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The History of the Sewing Machine and Its Use in Quilting in the United States

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Inventors developed the first sewing machines for commercial use, but quickly marketed them to the public-at-large in the early 1850s. Women took advantage of the time saved from the use of sewing machines for the production of household items to produce more quilts. Some utilized sewing machines for appliqué, some for piecing, and some for quilting. Women took great pride in their sewing machines at first, but by the late nineteenth century the machines' novelty had faded and a renewal in interest in hand needlework eliminated most visible machine quilting. Ernest B. Haight revived simple linear quilting by machine by the early 1970s and in the 1980s Harriet Hargrave popularized more complex, free-motion techniques enabled by advances in sewing machine technology. Controversy and questions surrounding the validity and value of machine techniques occurred at first with the introduction of new methods of quilting. The results of a survey of judges confirm the acceptance of machine quilting as a valid technique in the production of quilts.

First developed for commercial use, the sewing machine entered the homes of the United States very quickly in the 1850s. Women whose everyday lives were previously dominated by the drudgery of sewing their family's clothing and household linens by hand eagerly embraced the sewing machine. Their newfound leisure time enabled women to

produce more fine needlework and sew more quilts. Some used the sewing machine only for piecing and applying the bindings of quilts, while others incorporated machine stitching in the visible areas of their quilts, in appliqué and the quilting. By 1900, the novelty of owning a sewing machine had waned, coupled with the renewed pride in hand needlework that had its origins in the 1880s, putting an end to most visible machine quilting in the United States. Simple linear quilting by machine was revived in the early 1970s as a time saver for quilters, but it was not until the early 1980s that more complex, free-motion techniques were popularized with the concurrent advances in sewing machine technology. After twenty years of persistent teaching, exhibiting, and publishing by a variety of pioneers, there is widespread acceptance of machine quilting as a technique equal to hand quilting by quilters, quilt lovers and judges. This paper will trace the history of the interface of the sewing machine with quilting in the United States.

The Early Sewing Machine[1]

The need for a workable sewing machine found its roots in home and commercial venues. The production of clothing and linens for the home was historically women's work, a skill passed from mothers to daughters. Sewing skills were essential in a successful household.[2,3] Wealthier families hired professional tailors and seamstresses, but even in those families basic sewing skills were expected of the ladies of the house.[4] As well as producing items for their own household, many produced clothing and linens for others in order to earn money for family needs.[5] Up to the early part of the nineteenth century in the United States, the only ready-made pieces of clothing were for sailors.[6] A second-hand clothing trade developed in the cities, with the purchasers mostly being immigrants and transients who could not afford new custom-made clothing. Tailors began to offer used garments for resale, and the wholesale manufacturing of garments began in the mid-1830s, first in small shops and as piecework in homes. By 1841, $2,500,000 of wholesale clothing had been sold in New York City and by 1850 there were 4,278 clothing manufacturers in the United States.[7] Even very skilled workers needed an immense amount of time to produce articles of clothing by hand: sixteen hours, thirty-five

minutes for a frock coat; fourteen hours, twenty-six minutes for a man's shirt; seven hours, nineteen minutes for a satin vest; six hours, thirty-seven minutes for a calico dress; two hours, fifty minutes for summer pants; and one hour, twenty-six minutes for a plain apron.[8] In the home and factories, there was a ready market for a practical sewing machine.

According to Grace Rogers Cooper, the elements required for a successful sewing machine were: support for the cloth; a needle to carry the thread through the fabric; a combining device to form the stitch; a feeding mechanism to permit one stitch to follow another; tension controls to provide an even delivery of thread; and a mechanism to ensure the precise performance of each operation in its proper sequence.[9] Many inventions were required to perfect the sewing machine over the course of a century. Thomas Saint's 1790 British patent is credited as representing the first sewing machine, although no known model was built for actual use until 1874.[10] In 1830 Barthelemy Thimmonier, a French tailor, patented the first known machine used in commercial operation. First intended to mechanize tambour embroidery, his machine made a chainstitch using a hooked needle that was moved by a foot treadle.[11] By 1831, Thimmonier's shop in Paris had eighty machines in use to stitch army clothing, but a mob destroyed his machines and he was forced to flee the city, and, temporarily, the trade. By 1845, he had patented an improved machine, and joined with Jean-Marie Magnin to form the first French sewing machine company, which only remained in business for three years.[12]

In the United States, the sewing machine progressed in fits and starts. Several developments preceded the practical sewing machine as defined by Cooper: Walter Hunt's lockstitch machine (1832–1834); Edward Newton and Thomas Archbold's chainstitch machine for tambouring the backs of gloves (1841); John J. Greenough's machine designed for sewing straight seams for leather work (1842); Benjamin W. Bean's and James Rodgers' running stitch machines (1843, 1844); and George Carliss' two-needle-machine for leather work (1843). All were either not commercially produced or of limited use.[13] Elias Howe, Jr., patented the first sewing machine to incorporate several essential elements in 1846 (see Figure 1). His machine used an eye-pointed needle with thread supplied from a spool to make a lockstitch with thread from a shuttle. A toothed wheel moved the cloth that was hung vertically on pins projecting from

Figure 1. Howe's patent model, 1846. National Museum of American History, Smithsonian Institution.

