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A History of the Cutlery Industry in the Connecticut Valley

by
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CONTENTS

PAGE

INTRODUCTION

The ships which brought to early New Englanders what foreign goods they could afford carried an assortment of fine textiles, china, glassware, paint, hardware, and knives. The story is well known. Having little wherewithal with which to buy from abroad, New England developed its own industries. What work could not be done by the house wife and the farmer went to the village shoemaker, fuller, miller, or blacksmith. Nonetheless, scarcity of capital and skill and English opposition to American manufactures made it necessary to import some goods from England. The coins of the pioneer farmers were saved for these products of an advanced and organized industrial system. As New England, especially in its eastern portions, gained prosperity, it was able to absorb more foreign goods, and, despite its increasingly varied in dustry, continued to rely on Europe for many commodities.

Knives were easy to transport. Their value was high in relation to their bulk, and the fineness of English cutlery was beyond the attainment of the non-industrialized community. Most of the cutlery used by Americans until the 1840's was made in Sheffield by a skilled group of workers, wise in the use of metals and strong in their established reputation. The forger, the temperer, the grinder, and the cutler (or hafter) each did his own particular work, a division of labor which produced both quality and quantity of production long before cutlery was made in factories.This highly organized industry for many years depended for its pros perity largely upon the American market. [1]

Knives were made in small quantity in America before there was a cutlery industry as such. Scattered through Colonial records are occasional references to men who held the title of cutler. As early as 1698 there were cutlers and file-cutters in Pennsylvania, and by 1718 Philadelphia had granted to three cutlers freedom of the city, the right to practice their trade. Seventy years later Pittsburgh was known to have one citizen who was designated as tool maker and cutler.[2] There were undoubtedly others, some specifically known as cutlers, some simply as blacksmiths. The early cutlers may have acquired their training abroad and come to this country already specialists, but there were few, if any, who confined their work to one type of operation or product. A cutler might make swords, knives, and tools. But the blacksmith, never a specialist, made whatever could be fashioned of iron and steel. He could forge, harden, temper, and grind, and these abilities made him a cutler of sorts. Although his product lacked fineness, he knew enough to make it strong, and he passed his experience on to the many industries that were to grow out of his craft, among these the making of axes and agricultural implements needed for the new settlements and too bulky to transport across the ocean. As early as 1740 a British writer noted that the people of America "make many things and export several manufactures of the same kind." Foundry ware, axes, and other iron tools were listed as products which the New England states were selling to the South.[3] By 1795 America made most of its own axes, and by 1812, many of its other tools as well. Mechanics, even in cities, made tools to orde but axes, widely used on the frontier, were produced for general sale.[4]

The Valley towns were of necessity even more selfsufficient than those of the eastern seaboard. Their access to the seaboard towns, afforded by the Connecticut River, enabled them to send out farm products and import a few manufactures. But in the early days they were forced to rely largely upon their own resources. Chiefly agricultural, these communities, like all pioneer settlements, first used their water power for grist mills and saw mills. Then came fulling mills, furnaces, and forges. Not until later did the power resources attract funds and promoters or foster wider industrial aspirations.

While America was importing almost all of its cutlery and many tools, it was fostering a small iron industry to provide material for the furnaces and forges of eastern Connecticut and Massachusetts and, later, for the western parts of these states. Local deposits of bog ore, though never highly satisfactory and soon exhausted, contributed to the growth of metal working industries in New England. Though the iron industry of western Massachusetts developed later than that in the eastern part of the state, as early as 1697 a blast furnace, at Chicopee Falls in Springfield, used local bog ore to make iron, utensils, and implements on a very small scale. This furnace later turned to other, more easily refined ores and finally became a manufactory of agricultural tools.[5] A deposit of bog ore in Bernardston, first used in about 1777, became the basis for a business in farm and butcher's tools.[6] In other towns where the bogore was not dug until after 1800, its use persisted until 1829 or 1830. By 1832 western Massachusetts forges and furnaces were using pig and scrap iron from several New England States, from Pennsylvania, and even from Norway, Sweden, and sometimes Russia. New England owners of blast furnaces feared foreign iron and iron products and urged continued tariff protection. Their fears were justified, for nearby deposits could no longer be used as cheaply as Pennsylvania and foreign ores.[7] The fabricating industries survived and grew, but not on the basis of local raw materials.

In 1832 western Massachusetts scythe, axe and tool makers still operated small shops mainly dependent on local ore and local sales with an occasional shipment outside the region.[8] Many of them employed only one helper; others, four or five; only in one case was the working force as large as fourteen. Still much a part of their agricultural environment, these shops often used their workers for only a part of the year-during the months, we can

suppose, when farming did not require them or when the streams were full enough to provide power. They must have produced some goods for general sale rather than on order only.

Meanwhile the United States Armory, established in 1794 in Springfield, Massachusetts, was having a profound effect upon the metal trades in the surrounding areas. It attracted mechanics from eastern Massachusetts and trained workers in the use of iron and steel. From 1800 to 1870 the valley was full of gunsmiths, and some of them later became cutlers and toolmakers.[9] Other industries were growing up in western Massachusetts—cotton textiles in Ware and Chicopee, woolen goods in Northampton, Monson and the hill towns, and paper in Holyoke, Lee, Pittsfield and other cities. These required machinery and tools, and the blacksmith was often called upon by the manufacturer, as he had been by the farmer, to make and repair what was needed. Thus, in an expanding economy, the work of the metal fabricating industries grew in scope and variety.

The shops of Connecticut developed in a less prosperous environment. In sharp contrast with the farm implements, arms, and industrial tools of Massachusetts, the cutlery industry of Connecticut stemmed most often from the making of notions and hardware. To be sure blacksmith shops here, as throughout the country, made edge tools and agricultural implements. One of them, the Collins factory, established near Hartford in 1828, later became the largest axe factory in the world. Others produced hardware of all sorts. Mercantile interests had fostered several budding industries, textiles, slaughtering, shipbuilding, iron and potash making, all of which needed the metal workers help [10]. Areas in the State outside the Connecticut Valley region developed foundries and fabricating shops to use local bog ores; and arms manufacture was established in several different places at an early date.[11] How much these early industrial developments influenced the Valley area can only be guessed, but they doubtless contributed to the state's total supply of metal working skills and ideas.

The famous "Yankee notions," buttons, spoons, forks, thimbles, tin pans, small brass castings, pocket books, and pocket knives, had been produced in numerous towns throughout Connecticut well before 1800. By 1840 these assortments of small household items were travelling forth to distant states in the packs of peddlers, those "pioneers in the widening of the market" for manufactured goods[12] Britannia ware, soon added to the peddlers' offerings, formed the basis for the later growth of silver and cutlery undertakings.

Several writers advance the credible theory that Connecticut's small metal industries grew up as a reaction to scarcity of resources and a declining agriculture[13] Others stress the idea that its people were “by natural inclination and gifts more mechanics than farmers.”[14] Whether a result of poverty or personality, the hardware and notions shops could open with little capital and made easily transported products to be sold far and wide.

Cutlery making developed slowly in the diverse small manufactories that made notions, hardware, agricultural implements, and edge tools. The pocket, butcher, and miscellaneous knives that were made in these shops were not impressive in quality or in number. Specialized skill was wanting, equipment was crude, and the market was not large or well enough organized to gain the advantages of specialization in products or processes. The eventual growth of local capital, some of it in the metal fabricating and tool shops, some in other local industries, the stimulating pressure of work to be done, and the numerous water power sites-all these gave encouragement to the initiators of cutlery making in the Valley area. When they began to use factory methods in the late 1820's and early 1830's, a period of general expansion, they also sought and found ready markets and built a specialized cutlery industry.

By 1860 Franklin county, Massachusetts, in the Connecticut Valley was turning out 49 percent of the nation's growing cutlery output. In New Haven County, producing 18.5 percent of the national total, the Connecticut Valley town of Meriden had become the leader[15] Starting out as craftsmen, the Valley cutlery makers showed considerable ingenuity and energetic ability in adopting factory techniques and actively developing markets. The cutlery industry was one of the "Great Industries of the United States.” [16]

In the course of its subsequent history, the magnificence of this “great” industry was dimmed by contrast with the technological and organizational revolutions around it. Cutlery manufacture saw innovations, design changes, and growth in size, but the demands for most cutlery products remained too small and diverse to give fullest advantage to the possibilities of automaticity and corporate integration. Such techniques as the stamping of blades and the use of grinding machinery affected the Valley shops, but the cutlery industries most characterized by modern precision and mass production methods, the manufacture of shaving equipment and electrical cutting devices, were located in other areas. This study of a minor metal working industry from its beginning to the outbreak of World War II illustrates the hardihood of a group of locally oriented enterprises. By 1941 cutlery was an "old fashioned" industry. A significant proportion of its output was made in factory buildings fifty to one hundred years old by methods which had changed little for forty or fifty years. Despite some shifts to firms and areas that made greater use of stamping devices, the high quality and conservative business practices of the Valley manufacturers were of no little practical advantage to them. Local financing and "home town" management and the

nearby markets for table blades in the silver concerns of New England were strong elements in reinforcing the industry's extraordinary geographic and organizational stability.

CHAPTER I
CUTLERY PRODUCTION

A. THE INDUSTRY'S PRODUCT

The cutlery industry is actually a group of industries, each with somewhat shifting boundaries but nonetheless with a relatively clear traditional definition. Most cutlery firms specialize in one type of product. Shifts in organization and developments of new products have altered the definition of "cutlery" which originally signified anything which would cut and included some hand arms, agricultural implements and other tools. The composition of the industries has changed with altered ways of living and the development of new kinds of cutting implements and machinery. The first cutler was a sword maker. Razors, files, scissors, sickles were a part of the industry's product as early as the sixteenth or early seventeenth century in England.[1] The sword and dagger, the hunting knife, and the scythe made the industry important long before knives were used for such effete purposes as serving pie, eating peas, or sharpening pencils.

The history of cutlery shows a continuous growth of specialized industries. Differences in the methods of making knives early separated cutlery from edge tools and agricultural implements. This process was further developed with the invention of new kinds of cutting implements such as safety razors and electric cutting and clipping devices. Such articles are for many purposes still considered cutlery, although in methods of production and industrial organization they differ from the traditional craft. Vertical integration, which has combined blade-making with silverware, has blurred an old boundary line. Today the term "cutlery" usually includes pocket knives, safety razors and blades, straight razors, table cutlery, scissors and shears, manicure tools, hair-clippers, kitchen and butcher knives, artisan's knives, such as are used by carpenters, shoemakers, painters and a host of others.[2]

Other cutting tools, such as hatchets, axes, augers, bits, chisels, and scythes are designated by the United States Census as edge tools. Many Census totals are for cutlery and edge tools together. Still other cutting implements such as metal cutting dies, files, saws, and cutting machinery are listed elsewhere. Silver and plated cutlery are, for most purposes, classified as flatware, and enumerated with the products of the silver and plating industry.[3] Knife blades made for silverware sets have been included in the cutlery category when made by cutlery firms, but not when made by silverware firms. Aluminum and silver knives are also omitted from Census cutlery figures. Although cutlery products made by munitions or domestic appliance makers or other multi-product firms are usually included in statistics for cutlery, the complexity of the output of these firms has rendered uncertain the estimates of the size of the industry's product, and even more markedly the costs, number of employees, and capital involved in making cutlery.

The problem of interpreting statistics for this shifting congeries of industries is considerable. It is necessary in some instances to use "cutlery and edge tool" totals to gain some notion of general trends because little data on cutlery alone is available. These totals do not adequately indicate developments in any one of the cutlery industries.

For instance, many of the recent figures are dominated by the razor and razor blade industry which therefore must be mentioned on occasion even though it has had little to do with the Connecticut Valley. Because census figures give these totals by states, they can be used to give only general background but no accurate picture of the specific small industries in the Valley towns.

The proliferation of industries making things that cut represents more than a statistical puzzle, for it arises out of the industrial process which creates specialized operations and tools for all manner of uses, from removing beards to slicing towering stacks of fabric or tough sheets of metal. Yet machines and machine tools have not replaced carving, kitchen, table, and many kinds of trade knives. The Valley manufacturers still make them and make them well, combining old plants and tradition with newer production methods.

B. THE GROWTH OF THE INDUSTRY IN THE UNITED STATES

The American cutlery industry has developed by supplying an expanding domestic market and by wresting control of that market from foreign producers. General trends in American cutlery production provide background for the Connecticut Valley sector which has participated in varying degrees in changes in the nation's industry. Technical innovation, American styles, and the protective effects of wars and tariffs have aided the industry in its growth. Throughout its history American cutlery manufacturing developed those products in which it could successfully ape, circumvent, or improve upon the skills of Sheffield and Solingen. Great Britain had, initially, the strongest hold on the cutlery market of the United States, but, as early as 1840, Germany was in competition with England in the sale of scissors and shears. By 1845 most high and medium quality shears sold in America were of German origin, and not a few German pocket knives found American purchasers.[4] The nature of American demand,

technique, and labor supply dictated the most advantageous products-medium quality table, butcher, carving and artisans' knives.

In the period before the Civil War, tariff protection, rising gradually from 20 percent ad valorem in 1792 to 35 percent in 1862, may have aided the infant industry.' Simplified technique, however, was the Americans' chief source of progress. A machine-forged knife, put into production in 1844, gave the American makers their first advantage, and remained the speciality of the Connecticut Valley for many years. Its labor cost was low, and its larger, heavier style appealed to American taste, a taste encouraged by patriotic advertising and attractive price.[6]
By 1850, 401 establishments in the United States produced almost 3.8 million dollars worth of cutlery and edge tools. By 1860 only 250 shops turned out goods valued at 5.3 million dollars. The War encouraged technological improvement and enlarged domestic demand thus further reducing numbers of establishments to 184 and increasing their output to 5.6 million dollars,[7] a figure which understates the change in physical production because of the considerable price reductions brought about by cost-cutting and postwar deflation. In this period Connecticut put forth some cheap cast scissors and malleable iron shears, but German cast scissors were far better, not expensive, and supplied most of the American market. High quality forged scissors came both from Germany and England. American pocket knives were beginning to equal English and German ones which still, however, were popular.[8]

While technical changes had some importance after the initial period of growth of cutlery making in America, the expansion of the market in general and the use of new designs played more significant roles. Severe depression in the 1880's rendered cutlery and edge tool production lower in 1889 than it had been ten years earlier. Though the number of establishments increased, the output of each was somewhat smaller. It was during this era that the cutlers first espoused the cause of protection enthusiastically. The tariff act of 1890 rewarded their efforts with detailed schedule, establishing higher duties for the articles most commonly competing with domestic products, and lower imposts on those in which the United States had a clear advantage or conceded the advantage to foreign suppliers. A lowering of these rates in 1894 was protested by a trade again harassed by depression, and a sizeable increase followed in 1897.[9] By 1900 the American cutlery industry was well established and produced almost every variety of cutting implement imaginable. A very few British items reached American consumers, hand forged knives or shears of highest quality or fine pocket knives. With the aid of the tariff and general prosperity, American production of these items had grown but was still less than imports. Certain fine cutting tools and straight razors came from abroad. In standard, medium-priced goods, America supplied itself.[10]

The first World War increased domestic demand and, more important, reduced imports to almost nothing. With German competition completely, and British competition, very nearly eliminated, American production of pocket knives, scissors, shears, and snips, formerly Germany's specialties, more than quadrupled between 1914 and 1919.[11] The war was not so long or so intensive as to cause a material shortage, though it did slow up the introduction of the new stainless steel. Producers of traditional kinds of knives sold some of their output to the government and altered patterns accordingly but were not forced into any major conversion of processes. The 1919 boom figures, followed by 1921's brief disaster, were topped in 1925 with a value product for cutlery and edge tools of 80 million dollars, an amount not again approached until the second World War. Sharply increased tariffs in 1922, as well as general business conditions, explain the prosperity of the 20's. The decline in value of production in the 1930's was due not only to a drop in output but also to a shift of demand to cheaper knives and a cut in razor blade prices. [12]

Although war, inflation, and later depression affected the cutlery industry, even greater was the impact of increased demand for safety razors and blades. The product of this industry moved from $4 million in 1914 to over $24 million in 1919 and reached a peak of $42 million in 1929. Less than one-sixth of the total United States cutlery and edge tool product in 1914, the safety razor and blade group was 37 percent by 1919 and 57 percent by 1931. It remained well over one-third of the total, in spite of a drastic cut, throughout the thirties. The Connecticut Valley did not participate in the safety razor boom. The largest firm in the industry, the Gillette Company, had its factory in Boston, and the removal of a large part of its business to a British subsidiary was responsible for most of the decline in cutlery production figures in the early 1930's.[13] Thus it is difficult to determine precisely what was happening in the cutlery industries of the Valley area. Important changes occurred in the smaller cutlery industries. Though dwarfed by large fluctuations in the safety razor figures, they are large percentage-wise. Changes in price and quality were doubtless as important as changes in quantity. The table and kitchen knife trade prospered with $13 million worth in 1923, and was seriously threatened when the figure dropped by almost three-fourths a decade later. Pocket knives reached their peak earlier, in 1919, but faced a declining market in the 1920's and 1930's. Scissors, shears and clippers had gained some foothold on America by 1919, retained it with some success in the 1920's, and even, though not without considerable setback, in the 1930's. Tariff protection and improved quality kept this industry largely in American hands.[14]

C. THE CONNECTICUT VALLEY: LOCATION AS RELATED To LINES OF OUTPUT

The location of the cutlery industry, originally closely related to power, capital, local markets, and local skill and initiative, later rested more clearly on such customary elements as the long-standing specialization of certain areas and companies, established outlets in New York and Meriden, and a local labor supply acquainted with this kind of industry and possessing those few specialized skills which were still important to cutlery manufacture.

In 1840 Connecticut and Massachusetts produced 29 percent of the United States hardware and cutlery value products. By 1860 these two states were responsible for 81 percent of American production of *cutlery*. In 1900 they commanded 47 percent of the nation's *cutlery and edge tool* total[15] These figures are of course not comparable, and it is possible that they conceal as much as they reveal. Specific data for cutlery in 1900 would doubtless show more geographic concentration than the combined cutlery and edge tool figures. Edge tools and other tools (such as agricultural tools) have shown a clearer tendency to move toward sources of raw material and markets, and these moved westward sooner and more definitely than cutlery materials and markets. The fabricators of heavier iron and steel goods were attracted to the neighborhoods of rapidly growing centers in Pennsylvania and the Midwest, but the New England states, it was reported in 1900, "clung tenaciously to the manufactures which originally gave them their chief prominence, namely the textile industry and the manufacture of machinery required in these industries ... its (New England's) pre-eminence extends to many other branches of machinery, more particularly to the making of fine tools and delicate instruments."[16] Foreign sources of high grade steel and other raw materials long exerted a counter-attraction to the Midwest and kept cutleries in the eastern states. There was no very concentrated market to attract a movement of cutlery concerns, except the commercial center of New York. Though some cutlery products had geographically concentrated users, the market was more diffused than that for edge tools and many other kinds of tools. There are buyers for cutlery wherever there are eating consumers, Boy Scouts, barbers, butchers, carpenters, and other tradesmen.

Some dispersion was bound to occur. Although detailed figures for the various products and their location are not available, it is known that New York State's pocket knife industry developed substantially between 1850 and 1900. Silver-plating concerns outside of the Connecticut Valley attracted some cutlery production to their environs, though many of them continued to buy knives in the Valley, and they never approached the volume attained by Connecticut Valley table-knife makers. Scissor and shear production developed chiefly outside the Valley area, centering in New Jersey and, to a lesser degree in Ohio. Though Massachusetts' share of the cutlery and edge tool value increased from 11 percent to 43 percent between the turn of the century and 1929 and dropped to 21.7 percent in 1939, these drastic changes were due almost entirely to shifts in the safety razor and blade industry and had little repercussion in the Connecticut Valley.[17]

Cutlery firms in the Connecticut Valley have traditionally specialized in table and kitchen cutlery and in the large and heterogeneous group known as artisan's knives. Fluctuations in these industries, each of which has its own pattern, have affected each state's shares of the total out put. In 1929 the United States production of table, kitchen, and "not specified" knives was 14 million dollars worth. Of this 4 million dollars was attributable to Massachusetts, and well over 3 million dollars to Connecticut. Most of the output of these two states was in or near the Connecticut River Valley. Massachusetts also produced an unknown and not imposing number of pocket knives, and Connecticut valued its output of pocket knives at $746,000-a figure far outdistanced by New York State's almost 3 million dollars worth. Makers of scissors, shears, snips, and clippers, not primarily centered in the Connecticut Valley, increased their product between 1929 and 1939. Pocket knives, produced in large quantities outside of the Valley, suffered severely in the 1920's but by 1939 had almost achieved the 1929 level of output. The cutlery groups most characteristic of Massachusetts all declined sharply in the 1930's, and had not completely recovered by 1939. Table cutlery and the "all other cutlery" groups, in both of which Massachusetts produced a large share, were less by about three and two million dollars respectively in 1939 than they had been ten years earlier."' Connecticut, with a stake in some of the more prosperous sectors of the industry, fared somewhat better in the 30's. Late in the decade it shared in the very limited prosperity of the pocket knife, scissor, and safety razor industries. Some of the Connecticut firms seemed to have been better equipped than their Massachusetts competitors to convert their facilities to stamped blades, the cheapness of which made them popular in this era. Large capital and perhaps a greater penchant for mass methods were conceivably responsible. Connecticut figures were influenced by the successful production of scissors and stamped blades in the eastern part of the state.

In summary, the Connecticut Valley firms shared in the prosperity of the 20's but did not participate in the safety razor development. They were fortunate, in this period, in having rather small stakes in the depressed pocket knife industry. They did not, by and large, actually lose their special cutlery industries to other states in the

depression years. But other areas specialized in products which were growing, or were declining less rapidly than the traditional specialties of the Valley manufacturers. The particular experience of skilled workers and management in Connecticut Valley companies gave them no special advantages for making razor blades. Their plants were not large enough to number their employees in hundreds and thousands as did the successful safety razor concerns, and their ways and capital resources were not suited to the financial complexities, patent litigations, and large-scale sales campaign typical of this new kind of cutlery industry. Perhaps, too, though the Valley shops adopted the stamped blade method widely, they were somewhat more conservative in this direction than their competitors in other areas. Despite some movement of firms and gains in other areas, Connecticut Valley concerns retained a substantial hold on the making of those kinds of cutlery products which they originated in the years before 1900

CHAPTER II
FROM CRAFTSMAN TO ENTERPRISER

In the United States cutlery was commonly a factory product before its makers were specialized cutlers. The blacksmith or notion maker extended his shop, hired help, and in short order became a manufacturer. Certain specific factors, differing from case to case, caused cutlery and tool makers to locate their shops in the Connecticut Valley or induced existing Connecticut Valley enterprisers to develop cutlery making as a specialty. Available water power and local capital provided initial encouragement. The metal working skills of the Valley people were doubtless important. But the willingness of small businessmen to "try anything once" was even more significant, for it led them to advance beyond the scope of previous experience and to import workers with skills previously unknown in the area; and their initiative carried them beyond the boundaries of the local market for their goods. Much of their capital they acquired by ploughing back slowly accumulated gains into their own closely-held concerns.

In the course of development from a handicraft to a factory system, the small metal fabricating industries did not go through the stage of 4cputting out" so common in England and Germany. In America outside contracting was far less popular than inside contracting.[1] The putting out system was not, of course, widespread in America and was used in the Connecticut Valley only in the late eighteenth and early nineteenth centuries in such trades as cheap shoes for Southern slaves, the knitting of coarse woolen stockings, and weaving of tow cloth for the West IndieS.[2] The merchants who handled these goods found a plentiful unskilled labor supply in the farm households of Connecticut and markets which would absorb large amounts of these cheap, standardized articles. They were eager to import those manufactured articles in great demand in the Valley, and so they bought goods which could, either directly or indirectly, yield foreign exchange-largely agricultural products. When Connecticut Valley mercantile capital sought opportunities in manufacturing on a larger scale, it flowed into such factory trades as textiles and occasionally into foundries or edge tool establishments.[3] These industries early made use of some capital and were doubtless more profitable than the local smithies and notions shops which sprang up and disappeared continuously in the Valley towns.[4] Metal work required more skill, independence, and courage than the usual homework employments. Surely the merchants aided some of these establishments, for they sold them metals on credit and received payment in kind as well as in cash, but no formalized or regular putting out relationship developed. At the same time cutlers or potential cutlers were accumulating modest but useful capital funds in their own local markets, and many of them were aggressively meeting their own marketing problems through peddlers who were employed on a commission basis or bought goods on their own account to sell to scattered households throughout the Eastern States. The peddlers, always short of cash, resorted to consignment selling and barter.[5] By the time that cutlery producers were reaching out toward nation-wide markets, they were already factory establishments. They made use of specialized mercantile services, commission houses and trading companies, but they also employed their own agents to travel the country with their sample boxes; and the larger cutlery companies soon set up their own purchasing and selling offices in New York City. The crucial element in the growth of the American cutlery industry was technical development, and the producer provided the active initiative in procuring both productivity and saleability.

The pioneers of the cutlery industry in America entered the industry in the years between 1829 and 1840 using manual skills and elementary factory methods. In the 1840's and SO'S they found new opportunities in expanding markets and the use of mechanical forging. While these early manufacturers were establishing the foundations of the industry, other craftsmen, engaged in similar trades, were developing interests that would turn them toward cutlery.

Agricultural implement and tool makers, notions makers, and hardware producers were opening shops, gathering capital, and acquiring aptitudes that could be turned to good use in the increasingly prosperous knife trade. During the Civil War period, their financial resources improved, and the spread of technical knowledge, together with shifting demands, led them to explore new possibilities. By 1875, the major cutlery companies which were to lead the industry in the Valley for many years were under way. These selfsame concerns or their lineal descendents are still producers of kitchen, table, and trade knives. This chapter will describe the history of the Connecticut Valley cutlers who made the transition from craftsmen to enterprisers.

A. THE AMES COMPANY

The first of these were the Ames brothers. They cannot be called typical as blacksmiths, as manufacturers, or as cutlers, but they were among the first to turn blacksmith's skill and Yankee shrewdness to the factory production of knives and edge tools.

Nathan Peabody Ames and his brother James had been taught in their father's blacksmith shop in Chelmsford, Massachusetts the fundamental arts of working metals.[6] In their childhood they assisted in the making of edge tools and knives on order for their neighbors.[7] In their young manhood they set up their own shop and performed a wide variety of tasks in making and repairing anything from knives and swords to mill machinery. Thus it was with the casual intrepidity of the village jack-of-all trades that the American artisan issued his challenge to the established British industry. Like other artisans of the time, the Ames brothers developed rapidly into entrepreneurs, gaining technical and business sense as they went along. Unlike many of the early cutlery manufacturers, they began their business with considerable financial help from outside interests who provided capital and a ready market for the varied talents of the Ames brothers but whose primary concern was not with the firm or the cutlery trade. The two young mechanics first went to Chicopee Falls from Chelmsford in 1829 at the behest of Edmund Dwight, one of a group of Boston textile mill promoters. Dwight had need of a capable mechanic and repair man for the Chicopee Manufacturing Company, one of the Boston group's cotton mills.

As the story has it, Dwight met Nathan Ames on a stagecoach journey in 1829 and, impressed with the intelligent and attractive youth, offered him the use of the old repair shops of the Chicopee Manufacturing Company. The water power, shaftings, pulleys, and other machines were already installed. Rent, supposedly to be fixed by Ames' judgment, was never accepted. Dwight also agreed to honor the drafts of the new establishment for what money might be needed. Nathan and his brother, James responded with alacrity, and started work the same year.[8]

In its first year the small shop made few goods for general sale. Its nine [9] employees performed a wide variety of tasks on the order of its customers. For the Dwight textile concern Ames made parts for machines, repairs and adjustments. For a neighboring paper concern he made bed-plates and rag knives which he ground periodically for twenty five cents each time. For other customers he made chisels, axes, butcher knives, carpenter's and shoemaker's hammers and knives, and farm implements. Much of his efforts went into fixing old instruments, polishing tools, and "new laying" axes.[10] The assorted product was sold in small quantities to individual customers, often one at a time. The payments were made sometimes in cash, not infrequently in kind. Among Ames' receipts in 1829 and 1830 were apples, wood, iron and steel, handles, a pair of shoes, a broom, silver, and boxes. Frequently a customer would trade in an old axe for a new one.[11]

The shop was somewhat like a collection of blacksmiths under one roof rather than an organized manufactory. There was some individual specialization, for one of the men was known as the expert in heat treating[12] But diversity of talent must have been required of each employee, for he had to be ready to work on whatever orders came to hand. Many of these workers developed their skills under the watchful supervision of Ames himself. Others had come with him from eastern Massachusetts, bringing their skills with them. After 1836 a few were imported from England for the sake of their knowledge of sword making, silver chasing, and other special crafts.

