credited to a Whitworth. On May 9, at Spotsylvania, Va., seconds after proclaiming "they couldn't hit an elephant at this distance," Union Maj. Gen. John Sedgwick fell to a bullet fired from more than 600 yards away. That Sedgwick was singled out by the shooter is unlikely in the smoke and confusion of the battlefield. He had dismounted to assist



an artillery battery in positioning its guns, and the battery itself was the likely target. Still, his death graphically demonstrated the long-range effectiveness of the Whitworth.

In the west, Confederate sharpshooter units, the best of them in Gen. Cleburne's Division, were armed with a mix of rifle-muskets, Whitworths and British-made .451-cal. Kerr rifles, as well as some heavy-barreled target rifles converted by the Atlanta arsenal to fire standard rifle-musket ammunition. Perhaps influenced by Cleburne's interest in longrange shooting, western Confederate sharpshooters seem to have concentrated on sniping more than skirmishing. Kentucky Sharpshooters from the Orphan Brigade were instructed to never approach within 400 yards when engaging federal artillery batteries with their Kerr rifles.

The impact of repeating firearm technology in 1864 was greatest in the Union mounted arm. Colonel John T. Wilder's "Lightning Brigade" of mounted infantry and the 5th and 6th Michigan Cavalry were issued Spencer rifles in 1863. That June, Wilder's men seized Hoover's Gap, Tenn., dismounted and used their Spencers to hold off a Confederate counterattack. Although the Michigan men had less clear results at Gettysburg, running out of ammunition at the Rummel Farm fight on July 3, both campaigns gained the Spencer an immediate following. After Spencer carbines went into production in October, Union cavalry units re-armed with them as rapidly as they reached the front. By the spring of 1864, demand was so great that the Ordnance Dept. contracted to buy every gun the Spencer factory made to replace the hodge-podge of single-shot carbines of varying Exhibit 2900494 Case 3:17-cv-01017-BEN-JLB Document 50-12 Filed 03/05/18 PageID.5073 Page 61 of 67 quality then in service. Cavalry Bureau Chief Brig. Gen. James H. Wilson reported that "the general desire of the best regiments is to be armed with the Spencer carbine," and the promise of Spencers was used to encourage re-enlistments.

The Henry rifle, with production limited to a few hundred guns a month, remained primarily a privately purchased infantry arm with ammunition supplied by the Ordnance Dept. Some Henrys ended up in the hands of horse soldiers, as influential Col. Lafayette Baker convinced the government to outfit his 1st District of Columbia Cavalry with them. Baker's Henrys, along with some purchased by soldiers in the 23rd Illinois Infantry, were among the few in use in the eastern theater of war, with most "sixteen shooters" found in the ranks of Sherman's western forces.

On May 9, 1864, as Grant moved south, the Army of the Potomac's 10,000-man cavalry corps conducted a massive raid deep into Virginia. At Yellow Tavern, Spencer-armed Michigan troopers combined dismounted firepower with conventional saber charges to drive the Rebels from the field, mortally wounding Confederate cavalry icon Maj. Gen. J.E.B. Stuart in the process. At Haw's Shop the Michigan men broke a stalemate and again sent the enemy running. Near Cold Harbor, Sharps and Spencer carbines broke a Confederate infantry advance in five minutes of rapid-fire shooting, and at Deep Bottom on July 28, dismounted federal cavalrymen armed with Spencers smashed an attack by four Confederate infantry brigades and pushed them from the field in disorder. In the west, the men of the Lightning Brigade successfully forded a river under fire, ducking beneath the surface to lever another round into their Spencers, and heard a startled Rebel cry out "look at them Yankee sons of bitches, loading their guns under water."

Repeating rifles did not guarantee victory, however, and they did fall into enemy hands when the battle went the other way. In a rear guard action at Brice's Crossroads, Miss., in June, a company of the 2nd New Jersey Cavalry took a wrong turn in the dark and was overrun, losing 50 Spencer carbines to Maj. Gen. Nathan B. Forrest's men. A Federal cavalry force was outflanked by Rebel infantry at Lovejoy's Station, Ga., in August and routed by a volley of musketry at 150 yds. followed by a rapid bayonet charge when the Confederates caught the dismounted Yankees reloading their Spencer magazines. Case 3:17-cv-01017-BEN-JLB Document 50-12 Filed 03/05/18 PageID.5074 Page 62 of 67 By November, Forrest had 73 Spencers in his command, and four out of five brigades in Brig. Gen. Wade Hampton's Confederate cavalry division in Virginia listed some Spencers in their ordnance reports. Virginia cavalrymen captured a number of Henry Rifles from the 1st D.C. Cavalry in a raid near Petersburg, and later used them against Yankees in the Shenandoah Valley. The employment of captured repeaters was, however, as previously noted, necessarily limited by the necessity to use captured ammunition.