a baster plate. To produce a long, continuous, straight seam, the machine had to be stopped and the cloth had to be repositioned at the end of the pins. Howe was unable to get financial support for his invention in the United States; he traveled to England and sold his English patent rights to William Thomas in 1849. Upon his return to the United States, Howe discovered that other inventors had worked on improving his ideas and were manufacturing their own machines.[14] The most important of the improvements were those of John Bachelder in 1849. He employed the first continuous mechanism to move cloth, with a changeable axis of rotation that could control the length of the stitch.[15] His machine also

had a yielding presser foot and a vertically reciprocating needle bar.[16] Bachelder did not manufacture any machines, but sold his patent rights to Isaac M. Singer in the mid-1850s.[17]

Isaac M. Singer began his career with the intention of promoting his invention to carve printers' wooden type. Finding little interest in it, however, he turned to the sewing machine after seeing a Blodgett and Lerow machine in Boston.[18] The "Rotary Sewing Machine," invented by Sherburne C. Blodgett and John A. Lerow in 1849, had automatic tension control and continuous shuttle movement, but the thread broke often.[19] Singer's "Perpendicular Action Sewing Machine" of 1850 (U.S. Patent #8924 of 1851) incorporated previous inventors' ideas, including the eye-pointed needle (Weisenthal, 1755 and Hunt, 1834), the lockstitch shuttle (Hunt, 1834 and Howe, 1846), and the yielding presser-foot and vertically reciprocating needle-bar (Bachelder, 1849). Singer added needle thread control, an overhanging arm housing the needle-bar and needle-bar drive, facility to sew straight and curved seams, and an underneath feed wheel for continuous feed of the cloth. The machine sold for one hundred twenty-five dollars.[20] At the same time, the Willcox & Gibbs Company was producing a simple chainstitch machine on an iron-frame stand with treadle for fifty dollars.[21] To meet the competition, Singer produced a lighter version of his original machine in 1856, the "Family Sewing Machine" (also known as the "Turtleback"). Also priced at fifty dollars, it was not heavy enough for practical use and was supplanted in 1859 by the Singer "New Family Sewing Machine," priced at seventy-five dollars.

Patent infringement suits (primarily those initiated by Elias Howe) consumed the sewing machine industry in the 1850s. Orlando B. Potter, President of Grover & Baker, proposed pooling the patents owned by Elias Howe, Wheeler, Wilson, & Company, I.M. Singer Company, and Grover & Baker Company that covered the essential features of the sewing machine. Under the agreement, the resulting Sewing Machine Combination would then issue licenses for the patents for a fee of fifteen dollars per machine; Howe would share equally in the profits with the three companies plus receive a royalty of five dollars per machine sold in the United States and one dollar per machine exported. As a result of this unique business model, Howe became a millionaire, and the sewing machine industry expanded rapidly with the stabilization of the industry.[22]

Dissemination of the Sewing Machine

A major impetus for sales of machines to the home market was the hire-purchase plan for monthly installment buying, the idea of Singer's partner, Edward Clark, in 1856. Clark later also initiated the idea of the trade-in, allowing an old machine to be turned in for a fifty-dollar credit toward the purchase of a new model, which resulted in a forty percent increase in machine sales for Singer.[23]

Marketing of sewing machines was accomplished in several ways. Singer, an aggressive and innovative salesman, opened elegant showrooms in major cities and employed young women as salespersons.[24] There are two known examples of white wholecloth quilts thought to have been made to demonstrate the versatility of the sewing machine. One depicts a building that looks very much like Singer's first showroom and headquarters in New York City and has "Singer Machine Work" sewn in script.[25, 26] The other, owned by the Oakland Museum of California, has "American Com.'s Machine" stitched next to the makers' names.[27]

Abundant examples of trade literature for sewing machines beginning in the late 1850s are in the collection of the Smithsonian Institution, with many available as digitized images online. One of the earliest pamphlets is addressed "to the public" by Grover, Baker & Co. of Boston in 1853. It extols their "patent sewing machine for sewing leather, and all kinds of cloth" as the ultimate time saver, claiming that "it never sleeps —it never tires—it never misses a stitch."[28] The writer makes the case for the advantages of the Grover & Baker double chainstitch machine over those machines with the single lockstitch, which he states can only be sufficient for "light articles and ornamental work."[29] Pages of diagrams of the various models, features, and prices are followed by testimonials from clothiers, shoemakers, and cloth bag-makers. An 1873 price list for the American Sewing Machine Company of Philadelphia counters that its lockstitch model is "the strongest and the best."[30] In 1876, American was advertising a "new, improved, comparatively noiseless" machine, a major feature for an item that had become a fixture in the homes of the United States.[31] In addition to the pamphlets, companies distributed attractive trade cards, an inexpensive way of advertising a variety of products including the sewing machine in the late nineteenth century (see Figure 2).

Figure 2. Trade card for the "New Home" Sewing Machine, Leavitt & Brant, Agents, Boston, Massachusetts, c. 1880. Author's collection.