By 1830 Ames had begun to manufacture for general sale. At first his goods went to the local merchant, James Dwight, who sold them on commission[13] But soon Nathan Ames took samples of his product to Hartford, New York, and Washington and exhibited them personally. Wherever he went, he met people, and everyone he met was treated to a full view of his wares. Steamship lines he traveled, hotels where he stayed, and casual acquaintances on the way-all were prospective customers. By April of 1830 a firm in Hartford was buying a series of boxes containing artisan's knives and assorted tools.[14] These were to be sold at a 26 percent commission. New York firms also received the goods, sometimes selling them for a percentage commission on a fixed price, but in at least one case selling them for what they would bring.[15] Although much of Ames' business was of this type, he was also increasing his work in cutting tools and machinery for local paper mills. The work for the Chicopee Manufacturing Company continued but was not by any means his chief source of income. In late 1830 or early 1831 the company began to make swords for the government.[16] Ames was assisted in his selling by the contacts of his patron, Edmund Dwight, but also by his own energy and sociable personality and by the patriotic enthusiasm with which Americans greeted the beginnings of a domestic cutlery industry.[17]

The river, which had provided transport for raw materials, now helped widen the market for finished goods, although it could not be used for shipping in the coldest parts of winter.[18]

In 1832, the annual production of the company was worth $10,000 and consisted of 3,000 paper mill knives, 3,000 carpenter's chisels, 1,200 axes and hatchets, and 5,600 knives and tools of other sorts.[19] The Ames name was soon well enough established to attract imitation. In 1833, a number of cheap carpenter's compasses, imported from Germany, were stamped "N.P. Ames" and sold in New York. The English were reported in that same year to have

supplied some New York importing companies with a cheap "counterfeit" of the Ames sword, but the local newspaper held the English blade inferior. Such practices, commented Ames, "show that there is as much Yankee in New York as in Massachusetts.[20] In 1834 Dwight and his associate, J. K. Mills, incorporated the business as the Ames Manufacturing Company, capitalized at $30,000. Although James and Nathan Ames were fairly large stock-holders and resident managers, the controlling interest was the "Boston group," absentee rulers of the town of Chicopee.[21]

By 1834 the working force had increased to thirty-five.[22] The shop was still producing machine knives and parts for local industries and small individual sales were still being made.[23] but Nathan Ames' letters show that his own interest was concentrated upon the wider world with its nobler and more decorative demands. An increasing proportion of his product was reaching Hartford, New York, and Washington. Precisely how large the government orders were is uncertain, but Ames' letters in 1834 and 1835 mention contracts for 1,200 to 2,500 swords.[24] By 1840 government contracts provided the largest part of Ames Company profits, and guns and brass cannon were added to its products. Quantity production of machinery and machine parts continued, but agriculture and trade tools appear to have dropped almost out of the picture.[25] The cutlery produced was table ware and fine carvers, some of them made with ornamented ivory handles. The making of tableware and ceremonial swords led Ames to an interest in silver, and he later developed a full line of plated were. Travelling in Europe in 1840 for the purpose of observing arms production, Ames noticed also methods of cutlery making and silver plating.[26]

The capital of the Ames Manufacturing Company was increased to $75,000 in 1841 when the company bought a new plant and set up a special sword shop; and again in 1845 to $200,000 when the Springfield canal property was acquired.[27] Increasing work in small arms and mill machinery enlarged the firm. The list of its products became more varied and, at one time or another, included cannon, guns, a famous gun-stocking machine, cast bronze statuary, and, in time, even tricycles. Silverplated ware was introduced, but became important only after 1851 with the use of a new "galvanic electroplating" process in a special department. The making of knives, closely tied to silverware production, was nevertheless a small part of an output which included everything from silver spoons to tea services and silver plated glassware. [28]

Thus the first manufacturer of cutlery proper (as contrasted with edge tools) in the Connecticut Valley did not long make a specialty of cutlery. The factor which originally attracted him to the locality was not its unique advantages for the making of knives, nor did the capital with which he started come from the making of knives as such. Some of it came from the closely allied trade in swords, but much stemmed from the textile business. No record reveals whether cutlery yielded Ames profit, loss, or nothing; and it seems entirely probable that he himself did not know, so varied was his total product. But his cutlery created a stir in New York and Massachusetts where the cutlery market was centered.[29] Ames opened the American market to domestically produced cutlery by the exercise of vigorous salesmanship and by showing what quality could be attained by American craftsmen. Some of the workers trained in his plant and some budding entrepreneurs in his area who had doubtless heard of his work were ready now to go ahead. A precedent was set, and some experience had been gained.

B. THE RUSSELL COMPANY

While the Ames Company was growing, John Russell, who was to become one of the largest cutlery manufacturers in the country, was beginning to make cutlery and to experiment with new methods that would enable him to compete with British goods. Originally a jeweler, silversmith and speculator in cotton, he returned from the South in 1832[30] to his home town of Deerfield, Massachusetts with a small amount of capital and a large amount of restless energy. A later writer says, "It seems strange that he should have selected a business entirely untried in this country, in which he had no experience, that was under the control of the Yorkshire cutlers, where it had flourished from the time before the Norman conquest." Strange it may have seemed, but his venture found financial backing, a growing market, and success. His inspiration came from a book published by A. S. Beckwith of Providence in 1832, called "The Practical Tourist." It was a record of the travels of Zachariah Allen, an eminent cloth manufacturer of Rhode Island.[31] So “poetical” was Allen's description of the cutlery works in Sheffield that it took young Russell very little time to decide upon his trade and start work. In that same year (1832) he formed a partnership with his brother, using the small amount of capital accumulated in his cotton speculations and employing a few workmen from the locality. His first products were cast steel socket chisels which were so fine that in 1834 they won a prize in a fair held by the American Institute.[32] In the same year the local newspaper announced that "the enterprising proprietors of the chisel factory are about to begin the manufacture of common butcher and large carving knives.”[33] Costs were high, and labor, scarce, inexperienced and expensive. Capital did not readily present itself for such a daring venture. The first shop was destroyed by fire, and a spring freshet left the second

building and its machinery "scattered all over the Deerfield meadows."[34] The firm might have died an early death but for the substantial assistance of Henry Clapp, who had come to Greenfield in 1835 with wealth accumulated in his jewelry and goldsmithing business in New York.[35] In a very short time Clapp was a leader in local enterprises, president of the Greenfield bank, of the Franklin Agricultural Society, and an important member of the Connecticut Railroad Company, the Greenfield Gas and Light Company, and the Greenfield Library Association.[36] Ten thousand dollars of his capital was put to use in a partnership called the John Russell Mfg. Company formed by John Russell and his brother Francis in 1836. This investment gave Clapp a right to one third of the company's profits for the seven years covered by the partnership agreement beginning May 1, 1837. The Russell brothers took responsibility for the active management of the firm and promised not to enter any other business engagements without Clapp's consent. Clapp's official responsibility ended with the capital advance, but his advice and the prestige of his backing were apparently continued sources of strength to the Russell firm.[37] The agreement provided that further capital contributions would be lent to the company at interest and that none of the "active means" of the company were to be withdrawn during the partnership except when needed for ordinary expenses.[38] The panic of 1837 placed the new firm in a dangerous position, but the credit backing of Henry Clapp carried it through.

With the capital problem temporarily solved, Russell met the next difficulty, scarcity of labor, by importing several skilled workers from England and by evolving new labor saving methods.[39] For a time he was hampered by sharp price competition from English firms who recognized this budding American industry as a threat. From the beginning Russell had used a small steam engine to turn his grinding wheels, but now he began to use power in the forging process, also a revolutionary change.[40] By 1845 the Russell Company valued its annual product at $60,000, employed eighty workers, and reported a capital of $20,000.[41]

A period of rapid growth is shown by the Census figures below:

JOHN RUSSELL MANUFACTURING COMPANY
CAPITAL, EMPLOYMENT AND ANNUAL VALUE OF PRODUCT, 1945-1870 [42]

Year	Capital	Employees	Annual Value of Product
1845	S 20,000	80	$ 60,000
1850	40,000	200	125,000
1855	175,000	300	250,000
1860	175,000	300	280,000
1870	175,000	500	721,000

During this whole period the business was tremendously profitable. Not only did its capital grow, but between 1857 and 1867 the average yearly dividend amounted to almost thirty-five percent of the capital. The largest dividends, sixty-four and a half and seventy-five percent, were paid in 1863 and 1864, but even in pre-Civil War years, dividends of twenty-three and twenty-five percent were common.[43] To the butcher and table knives and chisels the company added shoemaker's knives, forks, carvers, cook's knives, pocket knives, and, in about 1843, knife blanks for silver platers.[44]

A romantic part of the Russell trade consisted of hunting and sheath knives used by the western pioneers, fur companies, and Indians. The plainsmen bought Russell's hacking knives[45] the hunters and trappers preferred the "Dadlery" knife, a hunting knife named after the frontiersman who designed it. The Indians of the Northwest Territory exchanged their furs for scalping and hunting knives, not a few of which were marked "J. Russell Co., Green River Works"; the blades of these knives were often set into the Indian war club. The Russell hunting knife was popular in the Missouri country between 1835 and 1860 among white men and Indians alike.[46] The name became a symbol of thoroughness, though not because of its own excellent quality. When a job was done "up to Green River," the speaker referred to the act of plunging the knife so deeply into some hapless man or beast that only the words "Green River" on the bolster could be seen.[47] The knives were packed in watertight casks, sent by sail to New Orleans and up the Mississippi to St. Louis, where they were forwarded to the upper Missouri in small boats.[48] Other shipments traveled by steamboat on the Great Lakes to Chicago, and later by the Santa Fe trail to the Southwest.[49] Much of the firm's product was sold through large wholesale or commission houses and trading companies. The company sent its salesmen through Michigan, Illinois, Iowa, Wisconsin, and Minnesota, as well as into the South to establish the company's name and make contacts with firms which, it was hoped, would become regular customers.[50] As early as 1852 Russell's trade flourished throughout the Mid-west, even in California and

West coast areas. The Green River name spread not only into the wilds of America, but also fared forth into all parts of the world, notably the East Indies and the Mediterranean on American sailors' sheath knives.[51]

In 1855 the firm set up its own selling company in New York under the name of the J. Russell Company. The partners were Clapp, John Russell, and Nathaniel Russell, and the organization was to sell goods for the J. Russell Manufacturing Company and purchase "such goods as they needed for the prosecution of their business.[52] In 1869 the John Russell Manufacturing Company agreed formally to consign all its product to the New York firm on a commission which was to amount to five percent on the "net proceeds of sales." The New York agency agreed to purchase materials for the manufacturing company without charge for services.[53]

In 1868 a group of promoters, led by Alvah Crocker of Fitchburg, developed a plan to build an industrial city based upon the water power at Turners Falls, near Greenfield. The Russell Company was persuaded to move to a site in this projected city and to build a much larger plant with now capital contributed by the over-sanguine promoters. The new building was reported large enough for 1,200 workmen, although 500 were the number employed.[54] The company was now incorporated for the first time by John Russell, Matthew Chapman, and Charles W. Russell. Its name remained the John Russell Manufacturing Company. Its capital, by charter limited to $600,000, but actually $525,000, was liberally subscribed by the Turners Falls promoters who, in turn, were well represented on the company's board of directors.[55]

{Note: 1-7-2007 – The “Dadlery” knife here is mis-named. It’s proper name is the “***Dadley***.”
Source: Martin E.J. Yarmac. – Gill, Massachusetts. An authority on Russell Cutlery.}

The new venture and high hopes ushered in an era of serious difficulty. In 1869 the dividend was 5 percent, and thereafter no dividends were forthcoming until 1876.[56] When the new company was formed it paid for the assets of the old company in its own stock. Just how much was paid is not certain, but, as subsequent events proved, the worth of the old company had been over-estimated.[57] Two confusing statements of the company's standing in 1868 show quite different evaluations of its assets.[58] The new corporation had some difficulty getting enough working capital and used a number of devices to raise the needed sum. In 1871 a number of stockholders signed the notes of the firm, thus lending their personal credit as backing for the company's borrowing.[59] They named Matthew Chapman and S. B. Root, the President and Treasurer of the Company, as trustees obligated to repay these notes before any dividends could be declared. At some time during this period the company also issued script which was bought by the stockholders. The stock itself amounted to $525,000 and by June, 1873, the outstanding script was worth $175,000.[60] By 1873 the country-wide panic and the basically shaky foundation of the company precipitated a crisis in its affairs. A committee of stockholders was appointed to investigate and brought forth a report which resulted in a complete reorganization.

The committee admitted itself at a loss to understand the tremendous drop in the value of the company's assets. It is hard to tell whether the succession of boom and depression was chiefly to blame, whether there had perhaps been some conscious stock-watering in 1869, or whether it was merely the rather grandiose optimism which had pervaded the Turners Falls promotion. The committee seems to have given some weight to each of these possibilities. Among the causes for the losses that it noted were: (1) payment of too high a price for the old company, (2) high costs of moving to Turners Falls and building the new plant which was valued in 1873 at $175,000 less than its original cost of construction, (3) decrease in the value of the real estate below its purchase price, (4) large interest-bearing debts, (5) too many salaried employees, (6) loss on inventory which the committee felt had continuously been entered at too high a value in the company's financial statements. The result was that the company had only about $213,000 worth of realizable assets, after payment of necessary debts, against its $700,000 worth of stock and script.[61]

Following the recommendation of the committee, a new company, the John Russell Cutlery Company, was formed to take over the assets of the distressed firm. The capital of the new company was $375,000 and its shares were offered to the old stockholders on a pro rata basis at par, $100 a share. The new corporation also planned to issue a note for $125,000 to the old company, thus increasing the total capital of the successor to $500,000.[62] The old company was considered to be worth, as a going concern, about $88,000 more than was being paid for it. This was held forth as an inducement to the stockholders to buy the new stock.[63] Though some refused to "throw good money after bad," the majority chose to buy the new stock rather than follow the only alternative of losing virtually all they had invested in the firm.[64] The resignation of the treasurer was the only important change in the Board of Directors. His place was taken by R. N. Oakman, until then cashier in the bank in Turners Falls.[65] The John Russell Manufacturing Company continued for many years to be one of the most influential in the cutlery trade, but the rapid expansion of the 1850's and 60's was over. Thereafter the dividend rate ranged from zero to 6 percent.[66]

C. LAMSON AND GOODNOW

Another important cutlery firm, Lamson and Goodnow, began in the workshop of Silas Lamson, country craftsman and inventor of the bent scythe snath (or handle). In 1863 Lamson's two sons, Ebenezer and Nathaniel, started making snaths, using their father's design, in their own shop in Shelburne Falls, near Greenfield, Massachusetts. Their snaths were in great demand because of their unique convenience and cheapness, and for several years the partnership turned out twenty thousand a year.[67] In 1842 the brothers added cutlery to their output. The business grew rapidly, and in 1844 Abel F. and Ebenezer Goodnow joined the partnership which now took the name of Lamson and Goodnow Manufacturing Company.[68] By 1850 the firm had a capital of $75,000 and one hundred and twenty-five employees. The following year a larger factory was built at a dam which provided power. Lamson and Goodnow was incorporated as a stock company in 1855, but continued to be owned and operated chiefly by the small group which had built it up. By 1860 it was the largest cutlery producer in the United States, had a capital of $500,000, and employed three hundred and forty workers.[69] Its success was due largely to the inventions and designs of Joseph Gardner, a Sheffield cutler who had worked for the Russell Company for some years before going to work for Lamson and Goodnow. In the years 1848-1850 the partners moved the snath part of the business to Windsor, Vermont,[70] where Ebenezer Lamson later purchased an arms plant and went into the manufacture of guns and gunstocking machinery.[71] Although he left the management of the Shelburne Falls business to his brother after 1861, communication between the two plants was considerable. Mechanical devices and certain labor practices were carried from one firm to the other, and workers moved back and forth.

One of them, W. T. Clement, a gunsmith, became a cutler and later set up his own shop in Northampton, Massachusetts.[72] The roots of the Lamson and Goodnow Company lay more completely in the valley economy than was true of either Ames or the Russell Company. Not only was local water power an important factor for Lamson and Goodnow, but they also drew from the valley skill, technical knowledge, and capital. These were closely related to the area's agricultural implement and small arms industries.

D. THE NORTHAMPTON COMPANIES

Cutlery did not become an important product in Hampshire County, Massachusetts until after the two Franklin County firms (Lamson and Goodnow, and Russell) were well established. Other smaller firms followed the pattern of the Ames Company, producing some knives while concentrating on such other products as chisels, axes, scythes, and hardware. Through the 1850's the small metal trades increased in importance, and then the Civil War provided opportunity for new expansion.[73] It was after the war that Bay State, an outlying portion of Northampton, began to grow as a cutlery center and attract capital in small amounts from outside.

In 1854 a former hemp factory well supplied with waterpower from a dam on the Mill River and not far from the railroad, attracted a group of men from Waterbury, Connecticut as a suitable site for an edge tool and agricultural implement shop. Incorporated as the Bay State Tool Company, the enterprise found local labor plentiful and experienced. A capital of about $100,000 and a work force of 150 gave promise of a "large scale" enterprise.[74] After bankruptcy in the panic of 1857, the value of the plant was decreased from $90,000 to $35,000.[75] At this reasonable price four partners, Eleazer Maynard, a former merchant, C. H. Hawks, Jerome B. Jackson, and William T. Clement, bought the factory and continued the manufacture of agricultural implements. Clement, in his earlier youth, had been a foreman at the Lamson and Goodnow plant and an independent gunsmith and mechanic.[76] The most important product of the new firm was the "planter's hoc," which was sold to the cotton areas of the South. The partners made also field hoes for use in northern and western states, and forks and rakes.[77] A water-driven trip-hammer was used to flatten rough steel bars, then-heavy stamps shaped the blades, and skilled workers ground and polished them at power driven emery-wheels.[78] In 1860 the firm was producing $85,000 worth of goods a year, and had its own selling office in New York City.[79]

The Civil War cut off the market for southern hoes, leaving the firm in 1861 with less than half of its former output and employment. The partners attempted to fill the gap by increasing their production of New England hoes and adding table cutlery to their products.[80] They postponed their measures when they obtained a contract for bayonets and gun barrels. By 1865 the firm had achieved incorporation and a capital of $200,000.[81] As the wartime demand for small arms subsided Clement, Hawks and Maynard turned again to the idea of making table cutlery. In 1866 the company re-organized as the Clement Hawks Manufacturing Company with a capital of $100,000. It now employed about 225 men producing 400 knives and 500 dozen hoes each day.[82] The owners acquired new property, new water rights, built a larger plant, and laid a railroad track to the factory gate.[83] They planned to employ 300

workers at cutlery-making alone, and about 100 in the hoe plant. In 1867 their table knives were exhibited at a fair in New York, and were proclaimed to be "well-made and elegantly finished and equal to the very best of English manufacture." They ranged from "plain, cheap sets up to those costing $200 or $300," some with silver and others with pearl and ivory handles.[84] This promising firm succumbed to the depression of 1873.

Another Northampton factory, the Bay State Hardware Company, was founded in 1863 with land, buildings, and machinery worth $57,500 and five years later began making cutlery.[85] By 1871, after it had suffered bankruptcy and two reorganizations, it came under the capable control of H. R. Hinkley, an outstanding local businessman, whose capital and competence brought it through the depression of 1873 and almost trebled its output in fifteen years.[86] This enterprise, the Northampton Cutlery Company, sold its butcher, hunting, and carving knives to wholesale jobbers in various parts of the United States and after 1882 through its own New York office. It established a silver plating shop in 1890, but sold a large share of its knife blades unplated to Connecticut silver companies.[87] Substantial capital and varied products helped it weather the hazardous years.

Meanwhile, during these years when the Northampton Cutlery Company prospered, W. T. Clement struggled with little capital to salvage the cutlery business of the defunct Clement Hawks Manufacturing Company, while his former partner continued in the agricultural implement and tool business. In 1882 Clement joined with W. W. Lee, former manager of the Haydenville Brass Company, each providing $1,600 capital to incorporate the Clement Cutlery Company.[88] Lee was reported to have been encouraged in this step by an offer from the Meriden Britannia Company to buy large quantities of knife blanks every year from the new company.[89] But Lee was soon in sharp competition with other blade makers for the business of the Meriden Britannia Company and extended his list of customers to such concerns as Rogers Brothers, Reed and Barton, Holmes and Edwards, A.F. Towle, and numerous others, both in the East and the Mid-west.

Though specializing in work for silver platers, the Clement Company also made numerous other things for sale to hardware and cutlery wholesalers and later to department stores.[90]

The problem of inadequate capital was aggravated when Clement retired, selling his half of the stock to George Alden of Illinois. Lee, desiring to retain control, repurchased the stock but had to take a heavy mortgage with Alden to do so. In July, 1884, Lee's uncle R. W. Tailer, took over the Alden mortgage and thereafter the firm was family controlled. Considerable funds were put into the business by Tailer and Lee's mother. Small capital and dependence on the fluctuating knife blade business kept the Clement Company more vulnerable to crisis than its competitor, the Northampton Cutlery Company.[91]

In 1889, the "last of the Bay State Cutleries" was started by E. E. Wood, formerly superintendent of the Northampton Cutlery Company. It was reputedly a modern and efficient plant, equipped with four water wheels, a steam engine, and up-to-date machinery. Until it was bought in 1901 by the Rogers Silver Company, its chief products were kitchen and carving knives.[92]

All these Northampton concerns were financed by local capital. Their leaders were local me who had received their early training in cutlery and toolmaking or in other metal fabricating, and they grew by means of their reinvested earnings.

E. CONNECTICUT FIRMS

The Cutlery Industry in Connecticut, as in Massachusetts, grew from small shops which originally produced many different things. Butnin Connecticut not agricultural tools, but notions, britannia ware, buttons, and small hardware were the chief predecessors of cutlery. Craftsmen with very little capital set up their small shops not only in the River Valley, but also wherever a river or an upland stream provided a little power. Tinware, the first of these small metal products to be sold outside the state, did not even require power.[93] In the 1820's these scattered shops were numerous in the small towns of Connecticut. The strong backs and sharp wits of the peddlers provided the transportation and marketing facilities. Many of these enterprises lasted only a year or two, others remained small and specialized, but in a number of cases the craftsmen and peddlers learned the ways of business. They varied their own lines, entered into combinations with others, acquired patents, organized selling procedures, and thus brought forth modern corporations. Success in the tinware and pewter business in Wallingford and Meriden fostered the prosperous britannia ware industry which later turned to silver plating, the focal point of much of the area's cutlery market.[94]

As early as 1822 Julius Pratt began making ivory buttons in Meriden. Ten years later David Ropes established one of the first cutlery factories in the country at Saccarapa, Maine and, in buying ivory handles from the Meriden button shop, established a relationship which was later to bring him to Meriden.[95] In the same years George M.

Landers of Meriden, a man of considerable energy and ambition, was beginning his career as an apprentice and journeyman carpenter.[96]

The opening of the railroads between 1840 and 1850 gave the Valley firms wider markets and enabled them to grow and prosper in the location of their birth.[97] By 1845 New Haven and Hartford Counties, Connecticut, boasted six cutlery establishments with a total capital of $64,000 and an annual output of $86,000 worth of hunting, trade, and pocket knives.[98] Julius Pratt's ability to secure scarce ivory and his rare skill in cutting handles not only brought him such customers as John Russell, but also induced David Ropes to move his cutlery business from Maine to Meriden and to join him in partnership.[99] In 1853, when the Pratt Ropes company had been making knives and selling handles to other cutleries for seven years, Russell spoke of it as the "Pratt Monopoly" and indicated that it had virtual control over the distribution of knife handle ivory coming to this country from England. The price of ivory handles rose accordingly.[100] In 1855 the partners incorporated as the Meriden Cutlery Company with a capital of $75,000 and began to make other kinds of cutlery, such as blades for silver plating, kitchen and carving knives, and an assortment of trade knives. A patent on a cheap but very useful hard rubber handle contributed even more than the ivory handle to their prosperity. The Meriden Cutlery Company increased its annual output from $167,000 to $450,000 and its employees from 100 to 295 between 1860 and 1870.[101]

New Britain, Connecticut was a "locality aside from any thoroughfare of public travel, whose beginning had no advantage of capital or water power, or any material advantage for the prosecution of business." In this unpromising environment grew the company which was to be the largest producer of cutlery in the world by 1903.[102] Landers Frary and Clark started with a partnership formed in 1842 in Meriden by George M. Landers and Josiah Dewey. Their purpose was to make such small metal articles as furniture casters and cupboard catches.[103] After five years Landers opened his own factory and added to his product several types of hooks. He expanded his output continuously, acquired patents, formed new business organizations, absorbed a number of smaller companies, and meanwhile had time to become New Britain's first representative to the State Legislature.[104] In 1853 he joined with Levi O. Smith to incorporate the Landers and Smith manufacturing Company with a capital of $40,000. Landers, himself, provided half the capital sum, and Smith, one-quarter. The rest was subscribed by four others, and for ten years these six men owned the company. In 1862 Landers, increasing his company's capital to $50,000, bought the New Britain firm of Frary, Carey, and Company, makers of scales and balances.

A year later the capital was $80,000, and in 1865 the firm was reorganized and given the name of Landers Frary and Clark with a capital of $250,000.[105] Each change in organization brought new products into the company's lists-window trimmings, metal parts for baby carriages and for railway carriage windows, shutter bars, bolts, scales, and the like, and finally "cutlery in all its varieties."[106] By 1866 Landers began to make table cutlery in a large new building. As the company grew it dropped some lines, but added more until it achieved a fantastic heterogeneity. A profitable heterogeneity it was, too, yielding a 30 per cent dividend rate in several years. While many of the cutlery firms profited from specialization within the cutlery line itself, Landers Frary and Clark expanded so rapidly that it could make many different products and apply the advantages of large scale production to each. The swift growth of the company was fed by the small manufacturing shops of the area which had fostered many kinds of skills.

The success of the first large firm in the britannia industry was based on the economy of large scale in selling rather than in production. In 1845 the average britannia maker had a capital of only $2900, and Luther Boardman, the largest, had $5,000.[107] Their agents worked on a small scale collecting the contents of their packs and wagons from many different shops. Among them were Dennis and Horace Wilcox who formed a company in 1848 or 1849 and in 1852 organized the Meriden Britannia Company as a centralized selling agency. The members of this organization, most of them britannia makers, were Isaac C. Lewis, James C. Frary, Samuel J. Curtis, W. W. Lyman, Samuel Simpson, John Munson, and the Wilcox brothers. The manufacturing companies retained their own factories and identities but sold through the Meriden Britannia Company. It was a brilliant idea, for the year after its formation the company sold over $250,000 worth of goods.[108] The selling agency gradually took over the factories of its suppliers, and by 1863, after buying the electroplating patents and equipment of Asa Rogers in Tariffville, it combined all of its manufacturing operations in one plant in Meriden.[109] The Meriden Britannia Company, later to become the International Silver Company, grew to be the largest producer of silver and silver plated ware in the country and gave Meriden the name of the "Silver City."

F. THE ENTERPRISER

The men who laid the foundations of the cutlery industry in the Connecticut Valley were craftsmen-interested in mechanical devices and gadgets, in good workmanship, and, incidentally, in profits. Though occasionally attracted by promotional schemes, their common sense rules for success centered about the production of high quality wares

and, as proper Yankees, in selling them for as high a price as they would bring. They were enthusiasts in their trade and vigorous citizens in their communities.

Connecticut Valley cutlery manufacturers today are strikingly similar to their predecessors, while the tenor of the business world has changed. Though they do not possess the manual skills of the earlier craftsmen, they are closely acquainted with the work in their shops and not infrequently design tools and machines for them. Though often forced by competition to make cheap blades, they have a great respect for quality. With some interest in style and design, nonetheless they leave designing of table knives largely to the silverware companies, and their own changes in pattern are likely to be plainly functional. Unlike the typical business executives of today, cutlery manufacturers are owner-managers, closely identified with and leaders in their communities, where they are most likely to remain all their lives. The executives of the larger firms have, of course, more specialized functions, and show some of the interests in finance, advertising, and technical research and testing more characteristic of management in the large business enterprises. The influence of these firms will grow, but slowly. In this day of absentee ownership, separation of ownership from control, bureaucratic expertise, and impersonal corporate organization, the cutlery manufacturer seems in some ways reminiscent of an earlier era, no matter how modern his attitudes and interests may be. He is, in fact, probably like many small businessmen who have remained apart from the giantism so commonly thought of as the characteristic of modern industry.

CHAPTER III
HOW CUTLERY IS MADE

In the 1830's, the childhood of the American cutlery industry, European cutlers were using century old methods. In Sheffield men believed that the art of the cutler had been developed to its highest possible point. The Solingen area in Germany and the smaller cutlery centers in France were almost equally esteemed. Excellent steel was fashioned into these knives, by simple, traditional equipment. Nathan Ames, commenting with admiration on the skill he had seen demonstrated in Sheffield, Solingen, and Chatellerault, found it difficult to see how such good work could be produced "with such slight means." The total equipment of a shop in Chatellerault, he said, could be loaded into a hand cart, and was used effectively in a space "no bigger than a clothes press."[1] With wonder, he noted that, "the whole of the tools of the principal sword cutler in Birmingham are not worth ten dollars."[2] Possibly he underestimated! The sword shops of Solingen were much the same, and each one performed a specialized operation so that the goods often traveled miles before completion. Workers frequently had their own establishments where they wielded ancient and sometimes poor equipment made effective by even more venerable skills.[3]Americans had much to learn from Europe, and they learned it mostly from Sheffield. But before mid-century they showed an intense respect for machinery, less typical of Sheffield. Much has been said of the native ingenuity of the American innovator, inventiveness forced upon him by a scarcity of skilled workers. In Europe hand labor, always easily available, played an important part in cutlery making. In America its high value presented a problem and also a stimulus to labor-saving technology.

