

THE INSIDE CONTRACT SYSTEM OF PRODUCTION AND ORGANIZATION: A Neglected Aspect of the History of the Firm

by
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Inside contracting characterized many United States industries from the earliest decades of the 19th century through, in a few cases, the first years of the 20th.¹ It prevailed in precisely those industries which made up the "American System" of manufacturing: firearms, sewing machines, watches, machine tools, farm implements, etc.² Yet historians have not paid sufficient attention to this system of organizing production. As a result, an important aspect of the development of manufacturing enterprise is overlooked, weakening our historically-based theorizing about the development of the firm. Recent work by historians of technology, as well as a rereading of standard company histories and

¹Inside contracting occurred when a firm owner contracted with master craftsmen or artisans to produce the constituent components of a final product. This system differed from the putting-out system in that although the owner arranged the marketing and selling of the final product, the work was done in his own factory and not in the artisans' workshops. The owner provided the artisans with floor space, machinery, raw materials, and working capital. In return, the contractors hired and set the wages of their own employees, supervised the work process, and received an agreed-upon piece rate from the owner. The most complete discussion of an inside contract system is that of the Winchester Repeating Arms Company found in John Buttrick, "The Inside Contract System," *The Journal of Economic History*, 12 (1952), 205-221 and Harold F. Williamson, *Winchester: The Gun that Won the West* (Washington, DC, 1952), chapt. 7.

²The following firms used inside contracting during key periods in their development: Winchester Repeating Arms Company; Harpers Ferry Armory; Colt; Amoskeag Mills; Lowell Machine Shop; Pratt & Whitney; Singer (sewing machine company and cabinet works); Saco-Lowell Shops; Whitin Machine Works; Baldwin Locomotive; Waltham Watch; Pope Manufacturing; Wheeler & Wilson; and Browne & Sharpe.

Because some contractors employed 50 to 100 workers and others only a handful, there were obviously many variations of inside contracting used in different industries and even within individual firms. In fact, variations of inside contracting continued in many machine shops after World War I. See Buttrick, 215-217; Daniel Nelson, *Managers and Workers: Origins of the New Factory System, 1880-1920* (Madison, 1975), 37, 179.

census reports on manufacturing, suggests the importance of inside contracting to our understanding of the “stages” of the development of the firm, especially as described in the work of Alfred D. Chandler, Jr.

Since the pioneering work of Chandler, business historians generally analyze the changing internal organization of the firm in technologically- or economically-determinist terms. Change occurs as a “rational” response to inefficiencies brought about by either new technology or by increased production (including transaction) costs. Although such analyses help explain managerial responses to changing factor prices, they fail to provide an historically-based examination of either the management-worker relationship or the sources of technological change in the workplace.³ Chandler admits that he was not trying to describe either the work done by the labor force or the “aspirations of the workers,” but rather to fill the void left by most historians’ neglect of the modern business enterprise.⁴ This, perhaps, best explains the reason he only briefly discusses the inside contract system. Nevertheless, the system was important to the organization of work and the development of “American System” workplace technology. The longevity of inside contracting influenced, more profoundly than Chandler maintains, the nature of labor-management relations and technological change in the mass production factories.⁵

Most historical accounts of the development of the firm quickly move from the craft stage of U.S. capitalism to the factory controlled by capitalist-hired, salaried foremen—the initial hierarchical workplace. This neglect also extends to non-traditional or the “workers control” school of labor history. David Montgomery directed his attention to craft workers in the heat-using industries and their “helper system” of production and neglected the American System industries. Richard Edwards and David

³These traditional neoclassical assumptions, however, can contribute, albeit unintentionally to a broader understanding of technological choice. See William H. Lazonick, “Factor Costs and the Diffusion of Ring Spinning in Britain Prior to World War I,” *Quarterly Journal of Economics*, 96 (1981), 91–92.

⁴Alfred D. Chandler, *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, MA, 1977), 5–6.

⁵Alfred D. Chandler, “The American System and Modern Management,” in Otto Mayr and Robert C. Post, eds., *Yankee Enterprise: The Rise of the American System of Manufactures*, (Washington, DC, 1981), 157–158; Chandler, *The Visible Hand*, 277.

Gordon, et al, mention only in passing the existence of inside contracting and underplay its presence. Harry Braverman incorrectly equated inside contracting with the putting out system.⁶

Yet, a closer scrutiny reveals a series of important instances of craftsmen (capitalists with production skills and little capital) contracting with entrepreneurial capitalists (manufacturers with marketing and sales abilities, but little production know-how) to produce and supply highly-demanded goods in key U.S. industries. It shows a system of production and organization which does not fit neatly in the labor-management dichotomy and enlightens readers about the nature of technological change in the formative years of industrial development in the United States.