Early machines were of two types: portable, crank-operated models kept in a case or on a table, and treadle-operated models mounted on tables.[32] Therefore, manufacturers had to consider the appearance of the sewing machine if their product was going to appeal to the domestic market. Nicholas Oddy argues that because the "domestic machine developed directly from those for industrial use," the ubiquitous, durable, black Japan finish could be easily enhanced for the domestic consumer by transfer-printed ornamentation.[33] Singer's "Family Machine" of 1858 was elegantly decorated with flowers and scrollwork. The "New Family Sewing Machine" had equally intricate decoration and was mounted on a table with leafy vine cast-iron work side supports.[34] Manufacturers patented the designs for ornamentation applied to the machine heads that could be quite elaborate, as one used on a New Home machine of 1884 that features a picture of a country house in the middle of the machine bed.[35] Early manufacturers went so far as to market sculptural character machines, such as the "Cora Munro" (a character in James Fenimore Cooper's *The Last of the Mohicans*) and a generic "Lady," in hopes of spurring sales.[36]

Manufacturers offered different styles of cabinets and tables early in the history of sewing machines as well, generally following the tastes of

the day, but they were not sold in a quantity commensurate to the machines.[37] Cabinets were an added expense. The "New American Sewing Machine" of 1873 could be purchased in eight different table or cabinet configurations.[38] Case decoration reached its height in the Eastlake-inspired Wilson Sewing Machine cabinet exhibited at the 1876 Centennial Exhibition. Other manufacturers had large displays of machines with and without cabinets there as well.[39] By that time, the sewing machine had been firmly established as a part of the parlor décor, as an elaborate ornament to be seen or to be hidden in a grand piece of furniture.[40]

By 1860, there were 500,000 sewing machines in use in the United States, including those for domestic and commercial use. In New England, clothing factories had 500 to 3,000 machines in use at a time. A pleated shirt that previously took ten hours to complete by hand could be done in fifteen minutes with a machine.[41] The invention and dissemination of the sewing machine also released housewives from some of the drudgery of daily sewing for the family. Amelia Bloomer found the sewing machine to be a "merciful" invention, noting that "woman has long enough stitched her health and life away" and that by being relieved from such "toilsome, ill-paid labor," woman might be able to pursue more active and lucrative pursuits to occupy her mind and body.[42] By 1861, a calico dress could be made in fifty-seven minutes by machine instead of over six and one-half hours by hand.[43] Yet women continued to make dresses at home as late as 1880, while most military uniforms, men's suits, and children's clothing were increasingly produced in factories.[44]

According to Barbara Brackman, "women's diaries and letters indicate that Southern women purchased machines earlier than Northern or Western women" because diarists tended to be from the upper class, slaveholding society and, therefore, were responsible for overseeing the production of clothing on large plantations and could afford to buy the machines.[45] During the Civil War, the use of sewing machines increased in homes and factories in order to produce the bedding, clothing, and boots needed by the opposing armies.[46] Several new sewing machine companies began operations during the Civil War, while one in Richmond, Virginia ceased operations and one in Vermont converted to arms manufacture.[47]

Sewing machines arrived in the Western United States more commonly after the Civil War. Because all of the sewing machines were manufactured east of the Mississippi before 1870, transportation was a cost added to the already high price for working class and farming women.[48] Prices dropped in the 1870s when the expiration of patents resulted in increased competition in the manufacturing sector. More companies locating in the Midwest and the expansion of the railroads resulted in reduced freight costs.[49] Despite the lower costs, many Western women still had to resort to cooperative ownership or "sewing on shares" (the borrower sewing for the machine's owner).[50] Between 1870 and 1900, only a few manufacturers offered machines for thirty dollars or less.[51] For a time, merely owning a sewing machine was an achievement of which to make note (see Figure 3).[52]

Figure 3 Detail of *Prickly Pear* variant of *Pineapple*, reported to have been made using the first sewing machine in Collin County, Texas, some time after 1876. Collection of Carolyn R. Miller.

Figure 4. Machine-quilted block from *Mrs. Fitts Sampler,* an 1870 signature quilt quilted and assembled using the block-by-block approach. Collection of the Cranston (RI) Historical Society.

Nineteenth Century Machine Quilting

As the time needed for sewing household items and clothing for the family decreased, women were afforded the leisure time to do fine needlework and make more quilts.[53] They quickly adopted the sewing machine for use in quilting. An example of a pre-Civil War quilt that was machine-pieced is in the International Quilt Study Center collection; an example with machine appliqué is in the collection of the New England Quilt Museum; and a machine-quilted example is in the collection of the Art Institute of Chicago.[54, 55, 56] The Art Institute Whig Rose quilt is said to have been quilted around 1848 on the first Howe sewing machine in Washtenaw County, Michigan. The other two quilts were made further east of the Mississippi.

Opposing forces were at work in the realm of quilting in the period between 1870 and 1900: the popularity of the crazy quilt with its em-

phasis on fancy hand-sewn embroidery and the use of visible machine quilting and appliqué as a time saver and mark of pride in owning a sewing machine. The crazy quilt was a purely artistic creation for show, while patchwork and appliqué quilts continued to be a mix of artistry and utilitarianism.

Appliqué quilts with machine work made in the last forty years of the nineteenth century tended to be pieced by hand and machine appliquéd. Because of the unwieldy size and bulk of quilts and small beds of the nineteenth century sewing machines, some quilts were quilted or appliquéd block-by-block, then joined together by whip-stitches or felling, while other quilts had their edges and borders quilted by machine and their inner sections done by hand (see Figure 4 and 5).[57] Doll quilts were easily sewn by machine because of their small size (see Figure 6).[58] The most common and simplest overall pattern for large quilts was the grid,

Figure 5. Detail of the back of a *Lone Star* quilt, c. 1880, quilted and assembled in sections. Collection of Priscilla B. Godfrey.