A. TRADITIONAL METHODS OF MANUFACTURE

The old methods, altered in detail, survive in the making of the best steel knives today. Methods of manufacture and materials available determined the design of the knife. Hunting and table knives were made with ivory or bone handles, often elaborately carved and inlaid with precious metals. The blade was attached by means of a long thin piece of metal, usually of iron, called a tang, which slipped into a hole running into the center of the handle. At the juncture of the blade and handle was placed a metal collar called a bolster. The tang was usually glued into the handle, and the bolster helped to secure it. Many modern knives which need no bolster still have it in a vestigial form, possibly because it may make a knife easier to grasp. The traditional design of the pocket knife remains substantially unchanged today. Blades are inserted into the handle and attached with tiny rivets and springs. The handle is usually covered with thin scales of ornamental material as it was in older days. Fine Sheffield knives were first forged and cut to shape; second, hardened in a furnace; third, tempered; fourth, ground to exact shape, sharpened, and polished; and last, hafted, that is, attached to the handle. Each of these operations required great skill which was passed down from father to son.

In the forging process the heated metal is hammered so that the molecules are forced together into a compact mass. Thus the steel is rendered hard and tough and at the same time beaten into the desired shape. Forging was, in former days, done at a coke-burning hearth, with anvil, tongs, and a hammer. Sometimes, on light work, one man would tend the fire, heat the steel rods, and forge them. Oftener there would be two men; a "striker" or hammerman to wield the heavy hammer and the "smith" or "fireman" to hold the red hot steel in his tongs and guide the blows of the striker by tapping on the appropriate points with a smaller hammer. Re-heating the knife for each succeeding step, the forger would shape the blade, forge it to a molded or forged iron bolster, "draw out" the tang, refine the shape, and "smith over" the whole. With the striking of the maker's name or mark the hard brittle blade was ready for heat treatment.[4]

In the hardening furnace the knife was heated to a high temperature and then cooled rapidly in water or oil. The tempering, to give the hardened knife flexibility and resilience, was done by reheating the blade and cooling it slowly. The workers watched the color of the metal in the furnace as it turned from yellow to straw, brown, purple, and light blue successively and then withdrew it. The temperers' work was surrounded by long tradition and reverence. Some of them had special springs from which to draw their water and recited ancient charms as they

transferred their knives from furnace to cooling apparatus. A modern manufacturer explains that their chosen spring must have provided water of exactly the right temperature, and the spoken formula perhaps ensured the proper timing. But quite apart from knowledge of magic, a fine eye and sense of timing were required.

The knife, in order to be hard and not brittle had to be withdrawn from the fire and placed to cool at the strategic split-second.[5] Some cutlery manufacturers today claim that the eye of a skilled temperer gives more accurate results than the needle of the pyrometer.[6]

Grinding was the most lengthy process of all. It involved shaping and smoothing the knife on revolving abrasive stones of successively finer grain. European grindstones were sometimes turned by hand, but in Solingen and Sheffield most grinding establishments were spread out along streams where water power turned the wheels. In the grinding process the knife was tapered off from back to edge and from shoulder to tip. The best ones were ground with a rolling motion so that the surface would be curved. The German grinder held his knive with a wooden handle called a "walken" which facilitated the making of an evenly curved blade.[7] The grinder also smoothed the back of the blade, the neck, and the bolster. Some blades were "swadged" in addition-the swadge is the slight indentation along the back of the blade-and additional grinding operations were needed for special types of knives. In general, grinding was done in four stages: rough grinding on a large, soft grindstone rotated in a trough of water; "whitening" on a smaller finer stone; glazing on a wooden wheel dressed with tallow and emery; and buffing on a smaller wheel usually covered with glue and fine emery. Grinding and whitening gave shape to the knife, while the last two processes served to eliminate grinding marks and to impart polish.[8]

The grinders dressed their stones and kept the heavy ones wet to minimize the danger of bursting stones, to cut down dust, and prevent the heat generated by the friction from accumulating and spoiling the temper of the knives. To prevent uneven wearing, the grinder periodically cut V-shaped notches in the stone, spacing them closest together where the wear was least and further apart where it was greater. The glazer and buffer dressed their own wheels too, with tallow, emery, and leather.[9]

The English, German, and French methods of cutlery making were similar. Outwork was common. Grinding methods differed considerably. In English shops the grinder sat facing the stone with its top rotating away from him, the blade held against the stone a little below its highest point. The German grinder's stone rotated toward him, and he held the blade against the side of the stone nearest him, often using both hands and knees to get sufficient pressure. French workers, on the other hand, lay prone on raised planks above the stone. When English and German workers came to this country they brought with them their own methods of grinding. Consequently some American shops used one method, some the other. Because English workers came first, the English methods predominated in the Connecticut Valley.[10]

Hafting included the whole process of making and putting on the handle. Special groups of handlemakers carved elaborate handles out of bone, ivory, and wood, or molded them in dies. Then the "hafter" or cutler" fitted the handle to the tang. This required careful work, for never were any two alike. The hafter in the pocket knife trade had to cover the handle with thin scales of ivory or bone; assemble the blades into their cases, filing them to proper dimensions and using tiny springs that he himself tempered; and finally adjust the whole so that it would "march" or "walk and talk" properly, i.e. so that it would unfold easily with the blade halfway between the sides of the lining. The lack of uniformity meant that each knife was a new problem. The haf ter often tried several parts in a knife before he found one that would fit.[11]

There were variations in method for different types of product. Cheap scissors and knives were cast in molds rather than forged. Razors required a harder steel, more skilled forging and grinding. Forged scissors and forks had to be shaped by special operations, and swords, scythes, and axes-all products of industries peripheral to the cutlery trade-went through different processes.

The materials for the manufacture of knives were steel, ivory, bone, and wood. The best steel was made of Swedish iron, known in England to be the purest. England had started as early as the seventeenth century to import steel from Sweden, Spain, and Styria, while Germany had extensive ores of its own. Iron, neither hard enough to hold an edge nor elastic enough to use without breaking, had to be made into steel, a compound of iron with small amounts of carbon and other elements which made it tough and hard but not brittle. The making of steel centered in the Sheffield area in England, whence came many of the innovations that made for good cutlery steel. Blister steel, first made in 1609, and shear steel, in 1730, were for a time used for large knives and swords, but crucible steel, invented in Sheffield in 1740, quickly replaced these cruder, less uniform materials, first for fine tools and finally for all cutlery except the cheapest. Crucible steel was made by melting blister steel or iron in clay crucibles with exactly measured quantities of manganese, carbon, and other materials.[12]

B. EARLY AMERICAN METHODS

The first companies in America were started by people who had not seen the English shops at work. But they studied English writings on the subject, welcomed English workmen, and finally travelled abroad to see for themselves. James T. Ames wrote to his brother, Nathan, who was travelling in Europe in 1840, “Learn all you can about whitening--bluing -and gilding sword blades and all those things."[13] Nathan observed and, though not enthusiastic about Europe's equipment, admired its skill. The use of wooden wheels for polishing which he saw in England and France was new to him, and he decided to try it out at home.[14] The American manufacturers, unhampered by long experience with time tested methods, were ready to discover and try new approaches. Especially in the years of economic expansion, the early 1830's, the late 1840's, and the early 1850's, they adopted novel techniques and invested in mechanical power-devices for turning grindstones, forging, and shaping knives. From the beginning they used power extensively; every cutlery had its own water power. Seasonal variation in the supply of water caused difficulties in carrying on regular production, and this led some companies to install auxiliary steam engines at an early stage. The John Russell Company was one of the pioneers for it installed a steam engine for part-time use in 1847, possibly earlier.[15] In 1850 only four cutlery establishments in the Valley were listed in the census as using steam, and in at least two of these water was the more important source of power.[16] In general, water power was considered adequate and was an important factor in determining the location of any cutlery plant.[17]

Robert Orr, son of a famous gunsmith, iron master, and edge toolmaker of Bridgewater, had evolved in the early 1800's a method of triphammer forging for scythes, a technique which was to set the American cutlery industry on its feet. The trip-hammer was a rapid running, power-driven hammer. It had previously been used only on larger masses of metal, while implements and tools were laboriously hammered into shape by hand on the anvil of the smithy. The use of the trip-hammer spread to every small hoe and scythe shop that commanded water power and permitted a tremendous increase in the output of the forge.[18] From the Orr's shop in Bridgewater and others like it in Eastern Massachusetts metal working techniques spread westward, and Robert Orr himself was, by 1804, Master Armorer of the Springfield Armory. By the time cutlery manufacture began, agricultural instruments were commonly forged with a trip-hammer. But John Russell introduced the method into cutlery making. By 1844 the Russell Company was making a knife in which the blade, tang, and bolster were all forged from one piece of steel. These knives were advertised as superior in strength and beauty to the English knives whose bolsters were made separately (often of iron) and forged or welded to the tangs.[19] High labor cost and the prosperity of the period made the extra cost of steel and equipment involved in the Russell knife eminently worthwhile. In 1848 the Russell Company was using trip-hammers for the drawing out of the blades from bars of steel on all of the knives it made. Hand work was still used for the rest of the forging process-shaping the bolster, and the final hammering of the blade which was trimmed to the proper length with hand shears.[20] The next improvement was the use of heavy dies in power presses for cutting out blades which came from the hammer only roughly shaped. The use of such dies began in the Lamson and Goodnow Company about 1851, and in 1855 the Russell Company bought presses from Lamson and adopted the same method. Before these innovations one man and his helper could forge one hundred and fifty blades in a day, but now it was claimed that they could do three thousand.[21] American cutlery shops were accustomed to water power for turning their grindstones, and now it was applied also for forging and stamping. Eventually hand forging was eliminated for all but the most unusual products.

Americans, familiar with the use of wood, evolved numerous devices for simplifying handle making. While elegant knives were made with bone and ivory handles, many woods were made handsome and durable by the use of heat and pressure. Lamson's bent scythe-snathe had been based on this idea, and the Russell Company originated more elaborate means of treating wood for knife handles. Not only did the Russells mold the wood into desired shapes but they made it hard and strong, so that they could use many kinds of cheap native wood.[22] In the early days cutlery makers bought ready-made handles.

Ebony, Granadella wood, Cocobola wood, and ivory, pearl, and staghorn were imported from all parts of the world, made into handles in England or Connecticut, and then sold to cutlers.[23] But as American manufacturers brought more skilled workers from abroad and thought of new devices for working materials, they began to make their own handles. In 1853 the Russell Company began to experiment with fashioning handles out of bone purchased cheaply from a slaughter house and at the same time tried out the new India Rubber handles created by Goodyear. The latter, though not immediately successful, came into wide use later.[24]

Before 1860 cutlery steel was imported largely from England, but also some from Germany and Sweden. Russell used small amounts of blister steel, probably for larger, rougher tools, shear steel for finer instruments, and cast or crucible steel for the best of his products.[25] Grindstones came from the Lake Huron area, from Novia Scotia, or from England [26] while emery was readily available in local deposits.[27]

C. THE CIVIL WAR, BEFORE AND AFTER

During the Civil War the influence of the arms industry on cutlery making in the Valley was increasingly apparent. Cutlery firms making war goods for the government were given discipline by the exactness of specifications; new shop methods which had been in the stages of experiment in the 1850's spread throughout the industry, and workers were trained to new ways.[28] The idea of interchangeable parts made a significant contribution to cutlery making. To mechanical forging it added a further element in the trend toward mass production and encouraged the creation of designs suited to machine processes. At the same time the use of rolling to replace all or part of the forging operation became important.

Throughout the 1860's experimentation with types of bolsters and tangs was continuous, and a number of new ways of attaching the blade to the handle were invented. Joseph Gardner of the Lamson and Goodnow Company and Matthew Chapman of the Russell Company were active rivals in designing new models and methods. In 1867 Gardner perfected a knife with a pronged bolster into which the handle could be fitted and riveted. By machine-forging the blade and bolster in one piece, he eliminated the necessity of boring a hole in the handle for the tang.[29] Chapman countered a year later with a knife that could be forged all in one piece, handle and all, from a solid piece of steel. It was heavily plated with silver, and the company advertised it as a strong, cheap knife, especially suitable for hotels, steamboats, and restaurants.[30] This solid steel handled knife was to become the standard knife for silver plating for many years.

The use of metal dies in a power press was common in the 1850's in the stamping of knife blades out of forged-flat steel. This suggested the use of flat stock. But the forging process remained necessary until a way could be found to make the flat steel equally hard and strong. This has never been fully attained, but approximations have been made as methods of steel rolling improved. By 1848, Lamson and Goodnow used a rolling mill to roll the blades after they had been drawn out under the triphammer. After the Civil war this process was extended.[31] In the meantime the shaping and shearing process was mechanized by the use of dies and presses. Controversy arose as to who first conceived the idea of using flat stock. Matthew Chapman had made a number of experimental knives out of saw-plates in 1855. In 1860 he patented a knife design which made use of sheet steel.[32] Here he came into conflict with his old rival. For, in the same year, Joseph Gardner patented a process and design for a knife whose shank and blade were cut from a piece of sheet steel. Gardner's knife was similar to present day kitchen knives, with wooden scales riveted to the shank and a bolster fitted over the scales at the base of the handle to prevent splitting and loosening. In making this knife, rolling and stamping played a larger part than forging. Gardner's patent rights were extended in 1874, and the use of flat steel spread rapidly.[33]

Authorities varied in their opinions of the quality of the new rolled cutlery and differed about how widely it was actually in use. In 1874 a British observer reported: "Table cutlery is generally rolled and not hammered ; but although there is still a preference for hammered blades over rolled, I am told that for all practical purposes the best rolled blades are equal to the hammered blades and are, of course, considerably cheaper.[34]

The depression of the 1870's doubtless made these cheap products unusually attractive at the time of the Englishman's visit. The correspondence of later cutlery manufacturers indicates that, while rolling did supplant part of the forging process, it did not by any means replace it completely. The solid handle forged steel knife continued for many years the important product of the table knife trade.

The quarrel over the Gardner and Chapman patents reveals some interesting facts about cutlery manufacture in the 1870's and the experimentations of the preceding years. The flat knife design was associated with interchangeability of parts. That the Lamson and Goodnow Company was one of the first to use interchangeable parts in the manufacture of cutlery was doubtless connected with the fact that the family had, in 1859, purchased the Robbins and Lawrence gun and machine plant in Windsor, Vermont, one of the most outstanding factories in the use of this kind of technique.[35] The process of stamping out blades with a die, first used by Lamson in 1850, brought some uniformity. But the flat-tang knife to which scales were riveted gave particular advantage to exactitude in the shape of the tang and in the spacing of the rivet holes. As early as 1839 a templet had been used to measure the spacing for the drilling which was done by hand. Later foot presses drilled holes one at a time through a jig. Though this increased uniformity, the jig often slipped so that the pieces did not fit together well.[36] In 1860 in the manufacture of the Gardner scale-tang knives, a multiple drill was used to drill all the holes in the tang, and the scales were drilled in the same manner. These drills were set with matching jigs. This saved materials and time and eliminated the necessity for particularly skilled hafters. Joseph Gardner in 1875 testified that American production had doubled in the preceding fifteen years and attributed the growth to "our interchangeable system of manufacture."[37]

In other ways the cutlery industry, not itself a great contributor to progress, reflected the developments of the Civil War period in metal industries. Many processes still done by hand in England came under the sway of the machine in this country, so that American products competed with English goods more effectively than before. The making of dies had become much more accurate, and they were more widely used. The cutlery industry was among the beneficiaries. In 1855 E. K. Root, a native of Windsor, Vermont and superintendent of Colts Arms Company, perfected a drop-hammer which revolutionized the process of forging.[38] In cutlery making the drop-forge, equipped with a die, could shape a knife from a solid bar with one blow and in one heat; this replaced trip-hammer forging in which the knife had to be re-heated and hammered numerous times. Cutlery makers to this day do not agree on the best method of forging. Some use a rapid-running helve-hammer, the successor to the trip-hammer; others a drop-hammer; others, a combination of the drop-hammer for bolster and tang work and the helve-hammer for the blade.[39] Many do no forging at all.

The growth of the American iron and steel industry began to change sources of supply for cutlery makers, again giving them a boost in their competition with Sheffield. The production of American crucible steel expanded tremendously, but its quality remained so uncertain that English crucible and shear steel continued for some time to be more commonly used in the making of American knives. Bessemer and open hearth steel were increasingly important, but again, they were not uniform or hard enough for good cutlery. Heat treating methods also improved during and after the Civil War, and the metal trades, presumably a few cutlery manufacturers among them, made increasing use of pyrometers for measuring high temperatures.[40]

By 1874 it was obvious that American cutlery makers had entered whole-heartedly into the current enthusiasm for mass production and mechanization. The size of knife shops increased substantially, though small space suffices for astronomical quantities of cutlery. The Bulletin of the Iron and Steel Association stated:

The extent to which machinery has been made to take the place of manual labor is the great secret of American success in the manufacture of cutlery. The cutting of the wood for the handles, the finishing of the ivory, the cutting of the steel, the shaping of the knife, the fastening of the handle, the designing of the ornamental handle, the grinding, the finishing of the blade, and numerous other minutiae are also done by machinery, most of which is also made in the works.[41]

D. THE 1880'S TO THE FIRST WORLD WAR

After the expansion of the period before and immediately after the Civil War, growth and technical innovation proceeded at a slower rate. The depressions of 1884, 1887, and 1893 turned the cutler's interests toward design and product variation rather than capital-using devices. Though there was considerable work on the grinding machine, it was not adopted generally until the prosperous early 1900's.

Drop-hammer forging became more common during the early 80's. In Germany the drop-forge was equipped with paired dies, top and bottom, and the American firms most influenced by German tradition copied this method. English cutlery makers and their American followers commonly preferred trip or helve-hammers.[42]

The late nineteenth and early twentieth centuries brought a gradual increase in the use of steam power to supplement water. In many areas the plants along the streams had so grown in number and size that the water was not adequate to give the needed power. Droughts were a serious problem at times. Uncertainties as to style and general demand made the manufacturer reluctant to produce for stock when water was plentiful; and dry seasons delayed the filling of orders.[43] In the early 1900's an electric power plant was built in Turners Falls, and it was not long before the Russell Company plant was completely run by electriCity.[44] By 1913 Lamson and Goodnow also used electric power.[45] but many others continued with water and steam.

Experimentation in types of handles and handle materials was continuous and competitive. Fancy pocket knives still displayed handles of shell and ivory, and the more expensive carvers had handles, sometimes carved by hand, of stag and bone. Though cutlery manufacturers made many of their handles of local woods, they also bought handles.[46] Specialized producers and importers provided materials for table, kitchen, and trade knife handles-redwood from California, boxwood from India, rosewood from Honduras, and cocobola, ebony, and other exotic woods from South America and Africa.[47] Rubber manufacturers supplied a growing demand for hard rubber handles after 1880.[48] New kinds of metal came into use, as soft steel, nickel, and other soft metals were molded or struck in fine patterns for handles.[49] In some cases entire knives were made of German silver or "Craig silver," a similar product. Cutlery makers ground and finished them carefully and sold them unplated.[50] Various kinds of composition were tried for handles, Zylonite in the 1880's, then celluloid, and cellite in 1910. The Russell Company was able to secure exclusive rights to use Zylonite for knife handles, but competitors soon found similar materials.[51]

The development of a hollow handled steel knife in the 1880's brought change and controversy to those who made knives for the silver platers. The hollow handle was lighter and easier to manipulate than the solid handle. Because it was strongly welded to the blade, it eliminated the fashioned hollow handled loosening and breaking common to the old knife whose tang was glued or cemented into the handle. Of several designs patented, one was made by bending a piece of flat steel from end to end, then turning down the sides and welding them together. Another was fashioned from a tube welded to round stock which was later forged into a blade. Others were cast on to already formed blades. The Clement Company hired several mechanics to work on these designs in the hope of gaining exclusive right to manufacture hollow handled knives. Some of the mechanics assigned their patents, apparently in accordance with the terms of their employment; others sold their patents to the company.[52] By 1887 the Clement Company owned enough patents to have a virtual monopoly of hollow handled steel knives. The Hart Company of Unionville, Connecticut, and the Russell Company both had patented somewhat similar designs.[53]

A long and bitter litigation finally closed with Clement the loser. His inability to cover all the possible varieties of basic design and improvements in his patents left his competitors free to produce their own versions of the record-making implement.[54] The hollow handled steel knife became the standard type for fine silverware. Yet because it was much more expensive to make, it never completely replaced the solid handle type. Nor did it replace scale and tang knives as had been expected,[55] since newer light materials proved cheaper.

Other small improvements were numerous. They did not revolutionize the industry, but they gave advantages to those who could gain patents or agreements for exclusive use. A new method of etching names and designs on knives was patented by Maximilian Schweizer of Bridgeport, Connecticut in 1883.[56] By 1887 the Meriden Britannia Company had its own secret etching method.[57] "Satin finish" was another novelty. Knife handles finished in this way had a soft dull surface and felt less slippery than previously but still smooth to the touch. The process, apparently originated by the Meriden Britannia Company, was accomplished with brushes made of fine steel wires mounted on wheels.[58]

During the last two decades of the century, the cutlery industry experimented with American steel and used it with increasing though uneven success. The depression of the early 1880's brought great pressure on prices and a consequent tendency to cheapen manufacturing processes. Some firms experimented with bessemer steel and believed that the J. Edgar Thompson works could produce bessemer steel as good as any crucible product.[59] In general, however, the bessemer process did not permit the close control of carbon content and the uniformity needed for good knives. Open hearth steel gave promise of better results, and for a few years the table knife manufacturers adopted it almost universally,[60] but they found it unpredictable, often full of flaws, and likely to develop cracks after it was put into the silver plating solution.[61] Leaders in the trade were "disgusted at the debasement of the knife business" and yet could not charge prices high enough to permit a return to crucible steel. Lee of the Clement Company wrote to a customer, "This absolute perfection in work at the absurdly low prices we are getting will ruin every manufacturer of steel handle knives unless consumers will agree to pay a price that will permit of using a good grade of steel."[62] Open hearth steel continued in use until 1885, when some of the large silver plating companies, feeling that it yielded an unduly high percentage of rejects, returned to crucible steel blades.[63] But cheaper steel remained popular for lower grades of goods, especially as its quality improved. Lack of uniformity, imperfectly regulated carbon content, and cracks and scams in the metal were sources of continuous irritation to cutlery makers. Their correspondence with steel suppliers indicates that each order of open hearth steel was in the nature of an experiment, and their comments on each batch were descriptive and detailed. When a cutlery manager was satisfied with a particular shipment of steel, he would often request more from the same "blow," for the next lot might be quite different.[64] Much of the crucible steel especially that used for special kinds of trade knives, was imported,[65] and as late as 1884 American crucible steel, was used only experimentally.[66]

Knives made of flat steel cut with dies were quite usual, and cutlery makers began to get their steel in ready-made strips so as to minimize the cutting operations and reduce wastage of material.[67] Both cold and hot-rolled steel were used in the 1880's. The cold-rolled steel was softer and easier to cut. Generally considered too soft to make a satisfactory product, it was held by some to be an adequate material for plated ware.[68] In general the forging process was essential for any knife that was to have a respectable cutting edge. Knives made of flat stock required the same kind of heat treatment needed for forged blades.

Throughout this period, cutlery makers searched for mechanical methods of grinding and polishing. The grinder was highly paid, partly because of his skill, and partly because his work was extremely unhealthful. The immigration of grinders from Europe was declining, and training American born workers was expensive and difficult.[69] Strikes and wage demands increased employers' eagerness for a machine. Numerous grinding machines were invented, patented, tried, and discarded.

One Edward A. Severance patented in 1885 a device to burnish the handles of plated knives. In his machine, the knives were set in holders which rotated slowly while the burnishing tools were moved back and forth over the handles.[70] Severance's invention was at first used only to polish plated handles but was later used on steel knives-blades and handles-and other pieces of flatware.[71] The machine process could be carried out by unskilled labor. But it gave less satisfactory results, and it was held by several users to be fit only for cheap work.[72] In 1887 a Pittsburgh firm was making a grinding machine which, it claimed, would save 25% of the labor needed for grinding.[73] The Clement Company employed the inventor of a grinding machine to try to perfect his device in the company's plant. In less than a month the arrangement went awry, either because the inventor "spent his time and money in rum shops" or because "his machine was unable to grind any knives faster than we can do it by hand"-Clement offered both explanations.[74] Two years later a machine grinder, invented by an employee of the Russell Company was said to be working successfully in that company's plant, and the board of directors authorized the management to investigate the possibility of buying the patent.[75]

Between 1891 and 1893 another grinding machine was adopted in one cutlery and two silver plating establishments. It could rough-grind four hundred knives in a day and required no skill to operate. Hand grinders were needed to whiten blades ground on this machine. The Northampton Emery Wheel Company made an automatic grinder in 1894, and five years later a device appeared which was said to be capable of grinding three thousand knives a day in the hands of an untrained boy.[76] Because the organized grinders either refused to whiten blades ground on a machine or demanded premium pay for such work, adoption of the machine was slow. Lee of the Clement Company wrote, "Up to the present the attitude of the grinders has been against this machine, but if this could be amicably settled, there is no doubt of the saving that could be effected."[77] Added to the workers' reluctance was the employer's hesitance to invest in equipment which required large and standardized output to bring profits. The uncertain business conditions of the late 1880's and early 1890's were not conducive to such risk-taking.

The machine that finally revolutionized the industry, the Hemming grinder, was not produced until 1903.[78] This machine held the knife by the tang in an adjustable holder which moved back and forth past a revolving grinding wheel.[79] Most cutleries bought Hemming grinders between 1904 and 1911, but some firms clung to hand methods as late as 1918. With the adoption of the machine grinder, new kinds of abrasive materials came into use. Artificial grindstones-wheels covered with emery and manufactured alumina-replaced sandstone grinding wheels in many operations.[80] As the surface wore down, the artificial wheels required frequent re-covering, and this was done in the cutlery shop. The Clement Company reported that "it takes a smart man to keep the machinery in adjustment and mix the emery cake and wheel dressing. Thus you would have to pay this man as much as a wheel hand. So unless you have sizeable production, there is little economy."[81] But, with quantity production, the artificial wheels were cheap; and they had the additional advantage of added safety. When used with hoods connected to an exhaust system, they were considerably less likely than the old grindstones[82] to cause the traditional grinders asthma.

By the early 1920's about two-thirds of all grinding was done by machine. Today not only rough grinding but whitening and polishing are often done by machine.[83] One manufacturer substitutes for the first stage of rough grinding a process of "tumbling" the knives in a large revolving drum full of smooth pebbles, thus saving a great deal of labor.[84] Hand grinding remains important in the final operations on most knives and is required more extensively on those of high quality. Many cheap knives are made with no hand grinding at all, and some with no grinding of any kind. Widely used are machines which grind both sides of the blade at one time between two revolving wheels. Some of the more elaborate machine grinders will turn the knife to give it a curved edge similar to that of a hand-ground knife.[85]

E. WAR AND DEPRESSION

World war and the long depression had major effects on metal technology and had some impact on the cutlery industry. New steel alloys have made cutlery more attractive and durable, and others make possible cheap knives so bright and attractive in appearance that the consumer may overlook the fact that they cut poorly. Labor saving devices spread rapidly during the first World War and gave considerable advantage to their users in the sharp competition of the depression period.

Cutlers, inventors, and steel makers experimented for some time in attempts to create a knife blade that would remain bright and shining in use. The ordinary carbon steel blade, however fine its cutting quality, quickly became stained and rusted; and the knives with blades made of other materials or plated with silver were not cutting knives. Nickel steel, German silver, and later Monel metal [86] were used for handles and for certain kinds of knives, but were neither hard nor flexible enough for most cutlery uses. A "rustless iron" was made as early as 1888,[87] but it seems not to have been appropriate for cutlery. In 1910 a stainless alloy was invented by Elwood Haynes of motor-car fame. It was a combination of cobalt, chromium and steel and, according to a trade journal, was

especially suitable for making a knife that was more durable than steel and resistant to fruit acids.[88] "Rustless steel," tried in small quantities in 1914 and 1915,[89] gave trouble because it required new methods of heat treating and unusual care in forging. Few of the cutlery firms had pyrometers or thermometers, and the trained eye of the skilled annealer did not serve him in handling the new alloy. The Clement Company, reporting to a steel supplier on the results of a trial order, said: "The blade made of your rustless steel . . . became very brittle after hammered. Then we annealed it and it became soft. Please send us information based on color rather than temperature, as we have no fires fitted with thermometers."[90]

The most famous patent for stainless steel, that of Harry Brearly of England, was granted in 1916. Stainless steel is an alloy of mild carbon steel and chromium, the latter substance constituting 13 to 15 percent of the content. American cutlers had had little experience with stainless steel before the outbreak of the first World War. During the war both the American and British governments took over their national production of stainless steel for military uses.[91] Only secret black market transactions enabled cutlers to acquire small amounts.[92] By 1920 some of these fortunate or clever concerns were ready to go ahead with the production of stainless cutlery. But because of special problems of heat treating, machining, and grinding, the first stainless knives were not entirely successful. They often cracked or showed seams.[93] In most cases oil baths were necessary instead of the more rapid cooling of water in the hardening process.[94] The color of the metal in heat treating was different from that of carbon steel, and a more accurate timing was needed for good results. Thus electric pyrometers and automatic heat regulators became important to the trade.[95] Over sixty kinds of stainless steels are produced by American companies. Good tool steels can now be made to specification in electric furnaces and tested with fine exactitude for all their physical and chemical properties.[96] Cobalt, molybdenum, silicon, vanadium, and magnesium enter into varying alloys for different kinds of cutting instruments. The makers of fine cutlery advertise durability and sharpness and note that their special alloys produce "super edge holding qualities and greater tensile strength."[97] Because stainless was more expensive than carbon steel, cutlery manufacturers were slow to risk experimenting with it.[98]

A gradual development in the 1920's brought wider use, and by 1930 reliable methods had been established. The sharp competition of the thirties forced almost universal use of stainless alloys in some lines, and, during this period, 50 percent of all cutlery bought was stainless.[99] Particularly important in the depression was the spread of interest in cheaper kinds of stainless steel with a low carbon content and in stainless iron. These could be cold-rolled into sheets or strips. The rolling compressed and hardened the metal so that forging and heat treating could be eliminated, though not without detriment to the quality of the product. Stamping machines could now cut, or "blank," blades from sheets of cold-rolled steel or iron very cheaply. Often the metal was rolled into strips with beveled edges, thus further minimizing the work required in the cutlery shop. The quality of these knives was poor. The material was not as hard as forged, heat-treated steel, the grinding process, if any, was brief and slap-dash, and the resulting knife was neither sharp nor durable. Common kitchen, table, and souvenir pocket knives of this kind outsold better products during the 1930's. The reason was simple. They sold at ten to thirty-five cents retail.[100]

Increased durability and heat resistance, as well as improved appearance have given plastics a place, not only in handles for cheap kitchen ware, but also for some more expensive products.[101] "Ivoroy," "Pyrohorn," and synthetic tortoise shell have almost completely replaced their natural counterparts. The synthetics are cheaper and easier to make, are more durable, and can be cemented more firmly to the blade. "Catalin" and other plastics are made for cheaper products, though wood is still widely used for kitchen knife handles.[102] Plastics are also used for making entire knives-fancy bread, fruit, and paring knives. But as yet the material is not strong enough to make a thin blade or hard enough to hold a sharp edge.