Why have historians and, indeed, contemporary observers played down inside contracting? The easiest explanation is that few records survive on the internal organization of work and the role of laborers in the 19th century firm.⁷ Of more importance to historians, inside contracting has seemed to be an anachronism which inevitably had to disappear. Paradoxically, 19th century observers apparently overlooked the system because it was so commonplace in key U.S. workplaces.

This is not to suggest, however, that inside contracting has been totally ignored. The exception to this neglected history is an excellent chapter in Dan Clawson's *Bureaucracy and the Labor Process*.⁸ He uses much of the early literature which is reviewed in this article and raises key questions about this period of industrial history. We can also "discover" inside contracting by carefully reading census reports and standard company histories as well as the recent work in labor history and the history of the

⁶David Montgomery, "Workers' Control of Machine Production in the 19th Century," *Labor History*, 17 (1976), 485-509. See also Katherine Stone's "The Origin of Job Structures in the Steel Industry," *Review of Radical Political Economics*, 6 (1974), 61-97. Richard Edwards, *Contested Terrain: The Transformation of the Workplace in the Twentieth Century* (New York, 1979), 32. Gordon, Edwards, and Michael Reich, *Segmented Work, Divided Workers: The historical transformation of labor in the United States* (Cambridge, 1982), 91-92. Harry Braverman, *Labor and Monopoly Capital* (New York, 1974), 63.

⁷Thomas R. Navin, *The Whitin Machine Works Since 1831* (Cambridge, MA, 1950), 584; George S. Gibb, *The Saco-Lowell Shops: Textile Machinery Building in New England 1813-1949*, (Cambridge, MA, 1950), 216-217. A.F.C. Wallace found that census returns, even as late as 1850, might have referred to an inside contractor as a "cotton manufacturer." See Wallace, *Rockdale: The growth of an American Village in the early Industrial Revolution* (New York, 1978), 177.

⁸Daniel Clawson, *Bureaucracy and the Labor Process: The Transformation of U.S. Industry, 1860-1920* (New York, 1980), 71-125.

mass production factories.⁹ As Clawson has also pointed out, these sources allow us to consider such important questions as the origins of the system; how owners chose the system; how they located craftsmen to come into their factories; how they negotiated the initial contracts; why craftsmen agreed to contract rather than retain their old ways; and, importantly, why inside contracting ended. Other questions are also worthy of further research. Did craftsmen agonize over their decision or see it as an opportunity? Did they aspire to become factory owners?

This essay reviews three broad areas encompassing the following questions about inside contracting: what are its origins, how did the system work, and why did it end. It concludes with a critical analysis of Chandler's discussion of this period of industrial history.

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Origins Of Inside Contracting

Harold Williamson has described a sequence of events leading to the development and use of the inside contract system at the Winchester Rifle Company. He argued that the system emerged as a compromise between the firm's owner and the craftsmen, each needing the other to succeed. An increased demand for fabricated metal products made it increasingly difficult to fill orders without substantial additions of capital and labor. Larger factories were needed to "exploit the principle of interchangeable-parts manufacture" which led to an increasing division of labor in production and to a separation of management functions. When this occurred, "the master armorer, mechanic, or tool builder ran the risk of losing his independence and becoming an employee in a large plant." On the other hand, the capitalist frequently had "neither the training nor the ability to organize the production

⁹See David Hounshell, *From the American System to Mass Production, 1800-1932* (Baltimore, 1984); Donald R. Hoke, "Ingenious Yankees, The Rise of the American System of Manufactures in the Private Sector" (unpublished PhD diss., Univ. of Wisconsin-Madison, 1984); Steven J. Ross, *Workers on the Edge: Work, Leisure, and Politics in Industrializing Cincinnati, 1788-1890* (New York, 1985), chapt. 4; Gary J. Kornblith, "The Craftsman as Industrialist: Jonas Chickering and the Transformation of American Piano Making," *Business History Review*, 59 (Autumn 1985), 349-368; Nelson, *Managers and Workers*, chapt. 3; and Daniel Nelson, *Frederick W. Taylor and the Rise of Scientific Management* (Madison, 1980), chapt. 1. An intriguing look at an earlier period is in Cynthia Shelton, "Labor and Capital in the Early Period of Manufacturing: The Failure of John Nicholson's Manufacturing Complex, 1793-1797," *Pennsylvania Magazine of History and Biography*, 106 (1982), 341-364.