One class of repeating arms that the Confederacy had in abundance, along with plenty of ammunition, however, was handguns, and many Rebel horsemen carried multiple revolvers. Union troops retrieved 36 sixguns from the bodies of six dead Missouri guerillas in late 1864, and when guerilla leader "Bloody Bill" Anderson met his end shortly afterward, he was carrying four revolvers. Multiple handguns were especially useful in the close-range, rapid-fire, hit-and-run mounted tactics favored by guerillas.

The men of Maj. John S. Mosby's 43rd Virginia Cavalry Battalion, which conducted numerous successful raids on federal supply lines in the Shenandoah Valley, usually carried four revolvers each. In November 1864, a special Spencer-armed Union unit under Capt. Richard Blazer was created to track down and destroy Mosby's Rangers, and, after some success, caught up with one of his companies at Kabletown, Va. The Rebels encountered dismounted Spencer fire and feigned retreat before turning and rapidly charging the outnumbered Yankees and delivering a blistering torrent of handgun bullets that wrecked Blazer's command in short order.

Unfortunately for the Confederacy, tactical victories like Kabletown were not reflected in the larger war. As 1864 came to a close, and more and more Spencer repeaters were delivered to the Union army, it was evident that Grant's strategy was the correct one. Atlanta had fallen and Sherman was cutting a 60-mile wide swath of destruction across Georgia on his way to Savannah and the sea with little opposition, while Gen. Hood and the remnants of his army lurched northward on a quixotic invasion of Tennessee that would end disastrously. Sheridan had decisively defeated Confederate forces in the Shenandoah Valley, once a major source of food for Lee's army, and was picking it clean. Although the Army of Northern Virginia was still a viable, if severely weakened, force, it remained pinned down in the Petersburg-Richmond siege lines by Grant and Meade. Lincoln's re-election in November sealed the deal, and a final winter of war began to set in upon the diminishing Southern Confederacy. <u>Exhibit 29</u> 00496

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IN THIS ARTICLE

GUNS OF 1864 HENRY .44-CAL. REPEATING RIFLES JOSEPH BILBY

SEVEN-SHOT SPENCER REPEATING RIFLES SIXTEEN-SHOOTERS WINCHESTER VA

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EXHIBIT 30

Exhibit 30 00498



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Exhibit 30 00500

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Case

Even prior to the organization of the new company Oliver Winchester had his organization working on an improvement of the Henry rifle. The chief faults of that arm, it will be recalled, had developed in the cartridge extractor, which frequently broke off, and the slotted magazine, which was easily bent and was liable to pick up foreign material when the weapon was dropped. During the latter part of 1865 and continuing into the following year a number of patents were taken out and others acquired which covered various extracting devices and types of magazines.

After several experimental guns had been made up the Company announced a new rifle to the trade in 1866. This was the Model 1866, more commonly referred to as the Model 66, and the first gun to bear the name of the Winchester Repeating Arms Company.

According to the Company's catalog for 1867, ". . . The Winchester Rifle remains in the mechanism for loading and firing precisely the same as the Henry, except the cartridge extractor. The latest improvements consist of an entire change in the magazine and the arrangements for filling it. By these changes, the gun is made stronger yet lighter; the magazine is closed and strongly protected; it is more simple in operation, requiring fewer motions in the one case and fewer pieces in the other. Not only can this gun be fired thirty times a minute continuously as a repeater, but it can be used as a single loader without any attachment to be changed for the purpose, retaining the magazine full of cartridges to be used in an emergency, when the whole fifteen cartridges can be fired in fifteen seconds, or at the rate of sixty shots a minute, or in double-quick time, in seven and a half seconds, or at a rate of one hundred and twenty shots per minute, or two shots per second, loading from the magazines—an effectiveness far beyond that of any other arm." ³

The gun was produced in several styles, including two sporting rifles, and a military musket. (See Appendix A-1.) The rifle carried 17 cartridges and the carbine 12. The ammunition was essentially the same as the original Henry cartridge, being produced with both a 200-grain pointed and a flat-nosed bullet and a standard load of 28 grains of black powder.

With the advent of the Model 66, the production of the Henry rifle was dropped. A few of the new guns were made during 1866, but manufacture really began the following year, after the move to Bridgeport had been completed. For six years the Company concentrated on this one model and during that period approximately a hundred thousand were manufactured and sold.

As far as Oliver Winchester was concerned the Civil War had demonstrated conclusively the superiority of the repeating rifle over the single-shot. With an improved model, he began an immediate campaign to get the United States military authorities to adopt the Winchester rifle for the services. The attractions of such an adoption were twofold: there would be large and presumably regular purchases, and the prestige would help sales in other markets.

In a long memorandum, entitled "Winchester's Patent Repeating Fire Arm the Coming Gun," which was printed in the Company's catalogs from 1867 to 1875, he reviewed the development of the single-shot breech-loader and the repeating guns and stressed the popularity of the latter among troops during the Civil War. On logical grounds he could see no reason why the Government did Promotion of Markets: Attempt to Obtain Government Adoption

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The Model 66 Rifle

Exhibit 30 00501