The technical reasons for the former strength of the industry in the Valley-water power and skilled labor-have almost vanished. Almost all cutlery plants now use electricity, and many can be operated with little skilled labor. Technological change in the industry was, until the first world war, chiefly labor saving. Each new invention meant a higher proportion of capital to labor. The optimum size for a cutlery plant grew steadily. Although the industry doesn't require a plant large in modern terms, still the capital investment necessary for success was increased by the development of mechanical forging and grinding, automatic heat treating devices, and even small riveting and drilling machines. As machines took the place of skill, the supply of skilled labor, formerly a bottleneck, ceased to be a factor in limiting the size of firms. Recent developments have had capital-saving as well as labor saving results. Cold-rolled steel and electric power have made it possible for a very small firm to make large quantities of cheap knives. Standardization, production control, and improved inspection, introduced in the 1920's, have given some firms more effective use of their capital.[103] The fairly large plant has advantages, because the making of good knives requires considerable equipment; any firm making several models has a large investment in special dies and tools, and the larger firm with a varied product can effect economies in selling even in cases where goods could be produced as efficiently in a smaller shop.

Cutlery-making processes vary tremendously from company to company. Many of the machines used are unstandardized because they vary in age, and some are made in the cutlery plants. Each company has its own way of doing things. It usually cuts its own dies and creates, re-builds, or alters its hammers, grinders and marking and drafting devices. Some plants are highly mechanized and use automatically fed stamping machines, mechanically regulated furnaces, and special handlemaking machines. Others still have recourse to some hand-grinding and have not yet entirely replaced skill with machinery in heat treating. Some plants making cheap knives of cold-rolled stainless iron dispense with heat treating; some forge most of their knives from flat steel; others use round bars. Some use drop hammers, others, helve hammers; others, both. There is also a variety of materials in use -carbon steel, stainless steel, stainless iron, and numerous alloys of steel. The particular process used in any one company depends partly upon its product and partly upon the experience, peculiarities, and preferences of the manufacturer. Interchange of technical information between cutlery makers is rare, and each goes his own way keeping his own trade secrets as best he can.[104]

CHAPTER IV
THE FIRM AND THE MARKET
A. THE SIZE OF CUTLERY FIRMS

Between 1860 and 1935 employment in the average American cutlery plant increased from about 26 to 85 workers, and its annual product, from $26,879 to $301,204. By 1947 average employment reached 90 and the average value produced, $731,133.[1] These figures are not strictly comparable, but they indicate an unquestionable trend toward larger size. Statistics for the cutlery and edge tool industries together show consistently smaller firms but are representative enough to give some picture of trends in the cutlery industry. From an average capital of $6,000 in 1850, cutlery and edge tool firms grew until in 1921 the average capital was $227,000. By the 1930's and 1940's it was obviously much larger, as shown by the only figures available, those for industry sub-groups.[2] The growth of the industry is reflected in an upward trend in the number of establishments and in their size as measured by capital, employment, and output. However, especially in periods of rapid technological change, the number of firms and employment rose less rapidly than production, and sometimes even declined.

Between 1850 and 1870 a sharply decreasing number of establishments produced a growing output.[3] Independent craftsmen found employment as wage earners in the growing factory system. Between 1870 and 1909, innovation was less rapid, but the size of the cutleries, their production, and their employment generally increased. After 1909, grinding machinery displaced numerous marginal shops and skilled wage earners, despite the prosperous market for cutlery. At the same time shifts in demand away from pocket knives and straight razors and toward safety razors, more typically mass produced, reinforced the trend toward larger establishments. In the eventful period, 1914 to 1930, the cutleries grew both in size and in number, though the increase in number was a modest one. In the depression of the 1930's a sharp decline in dollar sales was accompanied by a slight but noteworthy increase in the number of companies. Between 1929 and 1933 the average concern saw its sales drop from $341,000 to $194,000; and in 1939, despite some recovery, its sales were still $115,000 less than ten years before. Perhaps the increase in the number of enterprises illustrates a kind of competition so remarkably shown in England in the 1840's. Sweeping technical changes had still not completely closed the industry to the entry of small manufacturers of special or inexpensive wares. It was rumored that some skilled workers or foremen, when faced with unemployment, set up their own shops and made cheap, blanked-blade knives.

Industry sub-groups show considerable variation in size. In 1929 the average firm making straight razors had a capital investment of about $70,000 and a sales figure of $51,000 while "knives with fixed blades" were made in concerns whose capital figures averaged $508,000 and whose sales averaged $697,000. The silver tableware producers showed average capital figures of over $10 million and sales of $11 million, but what portion of these figures represent cutlery production is not known.[4] Among the silverware companies, somewhat less than 20 in number, only 4 are listed in Moody's *Manual of Investments.* Their net worth figures in 1946 were as follows: International Silver Company, $17 million, Oneida Community, Ltd., $10 million, Gorham Manufacturing Company, $6 million, Ontario Manufacturing Company, $1 million. The safety razor and razor blade industry boasted two firms with a capital over $10 million each, and a number of smaller firms with $1 million or less. The only other cutlery concerns sizeable enough to attract the interest of Moody are Landers Frary and Clark with a capital stock, valued at par, of $10.5 million, and the Henkel Clauss, a scissors and shears company, whose capital investment was not indicated.[5]

Geographic differences in the size of cutlery concerns are due largely to regional specialization in lines of output. In 1860 New England had less than one-third of the total cutlery production in the United States, but its firms were the longest established and were chiefly in the kitchen artisan, and table knife trades rather than in pocket knives and scissors. The average New England concern at that time employed 68 workers in contrast with a figure of 9 in the middle states and 26.2 for the United States in general. While the New England manufacturer produced $69,000 worth of goods, the corresponding figure for the middle states was $9,531; and the United States,

$26,789.[6] This disparity in size is less characteristic of the industry today. The larger factories are centered in the manufacturing cities of central Connecticut and New York, but these states also have their small firms in the small towns.

To summarize, it is clear that the size of cutlery and edge tool establishments has increased continuously except in severest depression. Output per firm and employee productivity have risen substantially. In some periods of rapid development the number of enterprises has diminished as their output increased, and in depression their number has declined less than might be expected or has even increased slightly. Labor saving innovation more than tripled the output of the average firm between 1904 and 1939, while the average number of employees increased by only a few individuals.[7] Connecticut Valley shops, little affected by the safety razor industry, have grown less than cutlery industry averages might seem to indicate.

B. FINANCIAL EXPERIENCE AND OWNERSHIP

The most prevalent form of organization in the industry is the closely held corporation, owned by families or local individuals. Even the larger enterprises typical of the silverware and safety razor groups are not often widely owned, and only the stock of the International Silver Company, and two of the razor blade concerns are listed on the New York Stock Exchange.[8] In spite of intense competition and low profits, the life of many cutlery companies has been extraordinarily long. Few highly competitive industries can boast many firms with a history of over a hundred years-such as that of the Russell Company, the Harrington Company, Lamson and Goodnow, Goodell, and even the longer than fifty-year span of the Clement Company, the Northampton Cutlery Company, and Landers Frary and Clark represent unusual stability. Cutleries in other areas are similarly long lived. In 1925 21 out of 51 cutlery companies surveyed were fifty years old or more.[9] Their longevity can be explained partly by their methods of financing, partly by the specialization which enhances the value of established contacts and accumulated managerial and manual skills. In 1938 the Tariff Commission observed that since their securities are held locally and their continued existence is of great importance to their communities, cutleries tended to remain in business without reorganization despite extended periods of lack of profit or even of loss.[10]

Not only the financial capital but also the physical capital of the industry is relatively immobile. The plants and much of the equipment are durable and have been kept in operation for many years after they had been fully depreciated or had their values written down in reorganization processes. The drop forge and various kinds of hammers can be altered and transferred to the making of many small metal objects, but the automatic grinding machine is made specifically for grinding knives, and, though it may grind numerous types of cutlery, it is limited in its range of possible adjustments. Some of the heat-treating equipment is also specialized. The cutlery's investment in patterns and dies may be a relatively large one and is not transferable to other uses. Thus even in bankruptcy and reorganization, there is a strong tendency for capital equipment to remain in the industry and indeed in the same location. Equally instrumental in the life of the older firms are the intangible assets — good will, established customer relationships, exclusive rights to designs and special materials, occasional strategic patents, the skill of the manufacturer and his foreman and workers.

C. VARIETY AND SPECIALIZATION

There is more concentration in the cutlery industries than is immediately obvious. Specialization within an already narrow market has enabled small enterprises to control substantial percentages of their own trades. In 1931 a survey of five categories of cutlery concerns show 33 firms producing 81 percent of the total output. Three producers made 72 percent of the straight razors; eight producers, 86 percent of the pocket knives; and six producers, 90 percent of the knives with fixed blades.[11] Some specialization within each group further increased the proportion of a market controlled by one company. Nonetheless there is always potential competition which can materialize on short notice. Firms, in neighboring specialties and less limited multi-product firms represent an incalculable but genuine threat. A small or unstable demand will often force a cutlery manufacturer to break into bordering markets even at the cost of mass production economies. Even the highest quality specialist is disciplined in his pricing, though the lowest priced producer may not always be similarly disciplined as to quality. The disadvantages of specialization become apparent when we observe the strength of the multi-product concern whose bargaining power is enhanced by the fact that no one item is vital to its survival. Even the specialists must produce a variety of styles, and novelty is rarely without appeal.

Especially abroad, the small specialized shop has been important. In England and Germany grinding and finishing, hafting, and fork-making were done in the homes of workers or in the shops of the "little masters." This

system persists today, though the factory system has made inroads upon it. As late as 1913 a British authority wrote, "In some instances the system of outwork seems to defy the factory system because of its superior advantage for the production of specialties of a small scale . . . No cutlery manufacturer in Sheffield manufactures his carving forks, himself. He finds it better to buy from the little master fork-maker, and to content himself with hafting them on his own premises."[12] Here the dominance of manual skill enabled the single worker to continue in his own enterprise. He may work alone or employ some helpers or apprentices, but he has no need of a large capital. In many cases he even rents a part of a large enterprise's factory, but he is still not technically an employee. He is a convenience to the large employer because of his special skill and the fact that he bears a portion of the risk." Even in trades where a good deal of factory production is feasible, mechanization has been slow because of the convenience of the outwork and the infactory contracting systems. Lloyd states: "The chief reason for the slowness with which these ancient features disappear—which will indeed, prevent their dying out altogether for a long time to come—is to be found in the immense variety of type and design, which determines the sale of articles which are of the nature of luxuries, and in which custom, taste, and personal idiosyncracy are determining factors.... This makes standardization difficult, and compels the production of goods in such small quantities as to render the adaptation of machinery a matter of great difficulty."[14]

The cutlery industry of the United States, which gained its foothold and established itself on the basis of standardization and mass production, still has a small optimum technological size. Cutlery products which require most hand work (manicure scissors, fine pocket knives, and straight razors) have traditionally been left to foreign countries to produce. The very cheapest cutlery has also been frequently imported.[15] The American maker has tried to concentrate on medium-priced articles demanded in sufficient quantity to enable the use of machine methods. The nature of the supply has doubtless helped condition the demand, for American consumers have been more willing than the British to buy standardized articles. But the American industry has not by any means solved the problem of variable and freakish demand.

In America, as in England, specialization was limited by the size of the market. Cutlery could be made in many kinds of establishment as is demonstrated by the diverse sources of the industry—blacksmithing, hardware, notions, silverware, edge tools, and agricultural tools. For many of the early firms knives were a sideline or a second thought. For others they represented a central, but not sole preoccupation. Versatility was a source of great pride. Ames, in Chicopee[16] made fancy swords and knives as part of an output which eventually included a vast array of articles not remotely connected with cutlery. He advertised in 1873 as follows: "Ames Manufacturing Company, Chicopee, Massachusetts, Manufacturers of Machinery, Machinists tools, gun stocking machinery, special machines for sewing machines and gun makers, mill shafting, pulleys and gearing, Boyden's turbine water wheels, patent steam and power pumps for mill mining and reservoir iron and brass castings, bronze cannon, regulation and society swords of all descriptions, bronze statuary, silver and plated ware."[17] Landers Frary and Clark offered a similarly extensive list.[1]The single product firms actually produced variety, as illustrated by Lamson and Goodnow's list of 2,500 kinds of goods on 1891[19] and Russell's 1885 catalogue containing 738 specimens of cutlery and plated ware.[20] The latter company reported that its stock consisted of "hundreds of different styles and sizes, each of which has a different cost and bears a different percentage of profit."[21]

Despite a certain delight in variety, most members of the industry rapidly departed from the catch-all philosophy of Ames. Concentration on a relatively few items offered the only hope for successful use of machine methods. The nature of the demand created a serious dilemma. A firm of any size had to be able to satisfy its customers on short notice and provide enough variety to attract them. This called for a large and complete inventory. But rapid changes in styles and fluctuations in demand made large inventory a dangerous asset. Few articles could be assured of sales on the mass level which production methods made possible. Consequently most firms attempted to produce as much as possible for orders and as little as possible for stock. In brisk times the producer was under great strain to fill his different orders. By and large, prosperous periods brought some increase in specialization and limitation of variety, while periods of depression, forcing producers to sell whatever they could, and often induced them to add new items to their offerings.

The Russell Company exemplifies many of these problems. It started with a limited line of axes, hatchets, and chisels. During the period of its expansion and greatest growth before 1870 it made constant additions to its line. But when business was best, it concentrated on its fastest selling articles and on items it could mass produce, and bought the rest from other sources or dropped them from its lists. The company's letters show it well aware of the necessity of limiting its variety and still maintaining an "attractive assortment."[22] It's original product, "the celebrated cast steel socket chisel," was given up because the demand for it was "too small to allow a proper division of labor." Russell reported to a customer, "We are giving all our attention to knives in which we have a complete assortment."[23] In the 1850's the New York office stated, "We have plenty of orders but each one has

something in it we haven't on hand," and feared lest they lose many customers because of delays in filling orders.[24] Answering the accusation that it was too often out of stock because of lack of system, the company reported that it made too many different kinds of goods and therefore, in the face of a variety of demands, could not afford to carry a large stock of any one item. The New York Office expressed hope that when business improved the firm could cut down its variety which "would give some relief."[25]

Like many others, Russell produced as much as he could for orders and attempted wherever possible to remain free of the financial burden and risk of producing for stock. The company was still following this method as late as 1904.[26] Unpredictability of demand and shortage of circulating capital dictated a hand-to-mouth production policy. The wisdom of this approach, and its difficulty of attainment, was well demonstrated in 1871 when large losses on inventory helped bankrupt the company. In that year the New York office showed a difference of over $52,000 between "goods invoiced at the store" and their final selling price. A share of this loss may well have been due to slipshod methods of accounting, but some was due to the large inventory carried in the face of falling prices and changing styles.[27]

Scattered notes from other companies tell a similar story. The Clement Company was continuously obliged to weigh the difficulty and expense of filling orders for small amounts or new patterns against the dangers of losing orders. It was time-consuming and costly to make a new die for a particular model, to order a stamp for labeling or etching a design, and to change the tools and adjust machinery to put the model into production. The company reluctantly abjured the notion of carrying "a full line of cutlery."[28] It offered inducements to its customers to buy on order instead of from stock and urged them to estimate their needs in advance, so that large lots could be made at a time and work could be scheduled with some foresight.[29] In busy seasons Clement found it necessary to slow up on "side-line" orders and concentrate on his regular work.[30]

The dilemma was sometimes partially solved by buying goods fully or partially completed from others or contracting out some manufacturing operations. The Russell Company in its early years commonly imported from England forks[31] which were probably made by those same outworkers and little masters who supplied the English cutlery firms. When business was brisk, knife blades and steels were also imported from Sheffield to be hafted in Greenfield,[32] and on some occasions the company imported scissors.[33] In the areas around the large cutlery centers some specialists set up shops to serve the dominant concerns. Grinding and polishing was sometimes done in small shops like that of Zur Hitchcock, who founded a business in Buckland in 1847, and, earlier and less well-known, H. S. Swan in the same town. Employing a few helpers, they ground and finished knives which came to them "in the rough." Hitchcock apparently worked for the Russell Company and possibly for other concerns in the area, for a number of years.[34] Small silver and plating shops were plentiful in the early days, and some of them bought, plated, and sold their own goods.[35] Others plated knives for larger concerns on a contract basis. Blade makers, like the Clement Company, while they bought their own materials and sold their output through various channels, were substantially dependent upon the silver companies who completed the knives and sold them to the public.

The process most persistently carried on outside the cutlery plants was the making of handles. The variety of types and world-wide sources of materials called for the services of people especially equipped to acquire, make, and process them. Handles of hard rubber, celluloid, and other plastics were made by several firms who had patents on processes.[36] Ivory, pearl, and exotic woods required, not only special skill in cutting and finishing, but also in locating and importing them from Africa, South America, and the Orient.[37] Many of these enterprises made as wide a variety of articles with their special materials as did the cutleries with their steel.

Technological change and vertical integration have gradually altered these arrangements. Rare, almost to the extent of extinction, is the outworker in America, though some one-man shops operated in 1935.[38] Grinding, forging, and hafting are all done in the cutlery factory. Many cutleries began to make their own handles and some handle-makers became cutlers. Though a few knife makers established their own silver plating divisions, more commonly the silver plating firms grew to large size and took over blade making. In many cases they bought cutlery companies and continued the factories in operation in the same location. Thus the vertical scope of the industry has increased since the early days. On the other hand, some vertical disintegration has occurred because of the extension of steel mill operations in the direction of fabrication. The cold rolling process, a substitute for forging in the making of stamped blades, is done in steel mills. The mill may even supply strips with bevelled edges, eliminating much grinding. Thus the non-integrated producers of cheap knives, with little capital, may use semi-fabricated steel and ready made handles and rivets to do a large business in stamping, assembling, and finishing.[39]

D. BUSINESS DEPRESSIONS

The cutlery industry is markedly affected by business fluctuations. Most of its products (razor blades excepted) are relatively durable and their purchase by consumers can easily be postponed. Expensive and semi-luxury items, such as silverware, high quality carving sets, and fancy pocket knives, are bought in smaller quantity in times of poverty. Necessities, such as household knives and scissors, can be re-sharpened and used for an extended period. A household can also "make do" with a small number of cutting implements even though it may prefer, in its prosperous times, to have not only a carver and a paring knife, but also several sizes of paring knives, special bread knives, potato peelers, apple corers, spatulas, steak, pie, cake, cheese and fruit knives ad infinitum. Artisans' and trade knives are purchased less freely because of the depression's effect on the demand for their services. The demand for cutlery is at any one time rather inelastic.[40] Especially in time of depression, price-cutting, while it often leads to shifts in purchases, is not likely to have a favorable effect on total sales. This fact does not, however, prevent price-cutting in times of stress. In England it was noted that in the depression of the early 1840's, a period of very low prices, output was actually increased.[41] There is no evidence of such extreme competition in the history of the industry in the United States, though something like this may have occurred in the 1930's. Larger capital requirements here have impeded the depression mushrooming of tiny undertakings which was long a serious problem for Sheffield cutlers.[42] It is clear, however, that prices of American cutlery tend to be considerably more changeable than production .[43]

In times of depression the lines of specialization tend to break down. The most highly specialized firms may go bankrupt, partly because of their usual small size and limited resources, but also because of the breakdown of their markets. The typical firm tries to augment its sales by adding new lines of cutlery, hardware, and gadgets of numerous types. Rarely has this kind of haphazard variation of product persisted after the emergency, though many firms have retained the more successful of the new lines as part of their regular output. For example, in 1857 the Russell Company complained that it carried too wide a variety, but the depression apparently forced it to produce whatever it could sell. In 1856-57 the company was producing cotton knives on order although they were not a part of its regular line.[44] The Russells experienced a not unusual, but rather paradoxical difficulty, for a slack period, in filling orders on time.

Again in 1884-1885 when cutlery firms were staggering through the general depression of the period, they shifted their production to new articles as well as to cheaper forms of their standard models. There was an increased interest in knives of second quality[45] and an anxious search for new customers.[46] The Clement Company hopefully informed a potential buyer that, though its special business was solid steel handle knives, it could make "anything in the cutlery line," and, because of a "temporary" shortage of orders, it had "ample facilities for forging and grinding a large amount of work"[47] It advertised "drop forgings and press work" in addition to its usual list of knives,[48] and explored the technique of making butcher knives because it found its regular business so bad that it needed to find a more lucrative market.[49]

W. W. Lee, of the Clement Company, can hardly be called a typical cutlery manufacturer. He was an inventor of many devices and unusually interested in gadgets, designs, and patents. This characteristic interest seems to have been most active when there was unused capacity in his plant. His willingness to accept rather small orders for "side-line" items was not at all unusual in the industry. During the bad years of the middle and late eighties his most intensive work was done in developing and patenting a hollow-handle knife which was later to become one of his chief products. In 1884 the Clement Company undertook the etching of knives with designs and trademarks[50] and the finishing of knives with a "satin finish"[51] both having previously been done by small specialized shops and silver platers. Also added to the firm's products were: steel nutpicks, forks, butcher knives, rubber-handle knives, spatulas, and "round-tang blades"[52] to be cemented into handles. Some of these items required the acquisition of equipment and techniques, others, innovation in design and method. As difficult years continued, Lee offered to his customers paper cutters, orange peelers, shoe knives, button hooks, screw drivers, and steel points for ice picks. He reported that he could sell few solid handle steel knives, his former specialty, but that his other departments were busy.

In the 1890's bad times again encouraged Lee's inventive propensities. He patented and put into production for a short time a new kind of lawn sprinkler and a hollow fork crown for bicycles, and applied for several other patents. He turned briefly to the manufacture of ice tongs because, as he reported, he couldn't sell any cutlery,[53] and exhibited a common reaction of his trade when he wrote to a business acquaintance, "If at any time you see any knick-knacks that we can make here, send them along, for we must make this thing go until regular business revives again."[54] In the years immediately after World War 1, some munition firms met the recession in their market by turning their excess capacity to the production of pocket knives and razor blades.[55] They brought a new kind of competition and demonstrated the relative ease with which metal products firm, with capital, could vary its product. At least one of these, Remington, made several types of knives before it abandoned cutlery making in 1940.[56]

The 1930's provide further evidence of the tenuousness of lines of specialization. The producers of high quality goods were affronted by the invasion of their markets by competitors who were novices in the trade. The makers of butcher knives, traditionally depending on a high degree of skill, found that "manufacturers of cutlery have expanded in the past few years and desire to maintain their facilities. Consequently they try to enter the butcher knife trade without experience or investigation of the requirements." The experiment may well have been as disastrous for the novices as for the seasoned butcher knife-makers who had the equipment and established reputation to deal with a special group of customers. Butchers could not afford to sacrifice sharpness and durability to cheapness. But the attempts of other cutleries to branch out and capture the trade" doubtless caused the specialists loss through the demoralization of the price structure.[57] And it is not improbable that a selected few of the newcomers learned how to make good butcher knives. Table, kitchen, and pocket-knife firms were more seriously threatened, for here cheap products were more readily substitutable for expensive ones, and the group of consumers involved was less keen in its evaluation of quality. By 1935 almost 90 per cent of the pocket knives produced in the United States had unforged blades, and a large number of kitchen cent knife producers had substituted cold-rolled, stamped blades for the more expensive forged kinds.[58]

It is difficult to organize the production of a large number of heterogeneous articles. The difficulties are intensified in depression, for then the orders are smaller than usual, the hazards of producing for stock are greater, and the anxiety over loss of customers is most acute. Most of the cutlery industries indulged in extensive variation of product designs and models, and their individualism in product differentiation has frequently encouraged an undisciplined, finicky, and often whimsical demand. Especially in the pocket knife trade, variety has amounted to a plague. In the 1930's some firms carried over 600 styles of pocket knives, and the larger factories were reported to have 2,000 to 3,000 patterns, any one of which could be further varied by use of different handles, blade finishes, and shields. The tool expense for each size pocket knife was about $400, and many firms had as much as $30,000 invested in tools for obsolete patterns.[59] The fact that specialization does not ensure limitation in variety is illustrated by the case of R. Wallace and Sons who make only cutlery to go with flatware sets. This firm reported, in 1938, that it produced 125 separate items, some of them requiring as few as seven operations, others, as many as eighty. The retail values of these items ranged from five cents to over two dollars apiece.[60] Gratifying, indeed, are the competitive search for novelty and cheapness, the gadgeteering impulse, and the interest in variety of design. But these attractive and useful traits have understandably been decried in strong terms by many members of the trade as the source of their most perplexing difficulties.

E. PRODUCTION PATTERNS AND MARKET ORGANIZATION

Modern developments have mitigated, but not solved the problems involved in the conflict between variety of output and machine methods. The 1920's brought systems of cost and inventory control which helped cutlery firms tailor their production to estimated market needs and keep detailed account of their heterogeneous processes and stock.[61] In the pocket knife trade, which had the greatest difficulty with excessive product differentiation, the three hundred basic patterns of the industry were reduced to one hundred and forty by an agreement of the producing concerns under the sponsorship of the Department of Commerce's Division of Simplified Practice.[62] Economies of mass marketing have in many cases helped to counteract diseconomies of varied output, and have at the same time shaped a market more amenable to standardized goods. The larger firms, which seem to have had increasing influence in the industry, have made use not only of modern machinery, modern production record-keeping and up-to-date cost accounting practice, but also have developed advertising and retailers' services and aids. A safety razor firm may make shaving brushes, shaving soap, and even other cosmetics, selling them all to drug jobbers or chains. Landers Frary and Clark made a complete line of household tools and appliances and sold its high-grade kitchen cutlery and carving sets along with electric mixers, refrigerators and meat grinders at little extra selling cost.[63] The munitions companies used established trade channels in hardware and sporting goods outlets to sell pocket knives. Silverware firms, in the course of their integration, have added cutlery to their already varied product. Owning their own blade suppliers no doubt means some direct savings in terms of purchase price, but probably more important were economies found in quality control and production scheduling. Many of these multi-product firms make their knives in separate cutlery plants formerly independently owned. Here factory specialization and company integration go hand in hand. Independent blade manufacturers have survived, but the integration of the large silver concerns has made their position insecure.

The rather small specialized firm remains the type characteristic of the industry. The demand for any given cutlery group is not great enough to afford both mass production and a large number of producers, and consequently the usual concern covers a sizeable percentage of its particular market. Fairly large homogeneous markets have been

made possible in some cases by standardization of design, as in the table knife trade, and by the evolution of cheap, nondurable items like cheap kitchen knives and safety razor blades. There are still many groups and sub-groups of cutlery products which are needed only in small quantities. These especially are unsuited to standardization and mass production. Geographic and organizational concentration in their production is not only natural but economical. Viewed in this perspective, the cutlery industry is a group of quite separate industries some of them exhibiting chiefly the characteristics of imperfect but very active competition,[64] others appearing primarily as oligopoly in microcosm.

CHAPTER V
COMPETITION, COOPERATION AND CONSPIRACY

The American cutlery industry was born and grew in a competitive atmosphere. Its earliest problem was British competition, but the passage of a very few years found domestic producers pitted against each other as well. The existence of cutlery combinations illustrates bow widespread, perhaps universal, has been the use of anti-competitive devices even in competitive industries. The cutlery manufacturers tried gentlemen's agreements, associations, pools, even a trust. Geographic concentration made it possible for the members of these trades to assemble for the traditional "diversion and merriment" and the consequent "conspiracies against the public." Rarely has conspiracy been on a smaller scale. Attempts to cooperate were threatened by the bargaining of the silver platers, by the cutlers' mutual suspicions, and by their tendency to shade prices. Partially shielded by product specialization and tacit or open agreement, cutlery companies have nonetheless been under competitive pressure to lower costs and/or maintain quality. The higgling process was common in cutlery markets even when they were in the grip of their most monopolistic schemes.