Figure 6. Doll quilt, c. 1880, 10 inches by 11 inches, showing machine quilting in-the-ditch. Collection of Pat Nickols.

adapted from those seen in manufactured coat and vest linings.[59] Some men seemed to enjoy grid quilting by machine, if only to challenge their wives.[60]

Machine Quilting Abandoned

Brackman reports that eleven percent of the quilts documented in the Kansas Quilt Project were machine-quilted between the 1840s and 1988, while Crews and Rich report that no more than six and one-half percent of the quilts documented in the Nebraska Quilt Project were machine-quilted between 1870 and 1950.[61,62] Meyer guesses that as many as ten per cent of all quilts made between 1865 and 1900 were machine appliquéd or quilted in some part.[63] These are not huge figures considering the

number of sewing machines in American homes at the time. Could it be that many more were done, but not kept and valued because of changes in taste? Changes in taste and a desire to return to old "American" values in the late nineteenth and early twentieth centuries led to a revival of hand quilting and appliqué over visible machine quilting and appliqué. A sewing machine in the home was no longer a novelty by the late 1880s, even in the Western United States. As early as 1864, the great Sanitary Commission fairs displayed nostalgic tableaux of quilting parties (hand-quilting) in eighteenth-century New England.[64] Similar exhibits appeared at the 1876 Centennial exhibition in Philadelphia and at the 1893 Columbian Exposition in Chicago.[65] The anti-industrial Arts and Crafts Movement, imported to the United States in the late nineteenth century and championed by Candace Wheeler, Charles Eastlake, Charles Stickley, and others, emphasized the handmade.[66] At this time, though, hand-sewing skills were at a low point, supplanted by the wide availability of sewing machines after 1860. At the end of the nineteenth century, many quilts were hand-tied. Ruth E. Finley, in her 1929 history of quilting, noted that the year 1880 was a watershed for needlework. Women no longer had to have the handwork skills necessary to produce quilts or clothing due to the proliferation of machines, nor did they necessarily want to learn those skills. For the "new women," educational and occupational opportunities beckoned as the twentieth century approached.[67]

Through the encouragement of needlework editors for ladies' magazines, such as Sybil Lanigan for the *Ladies Home Journal*, Anne Orr for *Good Housekeeping*, and Ruby McKim for *Better Homes and Gardens*, needle workers returned to hand sewing techniques to produce old-fashioned-looking quilts.[68] The sewing machine became a tool for piecing and binding quilts; visible machine stitching was most likely deemed suitable only for utility quilts. Handwork supplanted machine work as the status symbol, denoting a special skill and the affluence of leisure time.[69]

Technology and Twentieth Century Machine Quilting[70]

The general appearance of the sewing machine changed very little from the 1850s until almost the middle of the twentieth century. All machines were shiny black with gold ornamentation until White Sewing Machine

Company introduced a non-glare crinkle finish in the 1920s and a green version in the late 1930s.[71] Singer introduced the lightweight portable "Featherweight" at the Chicago World's Fair in 1933, but it merely looked like a shrunken version of its earlier machines.[72]

A significant improvement for sewing occurred in the 1870s with the introduction of the zigzag stitch, but only for commercial machines.[73] In 1892, Singer patented a zigzag for its machines, but just for commercial use, as well. A version was marketed to tailors and seamstresses, but only in Europe.[74]

Singer was the first manufacturer to introduce an electric motor to power its commercial machines in 1891, but did not make the motor-powered machine available for home use until 1915 with its "Singer 101."[75] It was followed by a portable version, the "Singer 99k," in 1921.[76]

White introduced its "Model 75" in 1935, which had a hinged presser foot for sewing over pins as a convenience feature.[77] The most useful advance that improved sewing ease was the invention of the free-arm portable machine with zigzag capability by Bernina in 1943, but, because of World War II, it was not imported into the United States.[78] In 1948 a free-arm machine was made in the United States by Portman Manufacturing Company of New Rochelle, NY, and marketed by New Home, but it did not have zigzag capabilities.[79] The first free-arm zigzag machine marketed in the United States was an Elna model imported by Necchi in 1949.[80]

Mechanical, disk-operated machines for automatic stitch patterns appeared in the 1950s, such as the Necchi "Supernova" in 1955 and "Supernova Ultra" in 1958.[81] The greatest leap in technology has been the computerization of all facets of functions in sewing machines. Both Janome (the "Memory 7") and Husqvarna (the "Viking 6680") marketed the first computerized models for home use in 1979.[82,83]

The histories of free-motion and longarm quilting could be said to have begun in the 1870s with the invention of the first movable quilting frame, patented in the United States by Augusta Hoover in 1871. This advance allowed quilters to produce parallel lines of quilting. William Heffley adapted and simplified Hoover's design later in 1871 to enable the sewing of a wavy diamond pattern. In 1877, J.J. Crall's frame allowed the sewing machine rather than the quilt to move, but only in parallel

lines. H.T. Davis also patented many versions of a frame for rolling the quilt under the machine in the 1880s and 1890s, but only Crall's version was a type familiar to the longarm quilters of today.[84,85]

The history of the longarm quilting machine is a little vague. Around 1960, the crank-operated longarm quilting machine was manufactured.[86] Nolting Manufacturing, celebrating its twentieth anniversary in 2004, claims to be the makers of the "original" hand-guided longarm quilting machine, designed by Fred Nolting in the 1980s. Fred Nolting had been designing and building other sewing and quilting machines since 1955.[87] Gammill Quilting Machine Company has been in existence for over twenty years, and American Professional Quilting Systems was founded in 1983. APQS's clients originally tended to be individuals starting businesses in quilting for others. This remains a major portion of their current business.[88] Commercial longarm quilting probably had a major effect on how judges and other quilters viewed longarm machine quilted quilts early in their existence.