of such articles as precision tools or guns, nor did he have the inventiveness which was an integral part of manufacturing at this time," nor the ability to supervise the expanding workforce. He concludes that this situation led to the system of inside contracting which offered advantages to both parties.¹⁰

Daniel Nelson attributed the management style to the technological demands of the manufacturing process. In the second half of the 19th century a "remarkable group of factory entrepreneurs appeared" in the heat-using and precision machinery industries, where the "intricacy or complexity of the manufacturing process required maximum decentralization." In the precision machinery factories especially these skilled workers had great authority and, under the internal contract system, they worked as "semi-independent businessmen." Nelson concluded that the inside contract system was "a useful expedient" for 19th century American machine building. Firms which expanded slowly continued to require highly skilled workers at crucial points. Henry Roland found this a necessity at Singer, where the company introduced improved tools in the 1860s. These tools required "skilled or specialized laborers, instead of machinists, contracting came in, and day-pay went out."¹¹

David Brody argued that technological necessity precluded a system of outside contracting and led to the widespread use of inside contracting: "Metal-fabricating firms, ranging from locomotive building to clockmaking, brought contracting inside the plant." Along with Williamson, Brody noted that the increasing size of production facilities decreased an owner's ability to supervise his operations and this led him to

carve his work force up into units small enough so that the accustomed form of labor control could be maintained through the agency of contractors, craftsmen, and foremen. . . . The unifying thread was the decentralization of labor supervision in the largescale enterprise. The conclusion to be drawn seems clear: whatever the imperatives in the direction of largescale production, on the specific matter of managing workers, the nineteenth century manufacturer conceded the superiority of the close, personal supervision that characterized small-scale enterprise.¹²

¹⁰Williamson, *Winchester*, 85-86.

¹¹Nelson, *Frederick W. Taylor*, 7; Nelson, *Managers and Workers*, 37; Henry Roland, "Six Examples of Successful Shop Management," *Engineering Magazine*, 12 (1897), 997.

¹²David Brody, "Labor and Small-Scale Enterprise During Industrialization," in Stuart W. Bruchey, ed., *Small Business in American Life* (New York, 1980), 271-272.

Charles Fitch, writing in the *Tenth Census*, observed that hardware manufacturing, beginning in the 1870s, meant producing thousands of different products.

Multiplicity of details, and details not absorbed in a comprehensive scheme, require detailed management, which can best be secured by the subcontract and piece work systems.¹³

Merritt Roe Smith found that inside contracting was introduced around 1809 to the Harpers Ferry Armory together with the enlargement of the factory and piece rate accounting procedures. In particular, inside contracting represented a shift away from "traditional craft patterns," including apprenticeship. This shift indicated that "workmen so well versed in every branch of gun making were no longer required."¹⁴

David Hounshell argued that when managers who worked in an inside contracting environment moved to a new company, they took the system with them. At Singer, for example, the new plant superintendent changed production processes and introduced inside contracting along the lines he had learned at Manhattan Firearms. Indeed, in the making of cabinets at Singer, inside contracting was reinstated in 1882. Replaced in 1879 by a foreman system to manage production, Singer executives went back to inside contracting after two years of rising prices.¹⁵

Finally, Carroll Wright, in his analysis of the factory system for the *Tenth Census*, found that inside contracting in the pottery industry was a long-lived practice, yet he could not identify the reason for it being so: " 'It always was so,' was the only reply the inquiry received."¹⁶

Inside contracting flourished where it did because it conferred real benefits on owners. There is no question that the owners had much to gain by using the system.¹⁷ At Winchester, they were

¹³Charles H. Fitch, "Report on the Manufactures of Interchangeable Mechanism" in *Tenth Census of the United States (1880): Manufactures* (Washington, DC, 1883), 711.

¹⁴Merritt Roe Smith, *Harpers Ferry Armory and the New Technology* (Ithaca, 1977), 64.

¹⁵Hounshell, *From the American System*, 140.

¹⁶Carroll D. Wright, "Report on the Factory System of the United States," *Tenth Census of the United States (1880): Manufactures* (Washington, DC 1883), 668.

¹⁷Henry Roland, discussing Pratt & Whitney, and John Converse, writing about Baldwin Locomotive, each related stories about significant cost savings which demonstrated why owners would want to retain inside contracting at their plants. Roland, "Six Examples," 995; John W. Converse, "Progressive Non-Union Labour: Some Features of the System and Management at the Baldwin Locomotive Works," *Cassier's Magazine*, 23 (1903), 664.