A. THE FIRST PRICE AGREEMENTS

The first available evidence of cooperation appears in letters and agreements between cutlery manufacturers in the early 1850's. No doubt they had previously corresponded about the problems of their trade. In 1852 three Connecticut Valley firms agreed to stay out of the World's Fair. If one firm had exhibited its goods, the others would doubtless have felt the necessity of participating. They thought of the Fair as a "speculation of a few gamblers in Wall Street," but their chief reason for nonparticipation was that they did not wish the "English houses to see all our samples together and copy them."[1] Perhaps they flattered themselves in assuming British interest, but at any rate it is clear that American patterns must, by this time, have become distinct from the English, with their own appeal to the American public. In February, 1853, hardware makers were organizing to try to "restore prices which they run down by their own competition."[2] Cutlery representatives attended their meeting, but found it of no particular interest to their trade.[3] Almost immediately, however, four companies, Lamson and Goodnow, Pratt Ropes Webb and Company, Russell, and the South River Cutlery Company, agreed to raise prices. They increased prices of knives with ebony, beech and cocoa handles from 10 to 30 percent and listed various kinds of table knives and forks at specific prices. The agreement applied to goods delivered after May 1, 1853, except for orders accepted before the signing of the agreement.[4] Discussing the price increase, Russell expressed fear of English low prices. The anxiety soon disappeared when he reported that goods could not be obtained from England. He wrote that rising prices of ivory, steel and wood had to be covered and that customers might accept price changes if they were applied to new models, when, if applied to "old familiar types," they might "drive trade away."[5]

Competition between domestic producers was no minor issue. The South River Cutlery Company participated reluctantly. It had a different price list which, though it was described by Russell as "amounting to about the same net as ours," required reorganizing and shifts in the system of numbering patterns, in differentials for special processing or marking, and in discount percentages. One is forced to wonder how it happened that there was no such problem of comparability between the price lists of the other three companies, and to hazard the guess that they had previously been compared. Attempts to raise prices by agreement are always threatened by the advantages available to a single firm which fails to enter or keep the compact. In this case the South River Company was suspected of the desire to capture the customers of its competitors by remaining outside the combination. This firm was smaller and in a weaker position than the others and doubtless wanted added business even more than higher prices. The other three concerns finally announced that there would be no agreement at all without South River, but

even while the agreement was being signed it was feared that "their agent don't do what he promises to do."[6] Lest this company appear a villain in the story, let it be known that probably no cutlery concern has ever existed for long without being suspected or accused by its competitors of some sort of betrayal.

The major consideration underlying the whole agreement was the fact that trade was brisk and, even with competition and mutual distrust, the manufacturers could expect good demand. The Russell Company wrote, "our orders are way beyond our ability to supply," and were confident that a price rise would not cut sales. Russell even felt sure he could raise the prices of some items without the cooperation of others; but he was aware of the danger of such a step.[7] By summer he was making a concession on butcher knives to at least one customer, though the agreement was still in force. The Russell Company wrote to customers that its prices were the same as those of other manufacturers and that “every price list we have seen corresponds exactly with ours.[8] It was the English price that put a ceiling on prices charged by this group. How long this agreement lasted or how strong it was is not known, but there is evidence that in 1857 at least the Russell Company and Lamson and Goodnow were still in somewhat uneasy truce. Lamson and Goodnow seem to have circumvented a price agreement by reducing the size of the scales and bolsters on a knife handle and cutting the price at the same time. The Russell Company consequently accused Lamson and Goodnow of having "no honorable feelings." Lamson introduced a wrought steel fork which attracted many customers away from Russell and did not improve the friendship between the two firms, though a week later they discussed an anti-pirating agreement to protect their patterns.[9]

B. THE AMERICAN CUTLERS ASSOCIATION 1870-1873

The Civil War, with its increase and shifts in demand, rendered the price agreements of the 1850's obsolete. Then in September 1870, three manufacturers of table cutlery came together in Greenfield, the town that 63 years later was to be the headquarters of an N.R.A. code association for the industry. They met in the interests of "apportioning the sales" of their companies, Landers Frary and Clark, Lamson and Goodnow, and the Russell Company, and requested the three boards of directors each to appoint an investigator to study the basis and method of apportionment.[10] In December the same group of manufacturers met in New York and, abandoning the quota idea, formed an association to "establish uniform prices and conditions of sale, thereby removing the evils of competition so far as terms of sale and prices are concerned and forming a more perfect protection of each others' interests." The participants were Connecticut Valley firms, but they voted to invite into membership cutleries in Chicago, Pennsylvania, and New York.[11] During the next three months four companies signed memoranda of an agreement, joining the American Cutlers Association and pledging that they and their agents would follow the agreed price list.[12] The Association was a formal organization with a constitution, by-laws, and provisions for amendment thereof. The Constitution provided for annual election of officers, regular monthly meetings in New York City, special meetings on written request, and a quorum consisting of the majority of the members.[13]

The major problems were covered by clauses on: 1) list prices, 2) specified discounts for quantity purchases, 3) packing and shipping charges, 4) commission payments to agencies and salesmen, 5) pricing of new patterns, and a required profit floor. The agreement did not limit the amount or variety of production or sales of any member. The Constitution established the price list which was to apply to all sales by members with no exceptions unless by majority membership Vote.[14] Goods were classified so that similar items made by different firms could be uniformly priced.[15] Discount was permitted at 10 percent to customers who settled their accounts monthly by notes at four months from the average date of invoices of each month, 15 percent for cash within thirty days from "the average date of invoice within the month." A customer who purchased $1500 worth of goods or more for single delivery from an Association member could receive a discount of 15 percent if he paid in four months or 20 percent, if in 30 days, with the same discounts on all his purchases for the rest of the season, whether or not they amounted to as much as $1500.[16] Second quality knives could be sold by the members privately, but at a discount of "not more than 35 percent nor less than 30 percent from the established list price."[17] Customers were to be charged for packages at the rate of 10 cents a gross of table cutlery, except in Philadelphia, Baltimore, Boston and Portland, Maine.[18] To limit further concessions to customers, it was provided that five percent be the maximum commission paid to regularly established consignment outlets and that no other commissions be paid except to regular, nonsalaried salesmen working on a commission basis. New agencies, warehouses, or consignment arrangements could be made only by unanimous consent.[19] Manufacturers had often guaranteed customers against price cuts on the part of competitors. They made these guarantees in order to encourage purchasers to give them sizeable orders at one time or to make advance contracts to buy quantities of goods over a period of time. The association permitted such guarantees to be made for one six-month season at a time, but only against other members of the association who

violated the agreement. All members were bound to make good the losses incurred by any member in carrying out such a guarantee.[20]

A rather confused basing-point system was established which allowed manufacturers to absorb freight on goods sent to New York, Baltimore, Boston, Philadelphia, or Portland, Maine. Shipping charges on goods passing through New York or Boston could be paid by the sellers as far as these two cities, but no further. Cartage within the cities was to be paid by the customers.[21] The large Massachusetts and Connecticut firms had branch offices in New York and could thus always pay freight to that city by shipping to their own offices. Their competitors, of course, required a parallel freight absorption opportunity. Baltimore was the center of established commission houses regularly used by the trade. Here again, because freight absorption by shippers was customary with some, it was established as the practice for all. Philadelphia, Boston, and Portland were also trading centers whose merchants were attached to cutlery makers by exclusive agency contracts. There was no detailed provision for freight charges for intermediate points between the factories and the centers listed. Nor was there mention of goods shipped straight through Philadelphia, Baltimore, and Portland to points beyond without sale in these cities, doubtless because most cutleries sold their goods to jobbers in these cities.

This kind of system enabled Connecticut Valley firms to maintain their relative position by equalized delivered prices in the important jobbing centers. With the industry centered in the East, the race for the rapidly developing markets of the West could have brought ruinous competition through freight-absorption. New York was as good a starting line as any. The Chicago firm which entered the association in 1870 never became a real competitive threat to the eastern concerns, and Connecticut Valley goods continued to be sold throughout the country.

The Association attempted to eliminate another evil, the imitation of product and design. Cheap copies of exclusive patterns were as great a threat to the price structure as were the more direct methods of price cuts, rebates, and discounts. The association provided that new patterns and designs were to be considered the "property of the parties first offering them" and others were not to copy them. Their prices were to be supervised by the association and were to be at least as high as prices of goods of the "same relative value" or else return a profit of at least 25 percent on good knives or 15 percent on forks or cheaper quality knives.[22] The by-laws did not specify the method of calculating the profit, but, since classification of new models was in the hands of the Board of Supervisors of the association, it can be assumed that the regulation was carried out with reasonable consistency.

The implementation of the entire agreement was in the hands of the Board of Supervisors, made up of one representative from each member company. Rules were provided to give effect to the various clauses. Customers entitled to a discount from all members because of a quantity purchase from one of them, could obtain it only on presentation of documentary proof of the original transaction to the Board of Supervisors. The Association prescribed the form of this document and specified that its signer must be the authorized representative of the selling firm.[23] A customer could claim recovery of losses under the price guarantee clause only if the accused violator was first given notice and opportunity to submit matters of dispute to the supervisors.[24] This protected members from the possibility of losses on claims which might subsequently be rejected by the Association and kept the supervisors informed as to price changes and the activities of members and customers alike. It was also required that the names of all salesmen on commission and their fees be regularly reported.[25] Any member could dispute a price established on a new pattern by giving notice to the association secretary who would then obtain the article for examination and classification.[26]

The Board of Supervisors enforced the agreement, heard and decided all matters of dispute, including charges of violation of the agreement. In important cases the board sent a copy of the charges to the accused violator and gave him an opportunity to answer. If the defense was unsatisfactory, the Boards of Directors of the member companies gave directions by vote to the Association's Board of Supervisors.[27] The general aim of the Association was stated in Article 12 of the By-laws: "No deviation from the established prices ... shall be allowed, either directly or indirectly, and any departure from the spirit of this agreement by giving any advantage in any way, unless it be superior quality of finish-shall be deemed a violation of this agreement.[28] The attention to detail leads one to believe that the cutlery manufacturers had had enlightening experience-if not in similar agreements-at least in careful calculation and observation of one another. The articles of agreement provided no penalties, except the possibility of retaliation for violators, and set forth a procedure for withdrawal of a member on three months written notice.

The minutes of the Association indicate that troubles arose, though the reader cannot easily guess their exact nature. Little is recorded of the discussions that took place or the feelings expressed. The regular monthly meetings refined the definitions and classifications of goods, discussed price changes, and introduced a few changes in the constitution.[29] An attempt was made to adopt a uniform procedure for collections,[30] but the cutlers naturally found it difficult to discipline each other on the matter of extending time to customers. Second quality goods presented an

important problem. The Association insisted that they be labeled as seconds,[31] and the permitted range of discounts on seconds was raised from 30-35 percent to 35-40 percent.[32]

In 1871, a solid steel knife which seemed to infringe American patents was being imported in quantity. The American Cutlers decided to unite their interest in this type of knife, basing their action on Matthew Chapman's patent of 1867. The Association instituted infringement suits against "certain parties in Northampton, Massachusetts," and sent notice to importers that they were ready to proceed against any seller of infringing goods. The members voted to bear the expense of such legal action up to $2000.[33] They overestimated the effectiveness of such a sum. Sources of infringing goods were numerous and not easy to locate. Three months after the threatening letter to importers, the Association withdrew solid steel knives from classified lists and voted to allow members to sell them for whatever they could get.[34]

At this time there was some internecine warfare. In February, 1872 there was serious discussion as to "whether any kind of combination could be maintained." But as the meeting proceeded Landers withdrew certain charges against Russell (the nature of the charges was not divulged), and the following resolution was passed: "That, letting by-gones be by-gones, we, the directors of the John Russell Manufacturing Company, the Lamson and Goodnow Manufacturing Company, the Meriden Cutlery Company, and Landers Frary and Clark, in joint meeting assembled, do hereby renew our pledges to the combination known as the American Cutlers Association, and that from henceforth its terms and provisions shall be faithfully observed by all employers of each of the several companies."[35] The following month two new members, Herman Boker and Company of New York and the Beaver Falls Cutlery Company of Pennsylvania, joined the Association.[36] Despite renewed organizational strength, competition continued to break forth here and there.

Price lists had to be decided upon in advance of their effective date and were usually put into effect the first of January and the first of July. Customers forewarned of impending increases could rush their orders to suppliers before the beginning of the season. The manufacturer who gave his customers advance notice might accumulate enough orders at the lower price to keep him producing and selling for an entire season. To prevent this, the cutlers voted that orders received after April 9, the date of the price list, must be filled before July 1, the effective date of the price increases, or be repudiated.[37]

The Association struggled continuously with lists of patterns and prices, hoping to establish the same prices for like items. There is no wonder that controversies arose over evaluation of slight differences in style and that in the fall of 1872 Russell believed that a large number of Lamson's products were being sold at a lower price than Association classified counterparts made by his own concern. He claimed the privilege of reducing his prices to meet Lamson's and of making refunds on goods already sold for the fall trade. Urging an enforcement of the classified lists, he expressed a hope that "some arrangement may be made to save the combination."[38] The Association seems to have supported the Lamson and Goodnow Company by stating that there had been some misunderstanding" about classifications and by rescinding the lists of patterns for the two firms which it had put into effect two months before.[39] The record does not detail the eff ects of this decision on the Russell Company, nor does it describe Russell's reaction, which would have made instructive reading. The Association altered its method of pricing soon thereafter when amending the Constitution in December, 1872. It abolished the "classified lists" then in use, and members thenceforth sold their goods at "net prices based on the cost of production, which prices shall be fixed."[40] In effect, the process of establishing list prices and then selling goods at varying discounts was abandoned in favor of the simpler listing of minimum net prices. Discounts for prompt payment were eliminated; payments were to be within thirty days with interest charges for further extensions. Whether the Association retained quantity discounts the amendments do not make clear, but it seems probable that it did.

Production of large quantities of seconds was almost inevitable. Knives with minor flaws competed with first quality. The Association was concerned lest poor quality goods, sold as firsts, might be used to cut the prices of firsts and/or damage the reputation of the industry, and discards and ruined goods could likewise depreciate the market for seconds to such an extent that reasonably good seconds might become unsaleable except at scrap prices. Even more alarming was the practice of selling first quality goods labelled as seconds in order to cut the price. Consequently the amendment to the by-laws provided that: "all second quality goods shall be sold at net prices according to the quality of such seconds, but in no case shall goods with the first quality label be sold as seconds, and the term 'second' shall in no case be construed to cover discarded or unsaleable goods but to apply strictly to imperfect goods.[41] The shipping charge clause was also revised and shortened, if not clarified. It stated: "All goods may be delivered in New York free of expense and nowhere else, but goods may be delivered in Philadelphia, Boston and Baltimore from factory direct, when this rate of freight is less or equal that from the factory to New York, and when it exceeds the equivalent of freight to these cities, factory to New York may be allowed."[42] Thus

factory-to-New York was established as the maximum freight absorption figure. In effect the system became almost a single basing-point arrangement.

No records of meetings of the American Cutlers are available after December, 1872. It seems unlikely that the organization adopted amendments only to disband. Possibly a new secretary was elected in January and the minute books kept elsewhere, or the organization was undermined by the financial panic. Whatever control remained was very weak.

An interesting document by D. C. G. Field of Lamson and Goodnow, probably written in 1873, proposed a plan for the industry. Pointing to the low prices of 1872, excess capacity, and low profits, he suggested the abandonment of attempts to control prices directly in favor of a central selling organization to share the market and enforce specialization of firms. He thus hoped to achieve the "advantages of consolidation without its disadvantages." Field stated that the sale of table and butcher knives had become unprofitable because of "very active competition caused by overproduction of goods" and that the business, "requiring as it does, much skill and great capital," should be put on a sounder basis. He noted that: "several attempts have been made to increase prices, but owing to the increased facilities of manufacture by different companies, and a desire on their part to keep in full operation, the temptation to break prices owing to what is considered present necessity, is very great, and has not been, and perhaps never can be effectually controlled under any means that has yet been presented ... there are five companies at the present time in the United States so nearly equal in resources that when acting independently of each other, as is now the case, there is no controlling power strong enough to make itself felt."[43] The plan set up a selling agency for its members to sell and ship the entire product from a central office and warehouse in New York. This office would receive all orders, check customers' credit, apportion orders to producers according to Association rules, collect all bills, and in turn pay the manufacturers their share. Salesmen were to act for the Association and to carry the full lines of all the participating companies. Production was to be established as follows: "each company shall make only specific kinds to a certain amount, or in the ratio to a certain amount. These sales shall be divided into classes thirty or forty in number, representing the different kinds of goods made . . . Let these be assigned to each company by drawing for first, second, or third choice and then, alternately their proportion of the amount of goods to be manufactured. If any company has a specialty, it may be retained by them to form part of their proportion. No cutlery shall be made by either (sic.) company not especially assigned to them by the Executive Committee . . . If at the end of three months there is a disproportion of sales of one company over another, such disproportion shall be adjusted among the companies equitably. Each company shall fix the prices upon the classes of goods assigned to them; but they may be revised by the Executive Committee to harmonize all classes. It is intended that each company shall make just their proportion of the amount of goods it is considered the country will absorb, and we take the sales of 1872 as a basis of calculation.[44]

It was hoped that this scheme would substantially reduce selling costs and credit risks and eliminate many manufacturing costs incurred when each firm produced many styles, carried large inventory, and a varied staff of skilled workers, often only partially employed. All of these advantages, together with the supreme one-control of prices-would make the cutlery industry, said Field, "what it deserves to be, a remunerative business,-not a by-word and a reproach and ... cutlery stock will rank among the best investments in the country.[41] The interesting notion of limiting variety of each firm's product would not only have economized production costs, but also would have brought some strength in pricing by giving the individual firm that degree of monopoly that comes from differentiation. Such a scheme would have solved many of the problems involved in detailed classification of products, and in checking erosion of prices by minor concessions to favored customers. It is not surprising that this arrangement never materialized. With an uncertain and changing demand, the manufacturer naturally feared to exchange the opportunity to compete in a large market even for monopoly in what might prove to be a declining or risky one. Despite the greater cost and inconvenience of variety production, it is safer than overspecialization, especially in a period of depression or rapid change. It is well known that "cut-throat" pricing is ruinous, but that any excess of price over direct cost represents a temptation to the producer with excess capacity.

C. THE AGREEMENTS OF 1876-1880

Early in 1876 the officers of the Russell Company undertook price raising agreements with other firms.[46] During this year two kinds of agreements took shape: one of them a traditional price-fixing association of six cutlery firms, and the other, a limited marketing and market-sharing contract between three firms. The latter, though limited in scope, is the more interesting. It incorporated some features of Field's report but did not assign different special products to the firms involved. In November the Russell Company and Landers Frary and Clark agreed verbally to employ a common salesman for the California market and to divide their sales in that area so that Russell would

supply 55 percent and Landers, 45 percent of the total California sales of the two firms. Soon thereafter Lamson and Goodnow joined the other two firms in a similar agreement which was put into writing and superseded the previous verbal comrnittment.[47] According to the new arrangement, the three companies empployed a joint agent to cover the territory of Denver, Salt Lake City, and west of Salt Lake City. Each firm was given a percentage share of the total sales of table, butcher, hunting knives and "kindred goods." Their quotas were: Russell, 44 percent; Landers Frary and Clark, 34 percent; Lamson and Goodnow, 22 percent. They agreed to report their sales in this Western area every month. If one concern should sell more than its quota it was obliged to pay 10 percent of the excess "to either or both of the other parties to this agreement as their proportionate shares may show to be due." The agreement was to be binding for five years after January 1, 1877, its effective date, but withdrawal could be accomplished by giving three months notice.[48] The agent was to live in San Francisco, visiting other points in the area, and giving "attention to the general interests" of his three employers. His salary, paid by the three companies in proportion to their sales quotas, was established at $5,000, with a bonus of $50 a thousand dollars for sales amounting to over $100,000. His salary and commission were to cover all expenses. He was employed for a five year period and was obligated by written agreement to sell the goods at the prices and terms directed by the three firms, and to avoid prejudicing customers in favor of any one of the three.[49] There are no records to show how long this agreement lasted. It held for at least one season, for in July, 1877, the Russell Company paid to the other two companies sums totalling $799.01, the agreed 10 percent of its sales over its quota.[50]

Meanwhile a larger association had been formed, probably on the initiative of the Beaver Falls Cutlery Company of Pennsylvania. It was destined to a continuous, if stormy life of at least seven-probably ten years.[51] The Table Cutlery Manufacturers Association of the United States was begun on November 14, 1876 for "mutual benefit and protection, and the promotion of a fair business understanding and pleasant and kindly personal relations among its members." By 1879 its members were six in number: the big three-Russell, Landers, and Lamson and Goodnow-and the Meriden Cutlery Company, the Beaver Falls (Pennsylvania) Cutlery Company, and the American Cutlery Company (Chicago).[52] The Constitution and By-laws of the Association containedthe usual procedural regulations concerning annual election of officers and their duties, the functioning of the executive committee, allocation of votes-one for each firm-order of business for meetings, and joint financing of the Association, on a "share and share alike" basis.[53] Whether because of mere desire for completeness or because of previous experience with difficult meetings, it was specifically provided that: "Every member who speaks (at a meeting) shall rise and address the President," and "the mover of any proposition may fully explain the same, but no debate shall be permitted, except on a motion regularly made and seconded."[54]

The basic Agreement first signed in December, 1876, was altered in December, 1878 and December, 1880. Its first Article was in the nature of a preamble: "This Association is formed on a basis of EQUALITY IN EVERY RESPECT among its members in their relations with each other and to the trade. We desire to establish for our common manufactures a fair market value, and intend that every article made by us shall be furnished to the trade at as low a price as can be afforded. The true intent of this agreement is, that we, as manufacturers engaged in the same line of business, may work together, fairly and intelligently for ourselves and our customers, and, in our friendly rivalry, we promise to use toward each other no meanness or unfair dealing whatever."[55] Surely no cartel has ever had a nobler aim.

The content of the Agreement was similar to the 1871-72 Constitution, but with some difference in the discount system and more detailed treatment of the complex problem of second quality goods. Members agreed to conform to Association price lists on all domestic sales. Free pricing was permitted on exports, but producers were to be ready with custom-house certificates to prove to doubtful competitors or Association officials that such goods had actually left the country.[56] Discounts of 4 percent for cash in ten days or 2 percent in thirty days were permitted. Sixty days was the maximum time to be allowed for payment.[57] Quantity discounts were allowed to two classes of customers-5 percent to those buying $500 worth of first quality goods in a season from Association members, and 12½ percent to those buying $1,500 worth. Customers or commission buyers who attempted to gain discounts by consolidating several orders under one name were to be penalized by losing the discount.[58] Members were responsible for compliance with the rules by their salesmen and agencies, and agreed to employ only salesmen who conformed and to use agencies only in Baltimore—where, it will be remembered, a number of them were already established.[59]

The combination struggled to separate second quality goods from the first quality market and to establish classifications that would prevent customers from being unduly cheated or, more important, from receiving undue bargains. The Association fixed the prices of most seconds and required them to be clearly marked and packaged in ' gross lots. Seconds in kinds of goods not regularly classified were to be sold only at periodic public auctions arranged by the Executive Committee. Terms and cash discounts were the same as those established for firsts, but

no seconds could be used as a basis for quantity discounts.[60] To prevent error or fraud in classification, all second quality articles must pass the inspection of an Official Inspector of Seconds. Goods which, because of inferiority or mere mediocrity, did not fit into either second or first quality category came before the Association which would then establish special prices for them." The agreement was to be strengthened by black-listing customers who deducted larger discounts than were due them or who otherwise evaded association rules." The practice of guaranteeing prices to customers to protect them in case of price cutting was discontinued, and the Association firmly stated:

The violation of this agreement on the part of any member shall in no way absolve any other member, neither shall such violation be met, but it shall be promptly reported to the Executive Committee, with proofs of the same, and if it is not satisfactorily explained to them, a meeting of the Association shall be called at once to investigate the matter.[63]

In 1880 the Greenfield Tool Company wrote to Russell urging him to "keep up the Association to prevent the present cutting of prices" and suggested that all manufacturers of cutlery or of a "partial line of cutlery" should unite. The Association's failure to enlist such firms as the Clement Company, the Meech Hart Company, and the Northampton Cutlery Company caused it to lose control of knives sold for silver plating, especially the solid steel handle and iron handle goods whose prices "dropped out of sight."[64] The pocket knife trade, too was feeling the sharp pangs of competition and low prices. In July, 1881, seventeen pocket knife makers met to form an association.[65] They doubtless adopted a price list, but no record of their activity has been found.

D. THE POOLS AND COMBINATIONS OF THE 1880's

In 1881 the almost defunct Association reorganized itself as a pool, the American Table Cutlery Manufacturers Association,[66] and added one new member, the Frary Cutlery Company, to the six long-standing participants. The procedures for pricing and discount departed little from the 1876-1880 practices. Each participating Company was given one vote in the Association, and the Executive Committee was made up of one representative from each firm. Monthly meetings were to be held in New York, and the Association's expenses were to be borne by assessment on each member pro rata, according to the pool allotment in force at the time of the assessment.[67] The agreement set up a classified list of minimum prices and discounts for cash in ten days from invoice date (4 percent) or thirty days (2 percent).[68] Rebates were offered to customers who bought specified quantities from Association members and who maintained Association list prices. Purchasers of $500 worth of goods in a season from the Association's members could claim a 5 percent rebate at the end of the season if they maintained the required prices and confined their cutlery dealings to Association members. Purchasers of $1,000 and $3,000 worth of goods in a season received 7½ percent and 10 percent rebates respectively at the end of the season, again with the proviso that they sell at Association-fixed prices. They were not obliged to deal exclusively with Association members but were offered a strong inducement to do so by an additional 5 percent rebate after a season of such loyal behavior.[69] The payment of rebates to customers only after a season of compliance with cutlery Association rules gave the organization a strong enforcement tool. All purchases had to be listed with the Association both by sellers and by buyers, thus providing a double check for quantity rebates and pool allotments. The regulation was further strengthened by outlawing guarantees of prices[70] and by making Association members responsible for their salesmen's observance of the rules.[71] All orders sent and accepted were binding on buyer and seller alike and must include definite specifications and dates of delivery. Thus the Association hoped to avoid secret rebates and overgenerous credit arrangements.[72]

Freight charges could be paid by the seller to New York, Boston, Philadelphia, Baltimore, Providence, Portland and Wilmington on goods sold to firms located in these cities. Goods shipped beyond New York to the rest of the country or beyond Boston to the rest of New England could be delivered in these two cities free of transportation charges only if they were bought by firms there and resold and re-shipped.[73] Thus control of outlets was centered geographically, a fact which probably facilitated enforcement of the fixed resale prices. Members could introduce new patterns only at the beginning of a season when the Association met to classify and set prices on its entire output. They agreed not to copy each other's new patterns except by permission.[74]

The chief innovation of this Association was the pool arrangement which provided for percentage allotments to be fixed each season, supposedly giving some consideration to the previous season's experience as well as to prospective output. The five Connecticut Valley firms were allotted, in all, over 95 percent of the total market.[75] Each member was required to make a monthly report of sales on the basis of list prices, deducting 10 percent on

firsts, 5 percent on seconds, and 4 percent from the gross sales.[76] Departures from allotted quotas were to be handled as follows:

When any member of the Association shall be found to have delivered more than such proportion, the Treasurer shall assess him ten percent, on the amount of such excess, and the same shall be passed to his debit on the books of the Association, and likewise credited in due proportion to the member who shall fall short of his percentage-a statement of each month's equalization to be reported at the next monthly meeting, and a settlement to be made by a check drawn to balance on the 15th of October, for the months of June, July, August and September, and on the 15th of January for the months of October, November and December.[77]

Reports had to be made by two individuals in each Company, an active officer and the bookkeeper, on Association affidavit forms, sworn to and notarized. The member's oath is as follows:

FORM NO 1

AMERICAN TABLE CUTLERY MANUFACTURERS' ASSOCIATION

MEMBER'S OATH

State of _____}ss.
County of_____ }
_____being duly sworn,
says, that he,_____
is familiar with the business of the said concern during the calendar month, ending on the first day of the present month, and with the prices fixed for that period by the American Table Cutlery Manufacturers' Association of the United States, and that, during the said month of_____,18_____, the total sales and deliveries of such goods, as are specified in Article XV of agreement, extended at the Association list price, and subjected to the discount of ten and five percent., and four percent, from the gross, amounted to $-_ net cash, no more and no less, and that he has not, nor has any member of his said concern, or any person employed by him, them or it, connected with him, them or it, in said business of manufacture of table cutlery, to the knowledge or belief of deponent, sold or delivered any table cutlery of any description during said period, at a price less or on better terms than that fixed for such goods by the said Association as aforesaid, nor accepted any such diminished price, either directly or indirectly, by means or device of eturn, rebate, discount, allowance, preference, gift, wager, barter, exchange, reward, brokerage, commission or otherwise, nor made nor had ith any person during said period any promise, agreement or under tanding, express or implied, whereby such diminished price would be in act accepted or received by deponent or said concern, either directly or indirectly, at any time whatever; and deponent further says, that he as no knowledge, information or belief that any employee of his or of said concern, or any person connected in business with him, them or it, has divided his commission, brokerage, discount or other pay or reward, for or during said period, with any purchaser of such goods, either directly or indirectly, or is or was during such period a party to any agreement or understanding for any such division, express or implied; and that the above is a statement of the aggregate amount of all table cutlery specified in Article XV., delivered by him, them or it, or by any of his employees or agents, said amount being the entire sales of this class of goods during the month of_____; and deponent makes this affidavit in good faith, voluntarily, and without equivocation or mental reservation.