Longarm quilting involves considerations that differ from sewing with a regular home machine. The size of the table must be large enough to accommodate the size of the quilts to be sewn. The size of the quilting head determines what size area can be quilted and how often the quilt must be advanced to reach another area of the quilt. Whether or not the machine has a "hopping" foot, a rotary bobbin, and a needle positioner affects the ease of operation, as do the latest features, the laser stylus and stitch regulator.[89] Longarm machine artist Linda V. Taylor believes that longarm quilting allows for more control in free motion quilting than using a home sewing machine: "Quilting on a home sewing machine is similar to moving the paper under a stationary pencil, while quilting on a longarm machine is comparable to using the pencil to draw on the paper."[90]

The Revival of Machine Quilting in the Twentieth Century

The use of the sewing machine did not totally disappear in the making of quilts at the end of the nineteenth century. Hedges, Silber, and Ferrero report an estimate that fifty to seventy-five percent of the quilts made between 1860 and 1940 had some machine stitching.[91] In the twentieth

century, machine stitching was generally relegated to the construction of the quilt. Examples of home machine quilting continued to appear in utilitarian, crib and doll quilts, and in some articles of clothing, such as petticoats and bibs.[92,93]

One of the first quilters to popularize a return to machine quilting was Ernest B. Haight of David City, Nebraska. In the 1930s, after Haight criticized the workmanship of his wife Isabelle's grandmother's quilt, his wife challenged him to make one himself. Using his grandparents' treadle machine, brought to Butler County, Nebraska, in 1880 by covered wagon, he completed the piecing on that quilt and many others. His father then learned how to hand quilt in order to finish many tops for Haight. After his father's death, Haight's mother and his wife quilted tops for him, but he and his wife were such prolific piecers that he turned to machine quilting in 1960 to finish them.[94] He used a regular, domestic zigzag electric sewing machine, using the small, narrow presser foot for better visibility, but using *firm tension* [Haight's emphasis], unlike the free-motion or lighter tension techniques prevalent today.[95] Haight used the grid pattern exclusively in his many machine-quilted quilts.[96] Haight explained his methods in his 1974 publication, *Practical Machine Quilting for the Homemaker*, a book cited by subsequent proponents of machine quilting. Having produced over two hundred quilts, Haight was well known in Nebraska and received national attention as a subject of articles in publications such as *Quilter's Newsletter Magazine*.[97] His work and publication are credited with the sharp rise in the percent of quilts being machine quilted in Nebraska during the 1950s and 1960s.[98] Because of the quality of Haight's work, previously rejected as "not art," the Butler County (Nebraska) Fair initiated separate categories for machine and hand-quilted quilts, now a common practice.[99]

Machine quilting had critics in its early reincarnation, among them the noted British authority, Averil Colby, who argued in her 1972 book, *Quilting,* that "the results cannot be said to be successful . . . as compared with hand quilting. The patterns are heavier in appearance, as the solid line of stitching, instead of the broken one produced by hand sewing, compresses the materials, and without the elasticity and softness of hand-sewn running stitch, the finished work loses much of its character."[100]

In the same year, Bonnie Leman, then editor of *Quilter's Newsletter*

Magazine, recommended Haight's methods for quilting a whole quilt, but she wrote: "perhaps the easiest, most foolproof method of machine quilting is to do it a block at a time . . . Quilts may also be easily handled on the machine in sections . . . each section is quilted individually, then the sections can be joined by whichever method you prefer."[101]

Two years after the appearance of Haight's book, Karen Bakke published *The Sewing Machine as a Creative Tool*, in which she devotes a chapter to machine quilting. She goes beyond Haight's techniques for quilting grids and straight lines by describing how to quilt with templates and random patterns. She almost achieves "free-motion" by advising the reader to lower the feed dog, but to leave the presser foot at half-tension (as for darning).[102]

Using the sewing machine for quilting was still not widely accepted at the end of the 1970s. In their 1980 publication, Robbie and Tony Fanning cautioned that the machine quilter should not: "expect machine quilting to look like hand quilting. Machine work has its own special qualities, which we must learn to exploit and tout. One way to do this is to avoid machine stitching intricate traditional quilting . . . designs, such as the feathered plume.[103]

Encouragement was offered by Hettie Risinger in her 1980 book about machine piecing: "for a sewing machine is a tool–nothing more or less. It is the hands and the mind and the spirit of the one who uses the tool that determine the quality of the results. It has the same relation to quilting that the electric oven has to the baking of bread or that the typewriter has to the writing of a book."[104]

In 1984, Pat Cody, who recommended the Fannings' book, offered a warning about not having "unrealistic expectations of machine quilting, which is never instant quilting. Speed depends on your own skills and standards."[105]