“freed from most, if not all,” of the more technical problems concerned with production, process improvement, and labor supervision. It also allowed Oliver Winchester to devote his attention to financial and marketing problems and prevented serious bottlenecks from developing during a sharp expansion of the labor force. At Whitin, the owners benefitted from the standardization of direct labor costs which meant they only had to watch material costs to know at what level to quote machinery prices. Job work was a handy and simple management device and, to some extent, inside contracting took the place of a cost-accounting system. A final reason owners favored the system was because contractors kept their costs low and often even lower than those of work performed under the more conventional foreman system. Manufacturers recognized from the beginning that the contract method provided “a powerful stimulus” for cost reductions through technological innovation and careful management.¹⁸

From the master craftsman’s perspective, inside contracting represented the way to maintain his independence in a changing business environment. Although he would no longer produce a product for market, he would still wield his craft skills, hire and supervise an employee force, yet be spared the problems of finance and salesmanship. Inside contracting also provided an important step to further success. Amos Whitney joined Francis Pratt in 1854 in the Phoenix Iron Works, where they worked together for 10 years, the former as contractor, the latter as superintendent. Joseph Roe concluded that a “better training for future manufacturers could hardly be devised, and a surprising number of these old-time contractors have succeeded later in business for themselves.”¹⁹

Contractors also served as role models to other workers. Their status indicated to workers that factory labor and specialization did not necessarily spell the end of autonomy and creativity which were more synonymous with the old technologies and traditions. For the contractor’s immediate employees, they benefitted from his instruction and supervision, his consideration of their per-

¹⁸Williamson, *Winchester*, 86–87; Navin, *Whitin*, 146; Nelson, *Managers*, 36–37.

¹⁹Joseph W. Roe, *English and American Tool Builders* (New Haven, 1916), 177.

sonal grievances, and their personal relationship with an "employer."²⁰

Workings Of The System

The relationship between the master craftsmen and the owners was, by definition, a contractual one. A factory owner agreed to provide a fixed piece rate to the contractor in exchange for completed product components. Components collected from the contractors were usually assembled by owner-employed workers under the supervision of owner-employed foremen. Three key elements, when combined, made this arrangement different from ordinary contracts: (1) the contractor hired, fired, and set the wages for his own helpers (employees); (2) the owner provided the contractor with machinery (although the contractor could make changes in the production techniques), raw materials, and working capital; and (3) production took place inside the owner's factory rather than in the contractor's workshop. This inside contracting system represented not only an economic response, but also a technological and social response to the changing conditions of U.S. capitalism in the early and mid-19th century. It affected economic relationships and social structure in the community as well as status and hierarchical relationships in the factory.²¹

The "focal point" in the relationship was the setting of the piece rate. The piece rate represented, in many instances, the largest portion of the owners' production costs; it determined the size of the contractors' income and, in turn, the wage rates paid to the contractors' employees. The bargaining over the piece rate was an arena where the parties used their own incomplete knowledge and intentional secrecy in order to gain the most in the contract.²² In such a relationship the interests of the contractors and the owner are directly opposed and thus it would be reasonable to expect that the system did not lend itself to developing the "ideal conditions of a harmonious relationship."²³ In fact, major conflicts arose at contract renewal times because the front office had

²⁰Daniel Nelson, "The American System and the American Worker," in Mayr and Post, eds., *Yankee Enterprise*, 179.

²¹Williamson, *Winchester*, 90.

²²*Ibid.*

²³Roland, "Six Examples," 966. This conclusion differs from Hoke, "Ingenious Yankee," 10.

relatively little information on which to base the prices paid to the contractors.²⁴

Although the focal point of the relationship was setting the piece rate, the central theme of the relationship was control—control over production information and control over the work force. The bargaining over this control was based on the incomplete knowledge which each party had of the other's activities and plans: the contractor not knowing at what price the product was to be sold and, hence, the prospects of a reduced piece-rate and the owner not knowing what new techniques the contractor was ready to put into use and, thus, what profits the contractor would make this year. When the owner expanded his accounting procedures, increased his inspections, and introduced piece-rate cuts, the contractor saw this as a threat to his position and status. Yet, for the owner, these efforts simply meant an effort to gain some control over a substantial amount of operations which were outside his immediate control.²⁵

Both owners and contractors, however, incurred serious problems as they tried to determine piece rate strategies. Because job-work accounts were settled with owners very infrequently, contractors found it "impossible" to measure the dollar effects of their efforts to increase efficiency. In turn, because they had no control over the volume and velocity of work in their departments, Navin noted that they "must have felt that their ability to increase their jobbing income was not very great." Owners, meanwhile, found it difficult to reduce the piece rates because the contractors "naturally resented having their rates modified, and, furthermore, top management had no accurate way of knowing what the new jobbing rates should be."²⁶

Because this struggle over control determined the distribution of income, inside contracting also had a strong social component. As Williamson points out

Insofar as money incomes were a measure of status and position both within the organization and in the community, the large contractors occupied an enviable position. . . . The largest contractor received an average income second only to the president [of Winchester] and above that

²⁴Williamson, *Winchester*, 88.