Sworn to before me this_____day of 188_____[78]

The few sparse minutes extant of 1881 and 1882 meetings show the members chiefly concerned with setting specific prices, refining definitions, discussing quotas, classifying odd patterns and second quality goods, and composing the affidavits to be sworn to by members and their bookkeepers.[79] These measures were incorporated into the By-laws as outlined above. A committee set up to investigate "any special arrangements, contracts, or irregularities" in the sale of Association-listed items. It reported: "There is a disposition to put this Association on an honest basis and live to it."[80] With this indication of unity, the organization voted a price increase of 50 cents on all except "iron handle goods," and raised the assessment on members exceeding their quota to 25 percent.[81]

It was, of course, impossible to achieve unanimous enthusiasm over the assigned percentages in the pool. The Landers Frary and Clark Company, which overshot its mark by more than $20,000 in the last half of 1881, reminded its fellow-members that it had accepted its quota only as a compromise, requested an increase in its share, and vigorously opposed the 25 percent penalty on excess sales. The Meriden Cutlery Company, which was selling above its quota by small amounts, also opposed the increased pool assessment. The Beaver Falls Cutlery Company, which had fallen far short of its quota, nonetheless demanded a larger one-whether motivated by pride or by a realistic expectation of expansion. It finally agreed to an arrangement increasing its quota .5 percent and accepted the 25 percent tax. The American Cutlery Company, the smallest participant in the pool with a quota of only 61 percent, complained about its share and threatened to withdraw. [82] In the first six months of 1882 it oversold its allotment by 2.3 percent. In July its quota was increased to 9 percent and the difference was subtracted from the quota of the other members except the Beaver Falls Company. Landers, .0Frary and Clark opposed this alteration of the contract, but finally felt obliged to accept it.[83]

The minutes of the meetings indicate what can easily be guessed, that those who favored the status quo in quotas and the increase in assessments were firms which were not filling their quotas. It is interesting to note that the strongest company in the pool, Landers Frary and Clark, found itself compromising on every occasion when other members firmly demanded change. This large firm contributed, by virtue of oversales, considerable amounts to the pool in 1881, and, despite readjustments for other firms, it received only a minute increase in its share of the market for 1882, accepted perforce the 25 percent assessment, and continued to pay a handsome tribute to the pool. The Meriden Cutlery Company was at a similar disadvantage. It accepted an 1882 quota somewhat below its

1881 sales and considerably below its 1882 performance, thus contributing large sums to the pool in every one of the first six months of 1882. Thus it appears that the established firms of the Connecticut Valley had to make some sacrifice of their relative position in the trade in order to maintain the combination. It was worth their while to make concessions to prevent the disaffection of the firms outside the Valley. Beaver Falls and American were smaller than the Valley firms but they were large enough to threaten the price structure and far enough away to be somewhat harder to control.

Price cuts and rumors of price cuts continuously plagued the organization. In 1881 and 1882 trade was reported to be booming for the Russell Company which was expanding its pocket cutlery output and instituting a silver plating department.[84] But for the rest of the trade it was a period of anxiety, and during the three years to follow, business conditions were poor and prices, low. In March 1882, a cut in production was seriously considered by the Association.[85] In May prices on "iron handle goods" were reduced by 50 cents a gross because of the low prices charged by producers outside the Association.[86] Sharp price competition in Canadian sales threatened American prices, and it was claimed that many of the goods sold for export were actually marketed in the United States at very low prices.[87] In October, after many mutual reproaches for violations of the rules, each member signed an agreement to abide by the prices of the previous July.[88] A year later however the Treasurer of the Russell Company reported that Association members often departed from fixed prices, and he secured authorization from the Company's Board of Directors to use his discretion in the event that it became necessary to withdraw from the pool.[89]

1885 saw a number of different starts at organizing in different trades. In Boston a number of cutlery makers met to consider reducing production and raising prices. They were not a Connecticut Valley group, and their specialties seem to have been machine and trade knives. No agreement was reached and the meeting was reported to be "rambling and unsatisfactory."[90] Scythe makers were also meeting. They lowered their prices and appointed a committee to consider production limitation.[91] The only successful venture of this kind appears to have been that of the solid-handle cutlery producers. As early as 1881 the specialized makers of solid steel-handled knives for silver plating, had considered forming their own Association to meet the competition of the Table Cutlery Association and to present a united front to the large silver platers .[92] Nothing seems to have taken shape at that time, but correspondence indicates that they compared notes on prices and formed occasional understandings. For instance, one manufacturer wrote to another that it W as impossible to make knives at the going prices and said, "I will do whatever you say and will not abuse your confidences."[93]

On December 17, 1885 a group of Connecticut Valley concerns held a meeting and organized the Solid Steel Cutlery Manufacturers Association. Seven companies were represented, but only two of these had been members of the former cutlery pool. They were Landers Frary and Clark and the Russell Company. In addition there were the Clement Manufacturing Company, the Upson Hart Manufacturing Company, a firm in Connecticut specializing in fork-making, the Silver Plate Cutlery Company of Meriden, the Northampton Cutlery Company, and the Williams Brothers Manufacturing Company of ConneCtiCtit.[94] Missing was the important name of Lamson and Goodnow

which remained apart. The Meriden Cutlery Company and R. Wallace and Sons became members soon after the formation of the organization.[95]

With a limited number of articles to control, the group hopefully signed a price list covering the standard types of first quality goods and "Sheffields" (seconds) with additional charges for "etching" and "swaging." Quotas were assigned in dozens of knives and forks, and these quotas, with slight alterations in May, 1886, remained the same until 1890.[96] The pool assessment was 5 cents a dozen for production over the assigned quota.[97] No copy of the By-laws is available, but the regulations appear to have been somewhat simpler than those of the former Table Cutlery Association. It is probable that geographic concentration and similarity of product had already brought substantial uniformity in such trade practices as shipping charges, definitions of first, second, and third quality goods, and discounts. It was, however, necessary to provide that each firm file two affidavits stating all their sales with a pool commissioner each month.[98] A rebate of 5 cents a dozen was offered to all who purchased from Association members 50,000 dozen or more knives and forks in a year. During the three years for which Association Minutes are available, prices were raised 25 cents a dozen in all, in three steps: 5 cents in July, 1886,[99] 15 cents more in January, 1887,[100] and another 5 cents in 1890.[101] Knives that had sold at 85 cents a dozen in 1886 were, thus, priced at $1.05 four years later. Differentials for special operations, design, and quality differences remained much the same.

This rise was an indication of strength, but these four years were years of improving business, and it is not easy to conclude that the Association was the decisive influence. Silver platers were not entirely reluctant to see price competition limited, for they were willing to pay a little extra for better quality-if their competitors were forced to do the same.[102] Signs of the weakness of the typical pool organization were evident. The 5 cent assessment was not large enough to discourage members from producing more than their assigned shares, and a motion to raise it to 10 cents failed.[103] There was no recorded dissatisfaction with production allotments, probably because the 5 cent tax was far from prohibitive. Several attempts to induce the silver platers to establish a fixed price on plated knives and forks met with failure.[104] The maintenance of prices during the first year was seriously hampered by a previous contract, apparently for a large quantity at a very low price, between one of the members and the Meriden Britannia Company.[105] That it was an unprofitable price can be concluded from the fact that the contracting producer was slow in filling the contract, and the other members, when offered the opportunity to assume part of it, rejected it.[106] Subsequent regulations provided that old orders, unfilled at the beginning of a new season, must be cancelled or filled at the new season's prices.[107]

Price regulation on first and second quality goods led to regulation of thirds, both by a minimum price and by the provision that no knives that could be used as "Sheffields" should be classified as third quality. Soon after this provision was adopted the price of seconds was made optional, but their quality had to be sufficiently poor to warrant the classification.[108] The competition of goods labelled third quality must have undermined the market for seconds to such an extent that prices of seconds could no longer be kept up. It was hoped that first quality prices could still be protected.

In 1888 the 5 cent quantity discount was abandoned and replaced by a preferred list of customers who were entitled to the same rebate. The basis of the preferred listing was not stated in the minutes. No doubt bargaining power as well as actual quantity purchased was considered; and the frequent changes in the preferred list suggest that it may have been used to discipline customers whose resale prices, credit standing, or dealings with non-Association producers incurred Association displeasure.[109] The Meriden Britannia Company and Rogers Brothers received a special rebate of 10 cents a dozen in 1890.[110] The rebate here, as in other industries, was a precursor of combination. The International Silver Company was in the making.

The Association never gained the adherence of all producers in the trade, and the early withdrawal of the Russell Company was a severe blow.[111] Later Landers Frary and Clark and Williams Brothers, which together had produced something like 20 percent of the Association's knife output, dropped out.[112] By 1890 it is doubtful if the Association controlled more than 50 percent of the solid handle industry. Association members consequently lost orders to firms outside the group or willing to make secret concessions.[113] Meetings were fewer and attendance sparse at the 1890 meetings,[114] but regular pool reports, assessments, and payments continued through 1896.[115] By this time two of the members, The Clement Company, and Upson and Hart Manufacturing Company, were turning their financial hopes to a new product.

While participating enthusiastically in the Solid Handle Association, several cutlery makers were attempting to stake claims for themselves in the hollow handle trade. The Clement Company made a contract with the Meriden Britannia Company giving the latter full and exclusive control of goods made under the "Beecher" patents. In return the Meriden Britannia Company agreed to buy from the Clement Company 25,000 dozen hollow handle knives in the year ending July 1, 1887, and 3 7,000 and 50,000 respectively in the two following years.[116] The Clement

Company made a strenuous attempt to patent all possible ways of making a hollow handled knife and "keep competition off as far as possible."[117] The Upson and Hart Company strove equally to secure patents on this kind of knife. Almost ten years of patent litigation and quarreling between these two companies ended in 1892,[118] when Clement abandoned the idea of appealing an adverse court decision. Competition in prices of hollow handle goods was held in abeyance for a time, but before long these models appeared in every blade shop. So it was that during the life of the Solid Steel Cutlery Manufacturers Association, solid steel goods were losing some of their importance, and the sharpest competitive struggle was centering elsewhere.

The other sectors of the trade seem to have survived without very much organization, but they probably retained their contacts, and seem to have had a "Gary dinner" on occasion. In 1888 a reporter asked a number of cutlery manufacturers who were meeting in Boston whether they planned to form a trust, and was informed that they "met for a good dinner, had no association planned, no trust."[119]

E. INTEGRATION

Not until ten years later, after the collapse of the Solid Steel Cutlery Manufacturers Association, did the industry consider a trust or a consolidation. The Clement Company tried to sell out to the Meriden Britannia Company, its chief customer. A plan was proposed whereby the Meriden Britannia Company would hold 40 percent of Clement Company stock in trust and receive dividends which it would then use to buy the stock over a period of five or ten years. In return the Meriden Britannia Company would contract to buy all of its knives of certain types from the Clement Company. The silver plating concern rejected the proposal, probably because it felt it could gain more, both in prices, and in access to innovations, on the open market.[120] Possibly the Clement Company's valuation of its stock seemed a little high.[121]

In 1898 a number of shear manufacturers bad been brought together by an active promoter who had formed a wire nail combination and some other consolidations. The National Shear Company was the result. It was hoped that 90 percent of the shear industry could be included, but the combination finally achieved control only of about 60 percent. Only one of the constituent concerns, the Seymour Cutlery Company of Holyoke, was a Connecticut Valley firm. The largest shear manufacturer, located in New Jersey, did not join. The shear industry had been going through a series of bankruptcies, falling prices, and rugged competition. The combination closed down two of its plants completely and, aided by business recovery, proceeded to advance prices, but eventually failed and was sold at a receiver's sale. Most of its assets were bought by a new company, the International Cutlery Company, at a considerable reduction in value.[122] Other makers of cutlery were approached by the same promoter, as well as by two others, with plans for a consolidation of cutleries, They were met with singular lack of interest, and the schemes never developed beyond initial planning stages.[123] Landers Frary and Clark were pessimistic about the prospects of consolidation and declined to waste the company's time until a Plan was made and agreed upon by others.[124] The Clement Company struggled to form a combination but finally concluded, "there does not seem to be among us a man of sufficiently strong character in the cutlery business to formulate a plan. All the men I have seen say prices are too low and expenses too large, and each expects disaster to someone, but still they hesitate."[125] The larger companies set a high cash price on their business,[126] and the improvement in trade conditions relieved the pressure toward control. Lee wrote, "I have all the business I can attend to so I am not giving myself any trouble."[127] At the same time, informal cooperation was continuing. Friendly manufacturers kept each other informed of their prices[128] and expressed willingness to establish terms for our mutual advantage[129] in dealing with a large In customer and gratitude that "there would be no ugly competition"[130] other cases one company would refrain from selling to another's customers for fear of retaliatory invasion of its own special market.[131]

While the cutlery groups were struggling to discover some kind of organization or order in their industry, larger and stronger organizations were growing up on all sides. It was an era of trusts and combinations, and the formation of the National Shear Company was only a minor symptom of the trend. Both the suppliers and the customers of the knife blade makers were achieving centralized controls, and cutlery labor, as will be seen, was able to set some lower limits to wages. The steel and silverware industries were developing sufficient organization to control some forms of competition, and this very fact accentuated competition between cutlery makers. The price of steel they could only take or leave, and the silver platers could shop around among them for the lowest prices. Cutlers were left very little freedom to determine their own prices and had to make the most of every penny of costs they could save. They were frequently forced to make price contracts contingent on the prices of labor and steel.[132]

The Silver Platers had been growing in size and power ever since their introduction of electro-plating in 1847. Although many concerns did electro-plating, and it was a process that could be set up in a cutlery shop with little capital, the silver business grew up, for the most part, separate from the cutlery industry, and in larger concerns. The

firms that made cutlery, plated it, and marketed it themselves, R. Wallace and Sons, Williams Brothers, and the Silver Plate Cutlery Company, tended to be small or medium sized. The leaders in the silver industry-especially the Meriden Britannia Company and Rogers Brothers-attained their size and strength through the possession of popular trade marks, designs,[133] and large scale marketing. Although competition among the silver concerns was vigorous, it was also reported that "relations had been more or less friendly" and that the combination of the leading interests in the trade in 1898 was a "family affair."[134] The International Silver Company, made up of thirteen formerly independent concerns, controlled, at its inception, 55 to 60 percent of the plated silverware product of the United States. This mammoth company raised prices by 10 percent, claiming that this was no more than commensurate with prices of labor and raw materials. At the same time the concern was apparently attempting to increase its hold on the industry by brand cutting.[135] The year after its formation the International Silver Company acquired four more silver plating concerns, and in the next six years it added three more.[136]

Meanwhile the Oneida Community, transformed in 1880 from the old cooperative community to a modern corporation, was growing into the second largest silver plating company in the United States. As the many smaller silver companies joined the combines, vertical integration became more common. Before this development many cutleries had had their own plating departments, and several middle sized producers of flatware had made their own cutlery. But the making of cutlery demanded enough hand skill and technical experience to give the specialized knife-blade makers an important place. As the large silver plating companies grew financially they bought cutlery plants. In 1901 Win. A. Rogers, Ltd. bought the E. E. Wood cutlery plant in Northampton, retaining Mr. Wood as manager.[137] This shop later became a part of the Oneida Community when Oneida bought the Rogers business in 1929[138] and was later transferred to Sherrill, N. Y. The International Silver Company set up its own cutlery factory in Florence, Mass. in 1920 in an old sewing machine plant. Thus the independent knife blade concerns were left to supply the small silver platers and those medium sized ones which did not produce their own blades. The scope of their market was diminished, but, since several of their competitors became part of the combines, competition for the market that remained was not disastrous. The Northampton area remained a leading center of blade-making, and the process of vertical integration even brought an additional cutlery plant to the area. Large selling organization, trade marks trusted by the public, and possession of a tremendous assemblage of popular designs, gave the International Silver Company its continuing strength. The name of Rogers was a word to conjure with in the silver industry. Members of the original Rogers family made connections with several competing silver companies, and trade-mark suits through the 1880's and 90's indicate the value placed upon the name. One salesman commented "I have tried to sell knives plated at $2.35, but it is all Rogers. If it was John Rogers it would go. But Rogers it must be on the knife if plated."[139]

While large scale business was absorbing the silver plated cutlery trade, other cutlery specialties were little, if at all, affected. Competing actively in price, quality, and materials, they were able to hold their own without being driven to combination. In 1906 a number of cutlery makers worked together for a brief period to settle confusion that had arisen over grinding machines. There were several different machines, all patented, and the user of any one was in danger of being sued for infringement of a similar patent. Eight cutlery producers, including the prominent Connecticut Valley firms, associated to purchase the patents of three inventors of grinding machines-Hemming, joy, and Johnston. They signed a five year contract agreeing to bear jointly the costs of suits arising under the patents, but voted specifically not to pay any judgments that might be rendered against any of the parties involved.[140] Each firm was to pay $50 on every Hemming grinder it used until $9,000, the price of the patent, was collected.[141] Similar arrangements were made with the other two inventors. Members of the group agreed not to sell their machines without the consent of the other signers and the proviso that the buyer abide by the same contract. The possession of the machine grinder gave this group competitive advantage, but they seem to have been more concerned to protect themselves against patent litigation than to control the machine. They made no provision to sue infringers of their patents and seemed not unwilling to admit to their "patent pool" outsiders who would support their defensive program.

There were doubtless other kinds of informal cooperation among cutlery manufacturers. In 1915 it was suggested that cutlery makers urge silversmiths to standardize the size and shape of their handle rims to save the blade-makers time and money.[142] The standardization plan did not meet with favorable response among blade-makers, but the suggestion apparently set off an abortive scheme to "keep the silversmiths from getting our last cent,"[143] I via a price agreement. The "Table Cutlers Society" as planned was to have a $25 initiation fee and a $25 annual assessment for expenses. An open-pricing scheme seems to have been the method chosen, and two or three firms exchanged price lists and discussed the problem of dealing with the International Silver Company which had to be handled with care because it was equipped to make the goods itself or buy them from other independent producers.[144] The idea died in less than two months because of lack of support.[145] Any unrecorded informal

agreements that may have existed were ineffective. Not until 1933 was another association formed, and its aim was to draw up and approve an N.R.A. code.

The interim period saw wartime shifts in production and prosperity, the use of new materials and techniques, depression in the pocket knife industry, and the entry of new firms into cutlery manufacture. The growth of larger wholesaling organizations and chain jobbers, mail order houses, large department and retail chain stores-all of these meant greater competition among the producers of cutlery.[146] Cheap, fast selling items found substantial demand, and the selling of commodities in groups weakened the specialized producer. Advertising, carried on by numbers of these firms, strengthened them little if at all. On the other hand, the prosperity of the 1920's for most of the industry mitigated the impact of these changes, and it was only in the depression that loud complaint was heard about undue competition, the power of the chains, the cheapening of cutlery quality and price, and the "unfair" advantages of the multiple product firms.[147]

F. THE CODES

In November, 1933 a basic code of Fair Competition was set up for the various industries in metal fabricating, finishing and coating. Hugh Johnson, in introducing the code, pointed out the fact that the larger divisions of metal manufacturing were organized through powerful trade associations which drew up and submitted their own codes of Fair Com petition. Hundreds of manufacturers producing small diversified items, some of them overlapping several industries, were not sufficiently organized to submit a network of codes to cover their operations. Many of them had no association at all. In August, 1933 a group of representatives of trade associations and individual manufacturers met and formed a Fabricated Metal Products Federation. They drew up a basic code, number 84.[148] The separate industries were to be encouraged to write supplementary codes to put the basic code into operation and to codify their own trade practices. Like all the N.R.A. codes, number 84 established the right to collective bargaining and a schedule of minimum wages and maximum hours of labor. Competitive methods were regulated by the prohibition of such "unfair trade practices" as: defamation of competitors or deception about their goods or practices, imitating trade marks to deceive customers, misbranding, deception as to quality or quantity of goods sold, bribery of agents of customers to influence their dealings with competitors. Price cutting was discouraged by defining as unfair the practice of selling at prices below cost and granting secret or discriminatory discounts or rebates to customers. Necessary exceptions permitted below-cost-selling of seconds and dropped lines or to meet existing competition.[149]

The price and trade practice provisions of the code were statements of general aims, but could not be implemented without the work of associations in the specific industries. The supplemental code for the cutlery industry provided for uniform cost accounting, and price-filing which, in the hands of a stronger association, might have amounted to direct price-fixing.[150] The American Cutlery Manufacturers Association, formed to draw up a cutlery code, was divided into six sections,[151] each of which had an executive committee and a representative on the supplemental Code Authority. The Code Authority was given the responsibility of prescribing uniform accounting methods and receiving from the members lists of their prices, discounts, terms of payment, freight allowances, etc. Price lists of each member were made immediately available to other members who could then file revised lists if necessary to meet competition. Any changes in prices had to be filed with the Code Authority in advance, and it was an unfair trade practice to sell at lower prices than those filed with the authority. If the Code Authority found an “emergency" in the industry arising out of "destructive price-cutting" it could go so far as to prescribe "lowest reasonable cost" of the products and make it an unfair trade practice to sell below this figure.[152] Thus any producer cutting his prices was obliged to inform his competitors and could be reasonably certain of swift retaliation.

Other than price concessions to customers were regulated in some measure. The standard terms of sale were established at 20/0 discount for payment in ten days, net (or list) prices for 30 days payment. The list of prohibited "unfair trade practices" was identical in some respects with the basic code: inducing breach of contract between a competitor and his employee, customer or source of supply; deceptive grading or labeling of goods as to quality or quantity; defamation of a competitor, secret rebates and the like. In addition to this list of general practices the cutlery code ruled out consignment selling, accepting contracts for stock without a "corresponding commitment on the part of the purchaser to buy a specified quantity of each item; false invoices or false records of sale." The code's probable effect on prices was in an upward direction, but article 11 stated that price increases, except to meet individual costs should be delayed, and when made should be limited to actual increases in the seller's costs. Whatever the general verdict on the code may be, the Mail Order Association of America thought it effective enough to warrant the protest that its price filing system was a concealed form of outright price fixing.[153]

The silverware industry was not included under the metals basic code, but drew up a very similar code of its own. Somewhat more elaborate than the cutlery code, it had a stronger organization behind it. Prices were to be set

at or above cost, and the Code Authority was empowered to evolve a uniform cost system. A series of rules prohibited various kinds of discrimination, deception, and secret concessions.

The distinguishing mark of the silver code was its emphasis on quality, design, and trade marks. The Code Authority was authorized to establish a series of quality standards for the various grades of the industry's products. Members were then required to label their goods according to the code grading system. It was an unfair trade practice to sell goods which did not answer the specifications of the quality mark which they bore. All products had to be marked with the manufacturer's name or trade mark. Imitating or copying a competitor's designs or brands and stealing his trade secrets were forbidden .[154]

The members of the Cutlery Association were 91 in number and represented about 96 percent of the industry's productive capacity. The Silverware Association represented 90 percent or somewhat more of this industry. But the large coverage of the code was not, apparently, an index of strength. The Cutlery Code was in force too short a time and with too little industry unity for a real test of its possibilities.

The Code Authority developed a "safe minimum cost figure" by estimating direct cost for each operation on each line of goods and then adding a "reasonable" percentage for overhead.[155] The overhead was the chief source of difficulty. Cutlery manu facturers had for years known the labor and materials cost per dozen of most of the patterns they produced. But they had always had difficulty in assigning and charging the cost of dies, depreciation, and management. It has been noted that manufacturers had frequently charged extra for small lots and special patterns; it was quite clear that such orders should bear a more than proportionate share of indirect costs. In some cases the silver plater paid for and owned the dies which made his own patterns, and this solved the problem for the cutlery; but in many branches of the trade, the cutlery had to bear the risky investment in dies and, not able to cover it all on initial orders, assumed or hoped, that the cost would be covered eventually. Similarly, costs of management, selling, and depreciation were impossible to assign when the output which was to bear them was multiform and based on an uncertain demand. Especially in the early 1930's, past records gave very little aid in attributing costs for present or future pricing. Added to all of these problems was the fact that the firms in the industry were variously organized. The "typical" middle sized firm was keyed to a specialized group of products with a relatively high overhead and an almost inescapable selling expense. Some of them, being family concerns, had a rather large and not easily varied management cost.

The multiple product firms, such as Remington Arms and Landers Frary and Clark could minimize or even disregard their selling costs on cutlery because they sold knives to jobbers and wholesalers who were buying their other products. It was even rumored in the trade that full-line forcing gave the cutlery output of this kind of firm an almost unassailable market. Whether the rumor was correct or not, the easy availability of cutlery sold with larger or more important items constituted a natural full-line inducement even without any forcing. The prices of these firms tended to be reasonably comparable with, if not lower than, the prices of the specialized cutleries. On the other side of the picture was the smaller manufacturer of cheap goods who, by extreme specialization on a few fast-selling items, managed to do business with little investment and a low cost of supervision. The shift of demand to these cheap items left the older firms with excess capacity which would necessitate a considerable rise in unit price, if price were to be based on the total cost of production. It was, of course, in this kind of situation that pricing based on total cost was most desired and least possible for cutlery makers. The makers of cheap stamped-blade knives had the advantages both of lower initial investment and fuller utilization of capacity.

It is not strange, then, that the "reasonable cost" standards, so painstakingly worked out by the Code Authority and its accountant, were not enforced. The Executive Secretary of the Association reported that many manufacturers did not know their costs[156] and the writer might add that none of them really did, and if they had, such knowledge would have served little practical purpose. The industry saw some improvement during the code period, but, as is well known, the causes of 1933's modest recovery were not solely, if at all, to be found in the N.R.A. Codes. Em-ployment in the cutlery industry increased by 22'. percent between July and October 1933, reaching the heroic figure of 4,690 in the fall month. Payrolls increased by 37' per cent, reflecting a rise both in wage rates and in average weekly hours worked.[157] Sales increased by something over $100,000. Prices were slightly increased on a number of items to cover wage increases and increases in the cost of steel.[158] Although conditions in the industry improved, prosperity was not achieved, and the code was not strong enough to inhibit widespread price-cutting, and alterations and cheapening of products. With the abolition of the N.R.A. the American Cutlery Manufacturers' Association disappeared. Revived in the war and postwar years, its purpose was government and public relations.

The long story of attempts and failures of attempts to organize and discipline the cutlery industry demonstrates both the persistence of the desire for protection against competition and the resilience of the competitive drive in an industry of this kind. The small, closely held corporation arose in an industry whose techniques and markets made it possible; and, once established, this form of financial organization encouraged the continuance of the small firm

which was often more concerned with survival and independence than with larger profits and integration. Many of the monopolistic methods and organizational forms which have been used by larger industries have been considered and attempted in cutlery. A steady growth in the size of cutlery firms reflects the evolving technology, the development of administrative methods in multi-commodity production and selling, and a growth of the general market. But the cutlery industry's diffuseness of ownership, its multitudinous variety of special products and its individualism have discouraged promoters of combinations and its stakes have been too small to excite Wall Street.

CHAPTER VI
LABOR IN THE CUTLERY INDUSTRY

When cutlery work was a skilled trade and cutlers were scarce and specialized craftsmen, their wages compared favorably with other industries. Mass production has transformed their skills, one by one, to unskilled and semi-skilled operations. Mechanization has brought to the cutlery worker, as to other workers in the United States, a gain in money wages and in real wages, but they have lost in relative position. Oncee a fairly high wage group, cutlery workers are today amongst the most poorly paid in industry. Tool and die workers and machinists are now the highest paid groups in the industry, while hand grinders and hafters are no longer the aristocracy of the trade. Competition among manufacturers has not only encouraged labor saving methods but has also furthered the development of cheap items which require little skill in production. These factors, together with the pressure of price competition, have kept wages low. Cutlery workers were somewhat more mobile before 1900 than they are today. They were often immigrants, young, male, with few ties in any American community. Employers recruited actively from city to city and often paid travel expenses for workers they wished to attract. Today the cutlery worker is more likely to be settled in a community, living with his or her family, and less eagerly sought by employers. About a half of the workers in the silver plated and steel flatware industry are women,[1] with the lack of mobility and low wages usually associated with women's work. Trade unionism, which flourished among skilled crafts in the late 1880's and early 1900's, practically vanished after 1907 and hardly touched the industry again until after World War II.