More encouragement and advice came from Maggie Malone in 1985: "If you have ever done machine embroidery, you'll have no problems with machine quilting, and even if you haven't it won't take long to get the knack of manipulating the quilt under the needle . . . First, a word of warning. If you are planning to enter your quilts in competition, check the rules before you machine quilt. Many shows insist that the quilting be done by hand."[106]

In the mid-1980s, Harriet Hargrave found that few quality machine-quilted quilts were being displayed at any quilt shows.[107] Hargrave traveled nationally, teaching her method of machine quilting in traditional quilting patterns, all the while defending the use of the machine. The first edition of her book, *Heirloom Machine Quilting*, published in 1987, was not the first publication to promote machine quilting, but it was the most complete guide to machine quilting techniques, equipment, and supplies to date (see Figure 7). Unlike the earlier publications, Hargrave's book emphasized the full possibilities of free-motion techniques.[108] Her book had a great effect on the early acceptance of machine quilting by some, but not all, quilters and judges. According to Harriet Hargrave, the quilt featured on the cover of the first edition, *Blue Medallion,* was "the quilt that inspired quilters like Debra Wagner and Diane Gaudynski. It was a showpiece of the time of feathers and elegant quilting done on the machine in the early 1980s."[109]

Diane Gaudynski stated that "the arrival of Harriet Hargrave's machine-quilting book sent me into a world of discovery, of joy, of completion. Finally, I could make quilts with the simplicity of my grandmother's everyday ones but with extensive machine quilting."[110]

In contrast, quilt artist Radka Donnell preferred to collaborate with others to put pantograph-quilting patterns on her quilts, as on *Demeter's Return* of 1986, as a feminist statement.[111] She felt that machine quilting freed women to perform more interesting tasks, such as the design and piecing of more quilts.[112]

Judges and Machine Quilting

Machine quilting is viewed as an acceptable technique for quilters today by a majority of the quilting community. In 1995, Harriet Hargrave stated:

> I find it amazing how nine years ago machine quilting was such a disliked concept, and today, the classes keep filling more than ever. Quilters just don't have the time to finish every quilt they make by hand. The concept that real quilts are quilted by hand is very unfair to today's

Figure 7. Cover of the paperback first edition of *Heirloom Machine Quilting* by Harriet Hargrave, featuring a detail of *Blue Medallion*.

> quilters . . . When you can complete a quilt in hours by machine instead of months by hand, and it looks every bit as beautiful, is it any wonder that machine quilting is where it is today?[113]

Yet in 2000, quilt historian Dorothy Osler was still not totally convinced about the merits of machine quilting, stating that "Although machine quilting has an important and deserved place in contemporary quiltmaking, the character of the running stitch cannot be suitably replicated with a sewing machine.[114]

General acceptance by judges developed more slowly than by quilters. It was not until 1988 that Lois T. Smith, another teacher of and writer about machine quilting, won a Best of Show award for her machine pieced work at the AIQA Show in Houston.[115] The next year, Caryl Bryer Fallert won the Best of Show award for *Corona II: The Solar Eclipse* at the American Quilter's Society and cited Harriet Hargrave's book as "a real breakthrough for quilters" (see Plate 3).[116] Other artists inspired by Hargrave's teachings, such as Diane Gaudynski, have perfected machine quilting to produce quilts that rival hand quilted pieces for their intricacy and beauty (see Plate 4).

In the past twenty years, there has been a shift in how quilts are produced and viewed. It is likely that the majority of quilts being made today are machine-quilted, either by the top maker or by someone hired to finish the quilt.[117] Just as judges, viewers, and quilters were beginning to accept machine quilting done with standard sewing machines, the longarm-produced quilt became a force with which to reckon. At first a tool for finishing quilts in an easy fashion, with simple patterns and pantograph templates, the longarm followed the pattern of the development of machine quilting as an art form in the late twentieth century.[118] Artists such as Linda V. Taylor, by teaching, exhibiting, and publishing, have raised longarm quilting to the same status as hand and machine quilting.

Compelled to defend her quilting technique against detractors, much in the way that Hargrave did in the 1980s, Taylor credits longarm quilters with finishing more quilts, thus fueling an entire industry by using more fabric, thread, and batting, and encouraging the sale of more sewing

Figure 8. Detail of *Magic Carpet,* 2001, pieced by Cheri Meineke-Johnson and quilted by Linda Taylor. The quilt measures 78 inches by 83 inches

machines. Longarm quilting also allows many quilters to earn a living from their homes.[119]

Taylor believes that the same rules of workmanship should apply to longarm quilting as for home sewing machine quilting.[120] An aspect that causes some lack of understanding is the place of the quilter versus the piecer in two-person efforts. Taylor feels that such projects result in the best effort from each (see Figure 8).[121]

In October of 2003 I sent a descriptive questionnaire to seventy-seven judges certified by the National Quilting Association to investigate their views on machine quilting, with particular interest in whether or not their views had changed over their careers as judges. Of the thirty-eight responders, twenty-three have been judging quilts since 1990; of those, twelve have been judging since the early 1980s.

In general, all would agree with the following criteria for a great quilt as expressed by one responder: [that it] "comes together when excellent color and design concepts are incorporated together with superior workmanship in construction and finishing techniques and then enhanced by wonderful quilting (either by hand or machine) which is compatible in pattern and style and contributes to the overall appearance of the quilt. The completed quilt must be able to "speak" to the spectator and stand on its own as a work of art, a masterpiece!"[122]

As for their feelings about machine quilting versus hand quilting, all of the judges' replies agreed with the statements, "good quilting is good quilting no matter the method" and that "precise execution of each is necessary."[123] According to the judges, the criteria for judging hand quilting is the same for machine quilting: even stitches, well hidden starts and stops of thread, suitable thread for quilting, a top free of distortion, and a quilting motif that enhances the top design. Added to those criteria is the lack of visible traveling stitches and the absence of loops or bumps of excess thread on the back.[124]

Many of the judges remarked on the improvement in the quality of design and workmanship and the increase in quantity of longarm quilts produced over the past two decades. They are pleased that more quilts can be made and finished. In general, they view longarm quilting as just another tool that can be done well or poorly. Custom quilting is deemed the best method, with pantograph patterns disfavored by most unless the pattern enhances the quilt in some way.

A few of the judges admitted to changing their views about or ability to appreciate machine quilting over their careers: "At first, long-arm quilting almost seemed like "cheating" but as I have been exposed to a variety of machine quilters, I have come to realize the difficulties of mastering this method . . . I don't think of it as a change in views – just a greater appreciation for the difficulty in machine techniques."[125] Another judge added: "Seeing new ways of doing things is very rewarding . . . judges must work hard to keep up with changing techniques . . . Judging is an ongoing learning experience. As soon as something new is introduced, judges have to change the way they look at things.[126]

The most significant change is how machine-quilted quilts are placed in show categories. New categories have been added for two-person

quilts and longarm quilts. Many of the judges are troubled by the inconsistent ways in which quilts are placed in categories and by the few remaining judges who insist that all machine-quilted items should be separated from hand-quilted items. As indicated by one of the judges, when a quilt's blocks have been outline-quilted by a longarm quilter, and then finished with hand quilting by another quilter, category placement becomes a problem for the competition committee. She also noted that, in California, home machine quilters want to be judged separately from professional longarm quilters.[127]

The question of authorship troubles some of the judges, as some quiltmakers do not acknowledge the machine quilter on their submissions. The commercial aspects cause concern for some who feel that machine quilters have already been paid for their work and do not deserve a share of prize money. Others are disturbed by the notion of quilts submitted by amateur quilters that have been machine quilted by another quilter for payment. One judge noticed the total lack of recognition of the machine quilter on gallery cards and show programs in many instances.

In general, all agree that, today, the judging community fully accepts machine-quilted quilts. All of the judges responding to the questionnaire have given awards to machine-quilted quilts. While one judge feels that "a good quilt will rise to the top," no matter what the technique, she personally is saddened "to see us all in a rush."[128] Instead of producing quilts to be used and worn out, quilters of today are "quilting for the art," "expression of self" and whatever else we decide. But we have got to hurry up and get it done. We all have projects that justify being quickly finished, but so many people never ever attempt hand quilting. If that continues, I'm afraid we may lose that most rewarding and relaxing of the quiltmaking steps.[129]

Conclusion

In our current technology-driven society, there is a yearning to return to hand crafts, much as the first Industrial Revolution spawned the Arts and Crafts movement. Many young women and men are learning how to knit and older women are resuming knitting as a form of relaxation. Could there be a hand quilting revival in the future that will replace ma-

chine quilting? Probably not; it is more likely that there will continue to be those who quilt by hand exclusively, those by home sewing machine, those using longarm machines and those who mix techniques, either by themselves or in concert with another quilter. All methods should be acceptable, as long as the process yields art, comfort, or both.

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Appendix I: Timeline for Early Sewing Machine Technology

1755	two-pointed needle [Charles F. Weisenthal—British patent #701]
1790	table for cloth, overhanging arm carrying straight needle, continuous supply of thread from a spool, forked needle and looper, hand crank [Thomas Saint—British patent #1764] (no machine made until 1874)
1804	common needle, overcast stitch, finger-like pincers, short thread lengths [Thomas Stone & James Henderson—French patent]
	chainstitch machine [John Duncan—British patent #2769]
1807	eye-pointed needles on single-stitch rope stitching machine [Edward Walter Chapman & William Chapman—British patent #3078]
1810	eye-pointed needle chainstitch machine [Balthasar Krems, Mayen, Germany]

1814 straight & curved lines to make couched stitches [Josef Madersperger, Vienna]

1818/19 single-thread/two-point needle backstitch machine [unconfirmed—Monkton, VT]

1830 first known sewing machine in commercial production—made chainstitch with hooked needle, foot treadle to move needle down, manual cloth feed [Barthelemy Thimonnier, Paris] (1841—mob destroys all his machines; by 1845, back in business as first French sewing machine company; company fails in 1848 Revolution)

1832–34 lockstitch machine with upper & lower threads; eye-pointed needle [Walter Hunt, New York—sold patent rights to George A. Arrowsmith] (not put into commercial production)

1839 twisted lockstitch made with multiple eye-pointed needles [Josef Madersperger, Vienna] (not commercially successful)

1841 chainstitch machine for tambouring the backs of gloves (could sew 2 layers of clothing) [Edward Newton & Thomas Archbold—U.S. patent]

1842 first U.S. patent specifically for sewing machine; designed for leather work; straight seams, running and backstitch [John J. Greenough—U.S. patent 2466] (only patent model was made)