A. THE SUPPLY OF LABOR

Early manufacturers in America needed workers who could forge, temper and grind. Such were available in valley towns, but few had the specific skill required for performing these operations on fine cutlery. Especially grinding and finishing required years of training for true proficiency and were unhealthy jobs not always attractive to young New Englanders choosing their trade. In 1843 the employers were desperate for workers of all kinds, forgers, filers, hafters, grinders, and finishers.[2] John Russell was continuously looking for workers and wrote, "We'll have to give up some of these goods unless we employ more grinders."[3] At the same time he wished to expand his production, partly because of varied demands, and partly because the importation of forks and other special items proved inconvenient.[4] It was hard to get skilled workers and still harder to get them to come to Greenfield. Describing the labor situation at the Russell plant in the 1840's and early 1850's, a local newspaper commented: "Employees were nearly all Americans, and a fine, intelligent lot of men they were, but only so unstable; here today, gone tomorrow; working with desperate energy for a year or so and then away; to the West, to business, to farms, to professions, to scatter the length and breadth of the land. The recruits came principally from the farming towns around Greenfield, and grinding was the favorite job, for by hard work a man might save a few

hundred dollars the quickest at that work." The report goes on to note that these men were "too free and independent" to work long in any factory and, "no business could bear such incessant change of help, such spoiling of work by green hands, so a different system was devised. America retired in favor of Ireland and Germany, . . . and from the advent of the Teuton and the Celt may be dated the wonderful prosperity of the business."[5]

Irish workers were coming to Connecticut Valley towns as early as the late 1830's, and they were arriving in large numbers in the 1840's, 50's, and 60's. But their presence is not especially noted in cutlery history until later. The earliest groups came to work as servants, farm laborers, and in railroad building.[6] Though on a few occasions skilled cutlers arrived in New York from Ireland and were immediately employed by the eager Francis Russell[7] most of the Irish workers were not experienced in any industry. They could be employed only in unskilled jobs and did not enter the cutlery shops in large numbers until they or their sons could learn the trade. The Massachusetts and Connecticut cutlery firms doubtless experienced the kind of difficulty that harassed Collins, the famous axe manufacturer, who wrote in 1845, "there have been so many deaths among the grinders that no Yankee would grind, and the Irish were so awkward and stupid that we did not get the quantity needed even by having extra men working at night."[8] Nonetheless many Irishmen and American-born sons of Irishmen found cutlery employment and eventually advanced to skilled and supervisory positions. They demonstrated perhaps even greater skills as leaders in local political and trade union affairs.

Before the Celt and Teuton entered cutlery making, skilled English workers came to American centers of the trade. They were imported not only to make knives, but for silverware, britannia ware, files, and axes.[9] In the early 1840's, a time of bitter depression in England,[10] a number of cutlery workers crossed the sea, and the Valley shops were full of Englishmen and English ways. They were fewer in number than the Irish or the later German and Central European immigrants, but they placed an indelible imprint on the American industry when it was at a very impressionable stage. Nathan Ames went to England in 1840 and brought back with him one or two workers who had been well trained in Sheffield methods.[11] Matthew Chapman came to this country as early as 1841 from Sheffield and was immediately employed by the Russell Company. He was later to become an inventor of note in the cutlery industry and superintendent at the Lamson and Goodnow factory. Two years later, eighteen-year-old Joseph Gardner was met on his arrival in New York from England by Francis Russell. He accepted a position hafting knives at a monthly wage for six months. After his first half year he was to receive the piece rates paid to other hafters in the plant.[12] Later Gardner became superintendent, a prolific innovator, and finally an independent manufacturer of pocket knives and small hardware. The Russell Company employed these workers after their arrival in New York, and the Company agent was active in making contacts at incoming boats and through newspaper advertisements.[13] On occasion workers were recruited in other Connecticut Valley cities, and in some, probably many, cases Russell wrote to England to workers whose relatives and friends had come earlier. Henry Bradshaw's arrival in New York in 1842 was obviously anticipated, for the Russell Company sent him a welcoming letter with an offer of employment as a grinder at "the same prices we pay Albert" (Bradshaw).[14] By 1845, Albert was back in Sheffield, but was eager to return to Massachusetts, and Russell wrote him that he would be glad to employ him again when business improved.[15] Countless others whose history is less well-known came to America and settled in the cutlery towns. Many came to Meriden to work in cutlery and silverware. In 1848 most of Lamson and Goodnow's twenty employees were of Sheffield origin.[16] Their names and lives are recorded only in piecemeal fashion in scattered letters and newspaper notes.[17] Francis Russell met them in New York, singly and in groups, and sent them to Greenfield. Their best references were relatives or acquaintances among workers already employed in American cutleries.[18] A few years of work in Sheffield was usually enough qualification. On occasion entire families were brought over from Sheffield.[19] Russell's payroll records between 1845 and 1848 list chiefly names that are unmistakably English: Parmenter, Severance, Hastings, Leonard, Hawkes; but how many were Yankees how many later arrivals cannot be discerned. Only a few had any Gaelic flavor, and none sounded German.[20] The Englishmen, sought after for their traditional skills, taught their employers the Sheffield methods and advanced rapidly. At one time most, if not all, of Russell's foremen were Englishmen, and no Sheffield man worth his salt could fail to find a good job in the Connecticut Valley.

As early as 1843 the Russell Company employed German filers and forgers. Francis Russell advertised for them in a German newspaper in New York and probably hired some of them. One was interviewed in New York but never reached Greenfield.[21] Whether the four or five "ugly fellows" who were sent to Greenfield that month or not were German or not is uncertain, but they seem to have come in answer to the advertisement. Their "ugliness" was a refusal to work for the $12 a month they were being paid, an issue which caused the first recorded walkout in American cutlery history.[22] The first German to live in Greenfield was a cutler named Frederick Boehmer who moved to Buckland shortly after his arrival and made fine surgical knives, high grade straight razors, scissors, and miscellaneous cutlery in a small shop in his own basement. The year of his arrival is not known, but his first child

was born in Greenfield in 1845.[23] In 1847 three Germans were employed by Nathan Ames and sent to Chicopee.[24] Most of the Germans who came to this part of the country had learned a trade before they left the old country. A few came in the 1850's, and their numbers swelled, reaching a high point in the 1880's, then dwindling to almost nothing by 1900.[25] Many, especially among early arrivals, started small cutlery grinding and repair shops in New York and New Jersey, and later some of them moved to the factories of New York State, Connecticut, and Massachusetts.[26] They brought with them skills equal to the British, but they found it hard to make their way, because English methods and English bosses ruled the Valley shops. One German fork finisher was discharged from the Russell Company for insufficient production caused by his lack of experience with Russell's methods and equipment. He later went to work for a German contractor in New York who predicted good performance from him, in an establishment where he could use his customary tools and techniques.[27] By 1870 Germans were prominent in the towns of Greenfield, Shelburne Falls, and Turners Falls. They established their own church, fraternal and death benefit association.[28] In 1872 their Sunday School picnic was attended by 167 "scholars" and the next year their pastor established an evening school to teach the children the language of their forebears.[29] The Germans were a cohesive group whose political strength the Turners Falls paper viewed with some dismay. Religous controversy and political maneuvering marked considerable rivalry between the Irish and Germans in this cutlery town.

The numerical ratios of the different nationality groups varied considerably from city to city and from time to time, but in all cases the English were the smallest group of immigrants, the earliest arrivals and the most influential in the cutlery industry. The Germans, more numerous, and later in coming, had the respectable status of a skilled group, but were set apart by language, religious, and cultural differences. The Irish background group filtered into the industry, but of ten not until the process of assimilation had made training available to them or to their offspring. By the mid-80's Germans were the largest immigrant group in the Massachusetts cutlery industry. In 1884, when 55 to 600/0 of the cutlery workers in Massachusetts were unemployed, their birthplaces were recorded as follows: 277, United States; 130, Germany; 88, England; 74, Ireland; 65, Canada; 39, other countries.[30]

The famous skills of Sheffield and Solingen workers did not make them rich enough to travel widely in search of jobs. Employers often had to give them more than verbal encouragement in the form of advances for transportation expense. The workers at the same time promised to give service to their benefactors until the sums were repaid. These agreements, rarely if ever written down, were none the less well enforced. In the early 1840's, when wages were paid at six months or one year intervals, a man could not default on his obligation without leaving behind some accrued wages. Employers corresponded with one another regularly and tried to avoid hiring each other's workers or tempting them to breach of contract.[31] The Russell Company Day *Book* has two items in 1846 and 1847 charging a worker, first for "$30 to cash paid in Sheffield," and later for "$2.00 for balance of passage paid."[32] In 1850 Russell sent Joseph Gardner to Europe to buy materials, to have some blades and forks made, and hire labor.[33] He doubtless sought workers in his home city and advanced their travel expense. Representatives of other companies followed the same procedure.[34] There are few records to show how the majority of workers paid their transportation expenses. In 1864 the Russell Company paid $2.00 to an "immigrant agent."[35] Workers in Shelburne Falls and Turners Falls, Massachusetts of both German and English extraction remembered hearing about their families travels to the United States in the late 1860's through the 1880's. Some remembered that relatives had lent passage money, and others recalled agents who had advanced the passage money and been repaid by the employers who later deducted it from wages.

Well remembered indeed were the hardships of the crossing. One of the common family stories among cutlery workers related the voyage from abroad of parents and grandparents, often in miserable steerage which was doubly distressing to the proud craftsman who had been led by agents to expect first class accommodation. In many cases relatives acted as agents, forwarding money from their employer and taking responsibility not only for its repayment by the immigrant, but also for his character and workmanship. A son of one of the later arrivals from Germany remembers that these agreements were made secretly through friends and relatives because of the contract labor laws.[36] After 1885 the employer who attempted to import labor legally faced an imposing and risky procedure. The Clement Company, unable to find grinders in this country in 1902, investigated the possibility of importing them under the contract labor law. The project was abandoned because of the fact that no worker thus imported could be assured of admittance until after he had reached this country.[37]

After 1900 the flow of skilled cutlery workers into the United States declined. Rising wages, at least in Solingen, made American jobs less attractive.[38] The grinding machine, partly a result of the scarcity of skills, reduced the interest of employers in foreign-trained craftsmen. Later immigration is of less interest to cutlery history as such than to the particular communities. Polish people came to Western Massachusetts to settle on the farms, and French Canadians came down to work in the textile mills.[39] Some members of these groups and more of their children went to work in cutlery. They did not come to the area for the purpose of cutlery work, they had no especial

affinity for it, nor did the employer seek them out. They entered the shops as they did others, because they were workers looking for jobs, and there were jobs available. With the gradual passing of the specialized skills and the unhealthy conditions of the earlier days, knifemaking was open and acceptable to the wageearners of the community at large. In 1911 the foreign born workers in American cutlery and tool plants were, in order of numbers: Swedish (largely in tool making), German, Armenian, Italian, Polish, English, Russian, Irish, and others. Almost all of the English and Irish workers had been in the United States over twenty years, while less than half of the Swedes, Germans, and almost none of the others had been in this country as long as fifteen years.[40] As might be expected, the "new immigration" reached this industry, as it did the country in general, largely after 1890. The central European groups found room in the industry sometimes by acquiring skills, often by obtaining the unskilled and semiskilled jobs created by expansion and technological innovation. In Connecticut there were fewer Poles and Canadians, more Italians and Russians than in Massachusetts. While old skills and the remaining skilled jobs were often passed down from one generation to the next in families of English, German, and Irish origin, these groups had no monopoly of the trade, and they gradually lost their special position.

B. THE CONTRACTING SYSTEM

The scarcity of labor induced not only immigration, but also special methods of organizing work. A note from the Collins Axe Company reveals a problem common to cutlery firms: There were few axemakers in the country and the firm was obliged to take common blacksmiths and learn them to make axes, as they would utterly spoil some of the iron and steel and make a large quantity of poor work . . . . We bound them to work for several years, paying but once a year and then retaining a part of their wages until an equal amount was earned on the following year ... the trouble with them arose after they got to be good workmen and could get high wages elsewhere. Some run off forfeiting their wages.[41]

It was expensive to train workers, especially since they were so likely to leave the employer who trained them. Russell observed that some kinds of grinding were done entirely by apprentices in England, but that in the United States he could not get an apprentice without paying him wages.[42] They often did not stay until their contract was completed.[43] The Russell Company and probably many others like it, employed its workers sometimes for a year at a time, sometimes for six months, and as late as 1848, paid them once in six months. But it did not make long-term arrangements as did the Collins Company, and in 1845 firmly refused a three-year contract with a forkmaker whose services it badly needed.[44] Market uncertainty made such commitments entirely too risky.

Beset by the difficulties of recruiting, training, and supervising labor the employers often resorted to a contracting system, letting out jobs to specially skilled workers either in the factory or outside. The contractor would agree to perform a given operation at a specified price. He could then hire his own assistants, often members of his own family and friends, and see to it that the work was satisfactory. The employer was able to shift the burdens of detailed supervision and training to the seasoned craftsmen who were often in a better position to bear them. The cost was fixed in the contract, so that the manufacturer did not need to be concerned with the efficiency or discipline of individual workers. The contractor, for his part, had considerable freedom, independence and status. By striking a good bargain with the manufacturer and keeping a sharp eye on his help, he could make a good living. If he had sons he could apprentice them and thus provide for their education and placement in the trade. Later, in many industries, the contracting system was associated with low wages and the sweating of labor, but in this era in cutlery manufacture it served the workers well. Doubtless they received better training and often more sympathetic, as well as more exacting, supervision than they could have received from their ultimate employer. Varying methods of doing work, both forging and grinding, made it difficult for employers to hire workers of different backgrounds. The contracting system enabled all, especially the Germans, to make use of their skills without re-training. Again especially in the case of the Germans, but also among the family groups of the English and even the American-born, the contractor-patriarch was well accepted as a boss.

Though Russell usually wanted his contractors to work in the factory, he frequently dealt with out-workers who liked their original locations and their freedom to serve a number of different employers. When the contractor took his place in the factory, the employer gave or rented floor space to him, and rented the use of machinery and some tools. On other occasions the contractor provided his own plant and equipment. How differences in the overhead cost to the contractor were taken care of is not known. In any case most of the hand tools and grindstones were paid for by the worker.

Outside contracting or out-work was never very common in America but was used for some of the skilled jobs in the early years of the industry. Henry Wilkinson who lived in Hartford in 1843 contracted to receive ivory sent by Russell from New York, cut it into knife handles in his shop, and send it on to Greenfield .[45] He was a

semi-independent enterpriser, paid by the piece and working with his own tools on materials supplied by his employer. If he had been working in Greenfield, the arrangement would have been almost identical. In initiating the manufacture of forks, the Russell Company again used a contract system. Hearing of an independent craftsman who had just "given up a plan of making forks at Wethersfield," Russell wrote to him, "we'll hire you or furnish you room and buy your forks of you and make a bargain which may be an advantageous one to you."[46] The Russell Company in this case preferred the contract to the employment relationship, and proposed that it should act as "agent" for the goods made by the forkmaker and leave him free to employ whatever labor he wished.[47] In the early 1850's when Russell could not get enough men to handle his orders, he contracted the manufacture of shoeknives to a man who had previously made them for the Ames Company.[48] Fork finishing was at one time in the 1850's done for the Russell Company by a German named Klansburg in New York. He had a well-equipped establishment with steam power and proposed to hire 100 men and "see to their work" provided he was sent enough at regular times.[49] He felt that he could do this more cheaply in New York where he was established than in Greenfield.

Although most grinding was done in the cutlery factory, an occasional grinder set up his own shop and worked on contracts from various manufacturers. The most famous of these, Zur Hitchcock, kept his own workshop for years, and ground large numbers of knives and forks for the Russell Company. He was charged by the company for emery, files, and once for the use of grindstone.[50] During the same period C. D. Dickinson, a broom knifemaker in North Hadley made some wood and ivory handles for Russell, and on some occasions the Russell Company ground a few knives for Dickinson." In hard times many somewhat larger enterprises accepted contracts for small jobs from other cutleries, but the typical outside contractor was a craftsman whose basement or shed was equipped with what tools his personal savings could buy.

More usual than out-work was the practice of assigning one kind of work to a craftsman in the factory, the inside contractor. He usually worked with his own hands but also hired workers and paid them their wages. On some occasions the company paid the men and deducted from the contractors' credit the cost of wages as well as charges for steel, emery, grindstones, files, anvils, tongs, hammers, upsetting tools, and occasionally spoiled work. As late as 1893 contractors were responsible for most of the work in the making of pocketknives in the Russell shop. One contractor was in charge of grinding and finishing blades; another of hafting barlows; another grinding, setting, and finishing springs. Swaging, grinding, and finishing ordinary and carving knives and forks, grinding and finishing handles, cementing handles, etching, handle making, etc., all were under separate contractors. Some of these contracts continued until 1907, and a few entries show contracting still in use in 1913 in the handle-finishing department of the Russell Company.[52] Not only Russell but most of the other concerns in the Valley used the contracting system. Lamson and Goodnow contracted all of its grinding and finishing work for many years, and continued to use this method in fork-finishing through the early days of the depression of the 1930's.[53] The Northampton and Clement Cutlery companies contracted their grinding, handle-finishing and forging until the early 1900's, and retained some vestiges of the system as late as 1917.[54]

The contracting system, which had been common in many American industries, disappeared gradually as the conditions responsible for it changed. It remained strong only in such industries as garment manufacture and the building trades. Here the employer used competition between contractors as well as their supervisory services to lower his cost. In the cutlery industry in the Connecticut Valley out-work declined very early. Mechanization added cost to the building of the small shop. The larger manufacturer often had a superior power site and later a steam engine that the independent contractor could not easily duplicate. Many of the skilled workers who might have become out-workers or "little masters" abroad, had used up their capital resources in travel by the time they reached this country. American patterns were standardized and usually not so fine as to require the individual attention of a craftsman. A centrally organized and supervised factory produced the precision that was more essential than beauty or originality.

Inside contracting survived longer. It retained the advantages of the factory with its regular schedule and centralized routing and planning of work and at the same time eased many of the problems of hiring and supervision. The habit and preference of the most experienced supervisors in the trade kept the contracting system alive after its period of greatest value was over. Before the advent of trade-unionism, contracting gave the contractor a clear economic advantage, but as the years went by he became less an enterpriser and more a foreman.

In its final years the system was merely a method of wage-payment, and by the turn of the century, the contractor was paid by the piece while the workers under him were on an hourly basis, or sometimes on a piecework basis. The contractor rarely, if ever, handled the wages for his men or determined their amount, but he had a good deal to say about hiring and firing. He could more easily give preference to members of his family and friends in hiring than he could retain workers who displeased his employer. The trade-unionism of 1885 probably terminated most of the contractors' previous powers in determining wage rates for individual workers. By 1907 contractors

found themselves so squeezed between the wage demands of the union and the employer's reluctance to increase his costs, that many of them chose to change to timework either as skilled workers or as foremen.[55] The metal polishers and buffers union flatly opposed contracting and their by-laws provided fines for any workers accepting contracts .[56] Had unionism been stronger in forging and finishing departments, the contracting system might well have died earlier. Forkmaking and fork finishing processes, not easy to mechanize, remained in the hands of contractors for many years.

The contracting system lost its appeal for workers with the disappearance of the ethnic unity and high skill requirement which made the contractors' services valuable. New groups of workers, who needed less training and had no family or nationality in common with the contractor, resented the system which gave him so much power, which caused him to put pressure on them, and gave him extra compensation for their speed. In cases where the contractor actually determined wages for his helpers, the workers complained of favoritism and secret wage differentials. It is probable that the system bred more such suspicion than the facts would warrant, but the cases of unfair preferences that did exist were enough to emphasize the general faults of the system. Rationalized and standardized production obviously called for rationalized and standardized methods of wage payment and supervision. The employer, too, wanted more direct control over his factory. He had become directly responsible for wages and felt the need of operating his production process as an integrated whole rather than a series of discrete operations. The power of the contractors often made re-arrangement of work and work methods difficult. Time after time, in the period from 1900 to 1920, when older contractors retired or died, their place was taken not merely by new men but by a new system. Thus finally the factory, which had long prevailed in American cutlery making, became one unit instead of a number of workshops under one roof.

C. WAGES

Ames employed his workers for periods of six to eight months at a time and paid them at these long intervals, partly in money, partly in kind. One worker, employed in 1829, started at $8 a month and room and board, then in the next three years rose to $13 and $24 a month, and finally to $1.25 a day. Another worker started at $20 a month "and board self" while his two sons received $12 and $14 a month. Other wage rates in 1833 ranged from $.94 a day to $1.25 a day, without board.[57] Ten years later the Russell Company was paying workers $10 to $12 a month for their first six months. He usually paid them at the end of the period and then gave them piece work, which yielded higher income, or an increase in their day rate. Wages for experienced workers varied from $15 to $30 a month, or $1.00 to $1.50 a day, about the same as the prevailing rates for blacksmiths in Massachusetts, in 1845 and 1846.[58] The sons of regular workers often became apprentices or helpers. Their wages, sometimes as high as $17.50 a month, were paid to their fathers.[59]

Available records do not reveal the daily or weekly wages of piece workers. A number of workers were credited with small sums for "work done," probably on a piece work basis. Some of them came to the shop for a short while and then moved on, others were farmers or employees in other establishments who worked occasionally for Russell. Contractors received stated piece rates varying with the kind of work. Their employer billed them for wood for handles, steel, emery, files, and sometimes for wages paid to their men.[60]

The company frequently paid the workers' board to local boardinghouse keepers and deducted the expense, $1.70 to $1.90 a week, from wages. Some of the boarding houses were company-owned and rented to employees at $25.00 to $44.50 a month for six months at a time. The company made the appropriate transfers between workers and between the company and workers by deductions and additions to wage payments. One enterprising worker, Chester Pratt, worked at the cutlery for a dollar a day, rented a house from the company where he boarded six men, pastured a cow on company property for $16.00 a year, and on a few occasions took his son to work in the plant at $.46 a day. The company books record all these transactions.

By 1850 Russell company wages averaged about $26.00, and by 1860 $29.00 a month. Ten years later the average Russell employee earned $540 a year, or $45.00 a month if he worked twelve months. Comparable data for other firms show considerable variety:

ESTIMATED AVERAGE MONTHLY WAGE [61]

	1850	1860	1870
Russell Company	26.00	29.00	45.00*
Meriden Cutlery Company	39.00	26.00	48.00*
Lamson and Goodnow	34.00	29.00	44.00*

Union Knife Co.	-	11.00	46.00*
Landers, Frary and Clark	-	-	36.00*
Bay State Hardware Co.	-	-	62.00*

*These are estimates derived by dividing annual figures by 12. Since many firms did not operate a full 12 months a year, they are not accurate.

Cutlery workers suffered in the 1873 collapse when many shops were working at one-half time or closed down. In this year their wages averaged $2.56 a day for men, $1.75 for women. Thus they lagged behind blacksmiths who made $2.75 a day, but compared favorably with workers in other metal trades who received $2.13 a day or less.[62] Between 1860 and 1878, according to the Massachusetts Bureau of Labor Statistics, cutlery wages rose only about 9 percent in contrast with a 24.4 percent increase in industrial wages in general. Most knife makers gained somewhat, but grinders had to face a cut from $12.60 a week in 1860 to $11.65 in 1878.[63] In these years blacksmiths' wages rose from $10.44 to $11.65. By 1880 cutlery workers received about $10.00 a week and $423 a year, or $58 less than they had received in 1870.[64]

The most plausible explanation for this downward trend in wages lies in the increasing competition in the industry and the immigration and training of large numbers of new workers. Simplified methods of forging and assembling diminished the demand for certain skills. Seasonal fluctuations brought further problems. When questioned as to the advisability of extending the Massachusetts ten hour law to cover men as well as women and minors, cutlery employers replied that competition in the industry kept piece rates so low that their men needed the long week for reasonable earnings, and that irregular employment made them eager for long hours.[65] 1888 brought piece rate reductions which must have cut earnings by about a dollar a week. In that year contractors in the Clement Company made $17.50 to $30.00 a week while their men made $5.00 to $15.00, most commonly between $9.00 and $12.00.[66]

1900 was the last year in which average earnings of cutlery and edge tool workers, $470, surpassed those of industrial workers in general, $420.[67] Skilled grinders and polishers in Northampton earned $2.00 to $2.25 a day. The grinders' union limited apprentices to earnings of $2.00 a day and grinders to $2.50, a way of limiting the worker's production to 10 or 12 dozen knives in a day. A year later, hours were reduced from 60 to 54 without a change in wages. This probably added less to labor cost than it might appear, for many grinders had been in the habit of filling their daily quota early and spending the remainder of the day talking with their fellows or fishing. Other groups were sometimes delayed to wait for grinders. By 1908 wages in Northampton cutleries were $2.00 to $3.00 a day.[68] When work was steady, earnings amounted to $13.50 to $18.50 a week. Four years later cutlery workers in the United States received $12.00 to $24.00 a week, the higher wage going to especially skilled hand grinders and heat treaters, the lower, to "honers" and "handlers."[69]

The inflation of 1919 brought cutlery workers' wages to the astounding figure of $40 a week, though their annual income was only about $890.[70] The Russell Company's wages in the 1920's, between $25 and $30 a week for most of its employees, were close to those of the rest of the industry, whose average annual earnings were $1223 in 1929. The depression brought severe cuts in wages and employment. By 1932 usual weekly earnings in the Russell Company dropped to $16 to $20, while the average annual income in the industry was $885.[71] Weekly earnings in pocket knife firms were $16.80 and hourly earnings $.44 in 1939. By 1942 the average weekly earnings of these pocket knife workers had increased to $26.15 a week, $19.03 for women, $30.45 for men. Their position was still far below that of the average worker in manufacturing who was earning $36.65 a week. Only 1.2 percent of them earned as much as a dollar an hour, and more than half of them received between $.40 and $.50 an hour.[72]

Detailed statistics for this industry illustrate the change that had occurred in the structure of skills. Hand grinders earned less than machine repair men, maintenance men and machine polishers and buffers. Much of the hafting process, formerly the work of skilled cutlers, was done by women "wirers," "riveters," and "assemblers" at $.401 to $.411 an hour.[73]

Diminished skill requirements only partly explain the low wages of the cutlery industry. Many of the workers are in small factories and often in small towns where prevailing wages are low and alternative employments are not numerous. Though not a woman's industry, cutlery manufacture employs many more women than it did in the past. Unionism has had very little influence in the industry.

D. EMPLOYER AND LABOR ORGANIZATIONS

British and German cutlers had strong and ancient unions, but there is no evidence that their traditions survived the crossing to America, for unionism did not arise in Connecticut valley shops until the 1880's. The earlier background of the workers may well have given the Grinders Union much of its strength and independence and some of its restrictive practices, but these characteristics could also be explained as a reflection of American conditions. Information on cutlery unionism is hard to collect. No local record books or correspondence have been found, newspaper reports have been rare, and employers' letters, the chief source of the data here presented, are, of course, neither complete nor unbiased.

Very early in the history of cutlery making in the valley, the scarcity of labor brought employers into communication and cooperation in labor matters. In 1844 Russell exchanged a list of piece wages with Landers and suggested that they agree not to employ one another's workers without consultation. Such agreements were common and considered as "honorable agreements between neighboring employers."[74] In a letter in 1853 Russell gave lucid expression to the rationale of employer organization:

We suppose that you have been informed by Mr. (name illegible) of a meeting here next week to try to advance prices of goods and it is our wish at the same time to have some agreement about hiring hands from each other's establishments and some general understanding about prices by the piece for labor. There is a general determination among all classes of mechanics to advance the prices of their labor this coming spring and perhaps to some extent it should be acceded to, but without some understanding among employers prices will go to a point that no price we will be able to get for goods will justify. We are constantly annoyed by men from other establishments coming among our men to make them dissatisfied by offering some inducement to leave us and are weekly losing our men. Unless this can be stopped we must and shall replenish from our neighbors, and when this is once the rule the men will have things their own way. We have never felt that it was honorable to send and get away men from other establishments, and we believe that we have furnished one or two factories in our vicinity since they began, more men than they now have, and have got tired of being thus used and are determined to submit to it no longer. Please think on this subject and be prepared to act. An agreement to hire no man from each other who does not show he has fulfilled his contracts and agreements, also to permit a man whose term is out a certificate if he deserves it, might obviate the difficulty without doing injustice to any.

It seems to us also desirable that nothing should be known of the meeting away from those who attend it. It will cause dissatisfaction among the men unless they get an advance at once, and it will not be popular among those who buy.[75]

Communications between employers throughout the 1860's and 1870's say little about such problems. But the 1880's saw continuation of the agreements not to steal each other's labor, and Association meetings doubtless gave opportunity for discussions of wages. Though there was probably no formal labor organization Clement noted his grinders were “captious,” and he feared a possible strike. In 1882 Valley employers followed the custom, not always adhered to, to be sure, of asking consent of a fellow manufacturer before employing a worker from his shop. It was held unfair to do otherwise.[76] Lee vigorously denied a newspaper report that he and E. E. Wood had an agreement that neither would hire workers discharged by the other, but they doubtless took some pains not to "pirate" skilled workers and exchanged information on wage rates so that the workers could not play one against the other.[77]

In late 1884 and early 1885, when the industry was suffering severe depression, employers initiated wage cuts ranging from 5 to 20 percent on different kinds of work. E. G. Lamson wrote, "I would like to act in conjunction with our neighbors in the matter and should like to know your views as to the scale to be made.”[78] Although employers do not appear to have reached a definite agreement on wage policy, their correspondence resulted in wage reductions at the same time by about the same amounts.[79]

The workers were little organized at the time. As early as 1883 Meriden wage-earners had formed a local "Mechanics Assembly" of the Knights of Labor. The movement did not immediately spread to other towns along the river,[80] though the grinders who were proud, independent, and even arrogant in the eyes of some, may have had their own organization. As wages were reduced in one town after another, a series of strikes broke out, some spontaneous and others instigated by traveling delegates from other shops. By the time the strike wave was over, the cutlery grinders union had spread its influence throughout the Valley, and though it lost most of the strikes of 1885, it survived to win in 1886. The Massachusetts Department of Labor reported the strikes as not sponsored by any union, but local sources indicate that the "secret" society of the Knights of Labor was known to be at work.[81] The Turners Falls newspaper publicized their meetings with such notices as: "a call of workingmen irrespective of class distinction, creed, or nationality is out asking them to meet in Temperance Hall on Saturday evening to form a Union of the Knights of Labor."[82] In 1886 it noted that Shelburne Falls had formed a Knights of Labor Assembly.[83]

The membership of these locals was largely among the grinders, and most of them were of the craft union type, though Shelburne Falls had a mixed labor assembly with the varied membership common in the Knights of Labor.[84] Employers viewed the grinders union with almost solid opposition and alarm. In 1886-1907 strikes were numerous, negotiations few.