1843 second U.S. patent for sewing machine; intended for continuous feed of fabric to stitch fabrics before processing in dyeing & bleaching mills; running stitch for straight seams of indefinite length [Benjamin W. Bean—U.S. patent #2982]

machine for making saddler's stitch with two two-pointed needles & two awls [George H. Corliss—U.S. patent #3389] (abandoned for lack of backers)

1844 running stitch machine [James Rodgers—U.S. patent #3672] (not commercially produced)

two-thread stitch using eye-pointed needle & shuttle; several sets working simultaneously; fabric carried by pair of cloth rollers vertically & horizontally to enable embroidery [John Fisher & James Gibbons—British patent #10424] (not commercially produced)

1846 Howe's sewing machine: lockstitch with thread from shuttle; grooved & curved eye-pointed needle with thread supplied from spool; cloth hung from pins on moving baster plate; cloth fed through machine mechanically [Elias Howe, Jr.—U.S. patent #4750 (his ideas pirated by many in U.S.); sold British rights to William Thomas in 1849]

1848 improvements on Howe's machine—bobbin case & simpler cloth feeding device [John A. Bradshaw—U.S. patent #5942] (machine not made)

1849 first U.S. patent for chainstitch machine; in commercial use in print & bleach works in New England; sewed one yard per minute [Charles Morey & Joseph B. Johnson—U.S. patent #6099]

first continuous sewing mechanism: yielding pressor foot & vertically reciprocating needle bar; could control length of stitch; one of most important patents in Sewing Machine Combination [John Bachelder—U.S. patent #6439—sold patent to I.M. Singer in 1850s] (no machines manufactured by Bachelder)

Howe begins series of patent suits

"Rotary Sewing Machine"; continuous shuttle movement; automatic tension control, but thread often broke; much commercial use [Shelburne C. Blodgett & John A. Lerow—U.S. patent #6766]

1850 reciprocating shuttle lockstitch machine [A.B. Wilson—U.S. patent #7776]

Isaac Singer's "Perpendicular Action Sewing Machine"—improvement on Blodgett & Lerow machine—needle thread control; could sew straight & curved seams; underneath feed wheel for continuous feeding; table to hold cloth horizontally; vertical presser foot to hold cloth; vertical reciprocating straight needle driven by rotary overhanging shaft [first patent model in 1851, U.S. patent #8924]; priced at $125

1851 double chainstitch with threads carried on two ordinary spools; horizontal table [William O. Grover & William E. Baker, Boston—U.S. patent #7931]

rotary hook with reciprocating bobbin [A.B. Wilson]

1852	stationary bobbin & rotary hook [A.B. Wilson; manufactured by Wheeler & Wilson]
	double-looped chainstitch—"Grover & Baker Stitch" [William O. Grover & William E. Baker—U.S. patent #9053]
1854	four-motion cloth feed [A.B. Wilson]
1856	Edward Clark of Singer Co. devises "hire-purchase plan" (first installment purchase plan)
	Singer "Family Sewing Machine" ("Turtleback")
	Sewing Machine Combination–first patent pool, idea of Orlando B. Potter, President of Grover & Baker Co.; plan for combining patents for licensing & receiving royalties for: Elias Howe; Wheeler, Wilson & Co.; I.M. Singer & Co.; Grover & Baker Co. (dissolved in 1877)
1857	cheaper chainstitch machine [James Gibbs—U.S. patent #17427] (manufactured in conjunction with Charles Willcox; formed Willcox & Gibbs Sewing Machine Co.)
1860s	practical buttonhole attachment
1865	first portable case [William O. Grover & William E. Baker—U.S. patent #14956]

Appendix II: Timeline for Late 19th & 20th Century Sewing Machine Technology

1870s	zigzag stitch for commercial use
1871	first U.S. Patent for movable quilting frame for sewing parallel lines [Augusta Hoover]
	"improved" frame to sew wavy lines [William Heffley]
1877	movable quilting frame (sewing machine moves) for sewing parallel lines [J.J. Crall]
1889	New Home "drop" cabinet
1892	Singer invents zigzag for its machines: only available in Europe
	rolling quilting frame [Henry Davis, Chicago]

1895	first hem-stitching machine [Friedrich Gegauf, Steckborn, Switzerland. (predecessor of Bernina Co.)]
	revolving quilting frame for commercial use [Frank Palmer]
1915	"Singer 101" electric machine for home use
1921	portable electric machine [Singer 99k]
1920s	non-glare crinkle finish [White]
	Singer discounts machines for public schools
1933	Singer "Featherweight" introduced at Chicago World's Fair
1935	hinged presser foot for sewing over pins [White Model 75]
late 1930s	first non-black (green) machine [White]
1943	first free-arm zigzag machine [Bernina 125]
1948	zigzag introduced in U.S. [Pfaff & Necchi]
	first U.S. made free-arm machine [Portman Manufacturing Co., New Rochelle, NY; marketed by New Home]
1949	Elna free-arm with zigzag imported to U.S. by Necchi
1960	first long-arm crank-type quilting machine
1979	first computerized sewing machines for home use [Janome "Memory 7" & Husqvarna Viking 6680]
	first hand-guided long-arm machine [Fred Nolting?]
1984	first hand-guided two-way control long-arm machine [Fred Nolting]
1998	home sewing machine with built-in disk drive [Husqvarna Viking "Designer I"]

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