The first of the strikes occurred at the Lamson Goodnow plant in December, 1884 as a protest against the wage cut. The grinders instigated it, and it was rumored that they had received encouragement and offers of support from Bay State grinders. After seven weeks ' the strikers went back to work, defeated, at a wage of $1.30 a day, 18 centss less than their previous pay, while the women accepted 84 cents a day, a cut of 9 cents.[85]

Meanwhile in January, 1885, 50 grinders at the Russell Company plant struck against the wage cut. They hoped to confer with and reach some agreement with their employer, but "there was nothing to compromise, and of course the management could not meet with the committee or any body of men." The situation was explained, "When one concern reduces the price of labor for the purpose of underselling a competitor, all others must follow suit."[86]

The dispute at Landers Frary and Clark was more serious and lasted three months. The strikers set up an organization and requested a conference with their employer who refused to meet their committee and offered them reemployment only if they would accept the full wage cut and disband the union. The union expressed the conviction that "our members are skilled workmen whom it is difficult to replace, and our success is but a question of time." They sent appeals for aid from fellow workers up and down the valley, saying: "It is not alone our wages we are fighting for, it is our union; not alone our own cause, but the cause of every workingman. Victory for us means victory for you, defeat for us means defeat for you." Their skill was more easily replaced than they predicted; new men were hired and trained; and many strikers found themselves unemployed and blacklisted.[87]

In Northampton a Knights of Labor Assembly was formed in 1885 and, unlike their brothers in other towns, they won from the Clement Company a wage increase of a penny a dozen for grinding after a strike of 5 days. Their success was due partly to business improvement and partly to union solidarity. When their employer tried to replace them with workers from Franklin County shops, "the strikers got hold of them and induced them not to go to work."[88] The following January the same grinders won a short strike protesting a new rule requiring them to pay for the belts used to turn their grindstones. The Knights of Labor was reported to have paid these members $1.00 a day while they were on strike. Soon thereafter the Lamson and Goodnow employees won an 8 cent an hour increase after a three-week strike.

By now the union was powerful enough to convince some of the members of the Manufacturers Association that the two organizations should confer on wages. The plan never materialized, but in 1887 Association members tried to set up a common wage and hiring policy. Bitter controversy about the wage level and its relation to Association prices almost broke up the Association. While some employers cooperated eagerly, offering to help fill each other's orders during strikes and to avoid hiring each other's workers, non-Association concerns sometimes enticed workers away from the member's plants with higher wages.

In the winter of 1887 two Northampton firms, acting together in acceding to a union demand, raised the wages of grinders and polishers 2 cents a dozen. At the same time they decided that "the two shops, as to the matter of labor, shall be run as one."[89] They tried to persuade the Association to establish a uniform wage at this new level. But several employers refused to grant the wage increase and made elaborate plans to break the union's power. They suggested that Landers Frary and Clark induce a walkout in its own shop by asking its grinders to work on knives from the Meriden Cutlery Company which was at that time involved in a strike. It was believed that such a sympathy strike would be disastrous to the union. At the same time the concerns which had yielded to the union were urged to close down for two months and then reopen offering their workers the old, lower wage rate. When E. E. Wood, of the Northampton Cutlery Company, who had favored the wage increase, refused to cooperate with the lockout, the stronger Association members threatened to lower the official price thus forcing a wage cut on their too generous fellows. The immediate advantage of such a policy was not clear, but group discipline had become a matter of principle, and a defeat for the union was considered a long run gain. Lee, of the Clement Company, was caught between Wood and the Association. He had urged the other members to grant a uniform wage increase and was eager to maintain the organization. Although the Connecticut members doubtless expected to raise prices promptly after the wage controversy was settled, the threat of "bankruptcy prices" was most alarming to a small concern like the Clement Company.[90] Shortly thereafter Lee capitulated, saying, "The men at Landers Frary and Clark have struck as anticipated. The only thing to do now is shut down for a few weeks and resume at 2½ . . ." [91]

Though Lee seems to have convinced his grinders of the necessity of the lower wage, his troubles were not over, for later in the summer the two men working on plugs for hollow handle knives demanded a 40 percent wage increase. They were soon replaced by a machine which was expensive, but Lee observed, "It works every day and don't play ball or strike."[92] Then the handle grinders and finishers demanded a 10 percent increase and, after a

month of fruitless negotiation, called a strike.[93] Because business was poor, Lee was able to fill all his immediate orders with a few new employees and a scattering of returned strikers, but after almost three weeks, he wrote to the Bridgeport chief of police asking for "information on Bohemian cutlery finishers formerly employed by James L. Frary" and planned to employ a group of them.[94] At the same time he urged The Silver Plate Cutlery Company, which had employed some of the strikers, to cease the practice and sent a list of the strikers' names to avoid further errors. He complained to the Association saying, "if this is all the protection given by our Association, we don't think much of it."[95] By this time, however, the men were returning to work, and four days later Lee reported, "plenty of finishers today."[96]

Though the unions were defeated, the spirit of solidarity among the grinders, on the one hand, and the employers on the other, remained. Association members continued to consult one another about piece rates and hiring, and the grinders were reported to be "rather saucy."[97] In the summer of 1890, when business was slack, the Northampton concerns tried to keep their grinders employed "lest they get together in their idle moments."[98] The grinders were strong enough to prevent introduction of grinding machinery in some shops by refusing to finish or do any work on machine-ground knives.[99]

As employment improved in the late 1890's and early 1900's, labor unions, revived and expanded, joined the American Federation of Labor. The finishers reorganized their union in 1896.[100] A grinders' wage demand in 1899 precipitated a meeting among all of the Valley cutlery employers who decided that, since prices of coal, iron, grindstones, and leather had advanced, they would accede to union demands and raise prices enough to make some profit.[101] Business was good, and the scarcity of grinders so acute as to limit the orders an employer could take. In 1901 the forgers in Northampton won a nine-hour day with no wage reduction, and the following year the handle finishers at the Rogers Company plant in Florence unsuccessfully protested the employment of an inspector accused of anti-union sentiment and disregard for the members' claim on work.[102]

By 1903 the Northampton cutleries were so thoroughly unionized that it was said that employers "could not hire or fire without union consent." The knife forgers, metal polishers, and table knife grinders unions had closed shop agreements, and their rules provided for strike benefits, death benefits, regulation of apprentices, and the expansion of union jurisdiction to new machinery in their trades.[103] They formed an Allied Metal Workers Association to work together and call sympathy strikes when necessary.[104] The years 1903-1907 saw a series of labor disputes which ended with the defeat of the cutlery unions.

In 1903 the grinders and finishers struck for higher piece rates in several Connecticut Valley shops. In some cases they complained that poor forgings and abrasives cut their earnings.[105] The grinders' determination and their scarcity intensified the employers' interest in grinding machinery. Machine grinding of knives cost about 22 cents a dozen including a charge for the machine, a figure about 3 cents less than the prevailing cost of hand grinding. The demand of the union for 30 cents a dozen made the machine even more attractive. Technological improvement became desirable not only for its efficiency, but also as a way forr the employers to "get the best of these devils," the grinders. In 1904 the Meriden Cutlery Company observed the effect of the machine on its employees, "our men are as meek as kittens since we installed them."[106] The Massachusetts companies, however, impeded by the high initial cost of the machine and the refusal of the grinders to handle machine-processed goods, were somewhat slower to change their methods.[107]

In 1906 the Northampton Allied Metal Workers Association called a strike in support of the handle-finishers who demanded increased wages. The three member unions started the strike with great confidence and countered Lee's threat that he would establish an open shop with the warning that there might be an "exodus of skilled men from the village," and they might consider setting up a cooperative cutlery to employ their members.[108] Lee employed a New York strike-breaking agency which provided 100 strikebreakers, largely unskilled Greeks and Armenians, and four detectives.[109] After a year of controversy and violence, Lee won the battle, despite much local sentiment in support of the strikers, sympathetic newspaper stories, refusal by retailers to sell food to the strike-breakers, and Aldermanic dismay at the sanitary problems involved in housing the strikebreakers in the factory.[110] The unionists, unsuccessfully searching the valley for jobs, accused the employers of having a secret blacklisting agreement.[111]

The open shop now became the rule in Northampton cutleries, and the unions lost their power and finally their membership.[112] While the buffers and polishers union of Meriden survived, the defeat of unionism in Northampton left it weak. In 1912 an open shop drive through Connecticut finished the work begun six years before.[113] Meanwhile the Northampton Cutlery Company successfully defeated the union's attempt to force it to give preference in hiring to Clement strikers over new workers.[114]

Though the first World War period brought some spontaneous strikes, for higher wages and a forty-eight-hour week, unionism did not revive. Employers yielded to informal demands and raised their prices to cover the cost.

They protected themselves by agreements not to bid against one another for workers, but often made concessions which they could cover by increased prices.[115]

The fall of labor organization in Connecticut Valley cutlery shops was due partly to the strength and determination of the employers' organization which reflected the trends in business groups throughout the country. Equally important was the advent of the grinding machine. The high wages of the grinders and their opposition to the machine hastened the death of their union, but in any case, their chief bargaining weapon, a rare skill, could not have been retained.

The limited prosperity of the 1920's brought no occasion for unionization among cutlery workers. The sentiment of the time was not favorable, and the industry was not so profitable as to encourage interest in wage demands. The depression further discouraged any possibilities of organization. Cutlery workers did not participate in the establishment of code Labor provisions, though they benefited, as did their employers, from this curb on the sharp competition of the time.

The Basic Fabricated Metals Code laid down uniform labor provisions, similar to those in other codes, for all the industries involved. Forty hours was established as the standard work week, with time and a half pay for hours worked over forty and an absolute maximum of forty-eight. Because the normal work week had been fifty to fifty-five hours, it was expected that the code would spread work considerably. Limited exceptions for extraordinary seasonal peaks or for delays caused by machine breakdowns permitted some flexibility. Minimum wages were forty cents an hour for men and thirty-five for women in the Northern Wage district. When men and women did the same work, their pay was to be equal. Workers not involved in the processing of goods were to receive minima ranging from $14 to $15 a week depending on the size of the town in which they worked. Beginners could be paid lower wages, but no employer could classify more than five percent of his employes as beginners in any one month. A differential of five cents between the Southern and Northern Wage districts probably had no relevance for cutlery concerns.[116]

Section 7a of the codes and the later Wagner Act had remarkably little effect on cutlery workers. In 1934 some of the employees of Landers Frary and Clark were represented in a dispute with the Company by the Iron Molders Union of the A. F. of L., and in the following months the International Association of Machinists attempted unsuccessfully to achieve recognition in the plant. In 1937 Local 207 of the United Electrical Radio and Machine Workers Union of the C.I.O. became the official bargaining agent for Landers employees,[117] and by 1939 had secured an agreement providing for consideration of seniority as well as experience and ability in lay-offs and re-hiring and for a standard grievance procedure which, however, was not to interfere with the privilege of an individual of presenting grievances to the foreman. Minimum wages were established for men at forty-five cents an hour, and piece rates were to be set so that the "average boy or female worker" could make forty cents an hour. Time and a half rates were agreed upon for hours worked over forty or on Sundays or on seven specified holidays.[118] During the late thirties attempts by unions to organize other cutleries in the Valley were rumored, but they were tentative and unsuccessful. The employees in these shops were not unaware of grievances, but the smallness of their workplaces enabled some communication with their employers. In many cases small groups of "old-timers" had great influence in the shops. They maintained a certain independence, expressed the sentiments of other workers and often helped induct newcomers into the customs as well as the techniques of the job. This relic of the old skill heirarchy died out gradually, and older workers interviewed in 1943 complained of the lack of training and responsibility of younger workers. To these newcomers the traditions of skill and of unionism were equally unfamiliar. The continuity of craft unionism had been broken by the disastrous events of 1907, and the progressive abandonment of skills left no basis for its revival. In larger plants or industrial areas these semi-skilled, low-paid workers might have been obvious candidates for C.I.O. unionism, as were the employees of Landers Frary and Clark; but in 1933, half the knives made in the United States came from communities with populations of less than 500,000, and much was produced in small towns of less than 2,500. Most cutleries employed fewer than 100 people.[119] The C.I.O. was busy with large mass production industries and did not go out looking for small shops in peripheral industries and isolated areas. There was not enough time and organizing talent available to reach those groups who neither took initiative in forming unions themselves nor presented a competitive threat to the labor standards of other groups.

CHAPTER VII
CONCLUSIONS

An economic region or area may be defined by: 1) more or less homogeneous geographic conditions and, 2) transportation and communication lines which unite it by facilitating the movement of goods, people and ideas, In terms of these two criteria, the Connecticut Valley is an economic unit worthy of study, but many of its demarcating and distinctive features have diminished in importance. The Valley environment, though favorable, was never uniquely suited to cutlery making, as is evidenced by the success of producers in other settings. Many towns nearby have escaped this study by only a few miles. Some of them, like Naugatuck and Winsted, Connecticut, saw a cutlery industry rise, flourish, and die, as the transportation and power advantages of the Valley and other competing areas proved superior.[1] Others retained or gained eminence, for instance Southbridge, Massachusetts, home of the old Harrington Cutlery Company and, since 1935, of the combined Russell Harrington Cutlery Company.[2] This merger brought the removal of the old and famous Russell Company into a former woolen mill a mere fifty miles from the Connecticut River. This short move, due to the slightly superior plant facilities and slightly greater financial strength of the Southbridge enterprise, cost the Valley a substantial portion of its household and trade knife output. Such marginal economic elements and distances highlight the arbitrariness of rigid geographic definition of the economic area. The cutlery towns of New York State are much like those of New England, with their possession of water power, their tradition of skill, their semi-isolation from large industrial centers, and even in their atmosphere. But Newark, New York, New Haven, Providence, and Bridgeport, the larger cities that produce cutlery, are in striking contrast. Nevertheless, the Connecticut Valley and its environs retained a strong position in certain types of cutlery, household and trade knives, for almost a century and a quarter. Local control and financing has given many of these concerns a remarkable stability, and there has been little to induce them to move. In small towns and large cities cutlery companies keep the same name and location for many years. The relative technological simplicity and conservatism of the industry are not conducive to sweeping change or high mobility.

While large proportions of the textile and shoe industries have left New England, small metal fabricating has grown in the region. Other areas have shown substantial advantages for the more mobile industries leadership alert to managerial and market changes. Especially in the textile industries, larger firms, wider ownership, and impersonal control have facilitated movement.[3] For cutlery, on the other hand, shipment of raw materials and finished goods is not a major expense, and other locations offer no vast saving in labor cost or marketing. The exodus of other industries left vacant old plants and workers looking for new occupations. These resources have been useful to cutlery manufacturers, though they have induced no sweeping migration.

The geographic elements originally most favorable to cutlery manufacture were the water power available through the valley and the local bog ores which early encouraged metal fabricating industries. These two factors and the self-sufficiency of the Valley towns shaped the human resources and called forth varied aptitudes. It was on the already firm basis of local experience that the immigrating English and German workers built a tradition of specialized craftsmanship.

The skilled labor was crucial for many years, but, because of new methods, has lost much of its influence. Connecticut Valley workers retain the nebulous advantage of acquaintance with this kind of industry. Only recently unionized, or not unionized at all, the semi-skilled and unskilled inhabitants of Valley cutlery towns are less threatened by cheaper labor than by cheaper processes in other areas.[4]

The river was an invaluable shipping route in the years before the railroads. Ames and Russell sent by water not only knives and steel, but workers between New York and their factories, and traveled by boat themselves. The building of the railroads up and down the Valley in the mid-nineteenth century facilitated an already customary traffic. EastWest railroads enabled the routing of finishing goods via Boston, but did not significantly alter the North-South flow which was strengthened by the New York market and the Meriden platers alike. Such silver companies in eastern New England as Reed and Barton and Gorham found Northampton an accessible source of blades. Marketing centers in the Mid-West and West and new organizations, like the retail chain and mail order house, became attractive alternatives to the New York selling office and jobber. But varieties of customer requirements rendered useful the Valley's access to transportation lines leading to the great commercial center of New York. Trucks have taken over from railroads the major part of cutlery shipping, thus negating the advantages of location on railroad lines, but also easing access to more varied markets.

Regional specialization in certain types of cutlery is clear, though not by any means perfect. Once established, such specialization is reinforced by custom and know-how. New methods and markets have gradually moved some of the industry from the Valley by weakening the usefulness of unique managerial experience and of old equipment. The Valley cutlery industry has not had the capital or initiative to forge ahead into such new lines of endeavor as electric cutting tools and safety razors. Though the valley was shielded by the gradualness of technological change and its own capacity to produce good wares, other areas in New England and in the Middle Atlantic States have grown more rapidly by virtue of more energetic marketing and more rationalized methods of production. But especially in blades for plating and certain household knives, the Valley shops survived.

The early organization of monopolistic agreements among the cutlers arose out of the nature of the industry, but was encouraged, if not caused, by geographic concentration. Manufacturers, few in number, accessible to one another, could easily meet. Keen price competition, complicated and sharpened by excessive product differentiation, made control not only difficult, but also greatly desired. The agreements may well have strengthened regional centralization by protecting the Valley group from price cutting which might have enabled distant competitors to capture some of the market. But the cartels would not have endured even as long as they did if areas beyond their power had had any marked competitive superiority.

Thus the features that marked the Connecticut Valley as an economic region particularly suited for cutlery: raw materials, water power, skilled labor, and transportation, one by one, have lost importance. Other areas have not, however, shown startling advantages in any of these elements. As some firms have grown rapidly, while others grew more slowly or declined, the Valley has become less outstanding as a cutlery center. Differences in managerial experience and skill and in the life cycle of individual companies seems more responsible than the more strictly geographical factors.

Experience in World War II and ensuing years confirms the picture of the industry presented in previous pages. Cutlery concerns have grown in size and a few have acquired several plants. The largest cutlery in the world is now not in the Connecticut Valley, but in Providence, Rhode Island (The Imperial Knife Co.). Nonetheless, the Valley shops benefited by prosperity and the consequent interest in quality. Many manufacturers, under the impetus of government orders and high consumer demand, concentrated on a smaller than usual variety of products. They found it profitable and resolved to continue the practice.[5] As long as prosperity remains, they will doubtless do so. Unions have become more active in some firms, but cutlery workers, especially in the Connecticut Valley, remained largely unorganized. While cutlery wages rose, they remained far behind those in other manufacturing industries.

Scarcity of raw material, acute during the war, forced a temporary return to carbon steel and a severe restriction of civilian supply. Many concerns made cutlery for the armed forces, mess kits, and small metal objects for various parts of war materiel. They shifted many of their methods and used ideas and materials developed in other industries. As has frequently been the case, the cutlery industry adopted and applied innovations but created few. Small firms with rarely a hint of research activity can hardly be expected to put forth revolutionary inventions. Plastics for both handles and a few kinds of blades, fruit knives and cheap picnic knives, new metal alloys;

improvements in the quality of stamped blades; and some new devices, such as a tumbling process for rough grinding, brought success to progressive manufacturers both in the Valley and elsewhere. Innovations in electrical devices had greater influence on cutting instruments made outside the Valley. In the early 1950's stainless steel table sets to substitute for sterling and plated ware attracted customers in some cases by low price, in others, by handsome modern design. Though much of the most attractive of this table ware was imported, domestic cutlery and silver companies show increasing interest and sense of style in these lines.

In selling procedures also the industry has been affected by outside forces rather than by any development of its own techniques. Chain and large department stores have continued to buy an increasing share, now amounting to 25% to 30% of cutlery production, and large grocery stores have added cutlery as well as certain other housewares, drugs and toys to their lines. The growth of these outlets encourages the production of standardized "quick-turnover" items. Cutlery makers themselves rarely indulge in such competitive selling methods as advertising, coupons or contests. Their product differentiation, though often based on slight variations in appearance or quality, rarely rests on purely hypothetical qualities or irrelevent inducements. Knives are frequently used as premiums to attract purchasers to trade-marked foods and soaps, but never is a bar of soap "thrown in" with a knife. Some firms have put a good deal of effort into making the consumers "brand conscious," and promoting a variety of knives for specialized uses, but they have not wholly overcome the housewife's feeling that a knife is a knife and that there is a definite limit to the amount of cutlery that one household can safely contain.

In 1947 Massachusetts had recaptured first place in cutlery and edge tool production, accounting for 25 percent of the United States total, as compared with its 21 percent of 1939. Connecticut's share had dropped from 17 to 8.2 percent, partly because of changes in census classifications. In both states the absolute amount had increased, but Massachusetts' output had quadrupled, while Connecticut's had changed by only 11 percent.[6] New York and New Jersey had both grown relatively as well as absolutely in cutlery production.[7] What share the Valley plays in state figures and what the future distribution of production will be are open questions. The data available do not give evidence of stagnation in the branches of the industry characteristic of the Connecticut Valley and its surrounding area, and they will probably continue for many years to make their modest contribution to the prosperity of the region.

With all its considerable changes, the cutlery industry shows great continuity with the past. The tradition of craftsmanship and an almost archaic atmosphere surround the making of knives, despite the rise of mass production and the abandonment of hand skills. Old shops, situated by streams and shaded by surrounding woods, are not unusual in the industry. In the adjoining towns are the homes of workers and management, not very far apart. The wage-earners often own their own houses and raise vegetables and even chickens. The work in the shop may be noisy, hot, and dirty, but outside the air is clear; and the clangor of the forge hammers, heard throughout the community by day, ceases at night and is replaced by rural quiet.

In the larger, newer plants, modern methods have brought more standardization, larger output, and the brisk pace that goes with "scientific management." The minimization of forging and grinding in some of these factories makes them cleaner and quieter, their windows are larger, and their ventilation systems more complete. But even these up-to-date concerns are hardly the kind one would choose to illustrate modern technology. They do not have conveyor belts, assembly lines, vast banks of machinery controlled by one or two workers, or research departments. Such organizational features appear only in the very largest cutleries or in those multi-product firms whose cutlery is a small percentage of their total sales. These larger enterprises are located in industrially diversified areas, small or medium sized cities. Even within the biggest plants, diversity of output prohibits assembly-line methods and perpetuates "the economics of small scale production."[8]

APPENDIX I
CUTLERY PRODUCTION IN 1860
Value by leading counties

	Establishments	Value of Product ($000)
United States	51	1,366
Connecticut	9	382
Litchfield County	5	129
New Haven County	4	253
Massachusetts	6	721
Franklin County	3	675
Middlesex County	1	16
Suffolk County	2	30

Source: U. S. Census of Manufactures, 1860.

APPENDIX 11
CUTLERY AND EDGE TOOLS
Value of Products
Total for the United States and Leading States
Percentage of United States total represented by each state

Year	U. S. Total ($000)	Massachusetts Total $000	Percent	Connecticut Total $000	Percent	New York Total $000	Percent
1947	205,009	52,447	25	11,709	8	40,096	19
1939	59,924	12,678	21	10,20	17	14,040	25
1937	68,194	14,047	22	18,583	27	13,584	20
1935	51,171	12,260	29	9,254	18	11,729	23
1933	38,718	12,131	31	5,527	14	8,201	21
1931	52,337	15,271	29	5,805	11	11,588	22
1929	78,661	33,663	43	8,529	11	15,507	20
1927	76,688	33,705	44	8,431.	11	13,882	18
1925	80,263	32,309	40	9,227	11	15,965	19
1923	72,477	20,733	29	14,t48	19	16,047	22
1921	49,341	15,447	31	8,614	17	10,214	21
1919	66,630	19,673	29	8,812	13	14,052	21
1914	25,541	4,357	17	7,357	29	5,056	20
1904	18,615	2,585	13	6,168	33	2,949	16
1900	14,881	2,608	11	5,363	36	1,666	12

Source: U. S. Census of Manufacturers

APPENDIX III
CUTLERY AND EDGE TOOLS
United States Value of Product
Average Value of Product per Firm, 1850-1939

Year	United States Value of Product ($000)	Number of Establishments	Average Value of Product per per Establishment ($000)
1947	215,009	433	496
1939	59,924	266	225
1937	68,194	251	271
1935	51,171	264	194
1933	38,718	200	194
1931	52,337	221	237
1929	78,661	239	341
1927	76,688	230	333
1925	80,263	211	380
1923	72,477	211	343
1921	49,341	210	235
1919	66,630	304	211
1914	25,541	252	101
1909	22,885	281	81
1904	18,615	254	73
1899	14,787	275	54
1889	11,111	474	23
1879	11,661	429	27
1870	5,623	184	31
1860	5,341	250	20
1850	3,813	401	9

Source: U. S. Census of Manufactures.

APPENDIX IV
CUTLERY AND EDGE TOOLS
Employment of Wage-earners
Average number of wage-earners per establishment

1850-1870 and 1899-1947

Year	Wage-earners	Establishments	Average Number of Wage-earners per Establishment
1947	29,076	433	67.00
1939	15,399	266	57.89
1937	16,830	251	67.05
1935	13,713	264	51.95
1933	10,807	200	54.03
1931	12,485	221	56.49
1929	14,991	239	62.72
1927	15,832	230	68.83
1925	16,407	211	77.75
1923	16,671	211	79.00
1921	14,345	211	68.30
1919	19,859	304	65.32
1914	16,561	252	54.47
1909	16,997	281	60.48
1904	14,545	254	57.20
1899	12,028	275	43.70
1870	4,428	184	24.06
1860	4,963	250	19.85
1850	4,275	401	10.66

Source: United States Census of Manufactures.

APPENDIX V
UNITED STATES CUTLERY
Value of Production by Types in Selected Years
(in $000)

Year	Table & Kitchen	Razors Plain & Safety	Scissors Shears & Clippers	Pocket		Clippers Hand & Electric	Butcher Knives & Cleavers	Cutlery	Cutlery & Edge Tools
1947	23,072	59,981	25,861[3]	17,465		-	-	14,706	-
1939	4,936	22 497[2]	6,680[3]	5,180		647	1,834	3,088	-
1937	4,633	29,804[2]	6,432[3]	5,211		1,172	1,311	3,940	-
1935	4,095	21,401[2]	4,701[3]	4,309		1,178	1,138	2,342	-
1933	3,493	17,474[2]	2,466	2,154		531	829	1,530	-
1929	7,776	42,195	3,063	5 ,33	-[4]	-[4]		6,631	-
1927	6,519	40,054	4,844	5,177	-[4]	-[4]		2,937	-
1925	8,269	39,780	4,780	5,472	-[4]	-[4]		-	7,682
1921	6,433	19,381	5,768	5,420	-[4]	-[4]		-	4,040
1919	4,863	24, 554	9,966	9,692	-[4]	-[4]		-	4 806
1914	5,606[1]	14,912	2,393	4,085	-[4]	-[4]		-	2,445

Source: U. S. Census of Manufactures.

1 In 1914 this figure includes only table knives.

2 Includes also dry shavers.

3 [3] Listed as scissors, shears, and snips.

4 [4] Not available. Included in "Not elsewhere classified" figure.

APPENDIX VI
a) CUTLERY AND EDGE Tools, EMPLOYMENT AND PRODUCTION VALUE, 1860 AND 1947

	Year	Establish-ments	Value of Product	Employees
Cutlery	1947	195	142,571	20,248
	1860	51	1,366	1,338
Edge Tools	1947	238	62,438	8,728
	1860	t66	3,244	2,869

b) LOCATION OF CUTLERY AND EDGE TOOL PRODUCTION, 1860 AND 1947 (in $000)

Cutlery	U. S.	Mass.	Conn.	N. Y.	N. J.	Penn.	Ohio	Ill.	Mo.	Other
1947	142 571	43,724	11,709	40,096	25,902	3,207	6,691	-	-	-
1860	1,366	721	382	33	161	16		-	-	-
Edge Tools										
1947	62 438	8,753	9,931	3,272	-	-	8,263	4,367	6,885	2,513
1860	3,244	649	730	959	258	373	-	-	-	-

C) CUTLERY AS A PERCENTAGE OF THE VALUE OF PRODUCTION OF CUTLERY AND EDGE TOOLS

Year	Approximate Value of Cutlery Production In the United States ($000)	Cutlery as a Percernt Of Cutlery and Edge Tool Total
1947	142,571	69
1939	45,417	70
1937	53,503	77
1935	39,604	76
1933	28,477	73
1929	64,998	85
1927	59,431	77
1925	S8,301	73
1921	37,002	75
1914	16,996	66

Source: U. S. Census of Manufactures.

APPENDIX VII

AVERAGE ANNUAL EARNINGS IN CUTLERY AND CUTLERY AND EDGE TOOLS, 1849-1947

Year	Cutlery and Edge Tools	Cutlery
1947	2,460	2,419
1939	1 096	-
1937	1:107	-
1935	987	975
1933	819	-
1932	-	885
1931	977	1,041
1930	-	1,084
1929	1,177	1,223
1927	1,193	-
1925	1,233	1,207
1923	1,185	-
1921	1,028	-
1919	1,010	890
1914	548	-
1909	503	-
1904	486	-
1899	470	-
1879	423	-
1869	481	-
1859	365	-
1849	332	-

Source: U. S. Census of Manufactures, 1850-1947.

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HOW CUTLERY IS MADE

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CHAPTER VII
CONCLUSIONS

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INDEX

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