²⁵*Ibid.*, 90. Roland, "Six Examples," 996.

²⁶Navin, *Whitin*, 144, 146-147.

of the average official. This situation could have further increased the dissatisfaction of the management with the contract system.²⁷

One of the key elements of inside contracting was that it stimulated contractors continually to innovate their production techniques. This process of innovation, with the focus on interchangeable parts and precision manufacturing, is at the heart of the American System of manufactures. The literature on the American System focuses almost exclusively on technology, with the exception of the recent studies by Hounshell and Hoke. Yet it is evident that most of the firms identified with the American System — e.g., Whitney, Robbins & Lawrence; Brown & Sharpe; Colt; Remington; Winchester; Singer; Wheeler & Wilson — used inside contracting. It is fair to conclude that these two aspects of 19th century production were intertwined.²⁸ As Fitch observed

The system of employing head machinists by piece-work or contract may almost be esteemed a germinant principle in the development of special machinery and a higher productive efficiency in the manufacture.²⁹

Inside contracting's contribution to technology can be seen in the growth of the machine tool industry where the system played a vital role in the development of a corps of master tool builders and mechanics during the mid-19th century.³⁰ These master craftsmen combined inventiveness with entrepreneurial skill, "blending men, machinery, and precision measurement methods into a workable system of production."³¹

In most instances, factory owners lacked technical knowledge, which allowed the contractors to direct technological change within the firm. As good capitalists, contractors changed production techniques in order to reduce costs, especially when their piece-rates were cut. They benefitted directly from increases in production or reductions in labor costs brought about by mechanization.³² As Charles Fitch observed in the *Tenth Census*:

²⁷Williamson, *Winchester*, 91.

²⁸Hounshell, "The 'System': Theory and Practice," in Mayr and Post, eds., *Yankee Enterprise*, 144.

²⁹Fitch, "Report," 650.

³⁰Felicia J. Deyrup, *Arms Making in the Connecticut Valley: A Regional Study of the Economic Development of the Small Arms Industry 1798-1870* (York, 1948), 149.

³¹Smith, *Harpers Ferry*, 219; 239. See also Hoke, "Ingenuous Yankees," 10. Buttrick asserts, instead, that inside contracting simply provided a "favorable environment" for these entrepreneurs and inventors and was not "responsible" for them. "Inside Contracting," 211, n.12.

³²Deyrup, *Arms Making*, 149; Hounshell, "From the American System to Mass Production: The

It is to [the contractor's] interest and profit to increase the productiveness as large as possible, and to the devices of this class, in the development of minor details to secure the greatest result from the smallest outlay, the improvement in productive efficiency in this [sewing machines] and in kindred manufactures is largely due.³³

At the same time contractors would attempt to conceal such technological changes from the owners. In particular, changes which allowed him to replace skilled workers with less skilled workers and, in turn, decrease his wage bill, would not be announced until after the company reduced his piece-rate. These innovations would also cause dissatisfaction among his employees and he would not necessarily be motivated to make the change unless his own income decreased.³⁴

Clearly, inside contracting allowed master mechanics to use their specialized production knowledge to retain their independence when they were unable to compete individually with a rising class of merchant-manufacturers. It is not clear, however, what sort of skills contractors demanded of their employees. Most scholars who have discussed these skills have used the armories and the firearms factories as their sources. In these facilities it appears that the work demanded some skill and even allowed a type of apprenticeship system. At Winchester the system "provided an opportunity for inexperienced boys to acquire a technical education under the tutelage of a master craftsman." Inside contractors wanted to keep those workers who had demonstrated an ability to perform and, in return, the workers were reasonably sure of steady employment in the factory.³⁵

Development of Manufacturing Technology in the United States, 1850-1920" (unpublished PhD diss., Univ. of Delaware, 1978), 52-53. "Receiving so much per piece, and being held to a strict accountability for quality, . . . [the contractor] gives his whole thought to the direction of his work, to the employment of the best artisans and to the invention and application of new machinery, processes, and tools—in a word, conducting the department with as much economy and skill as if it were his own. . . . Not a few of the marvelous labor saving processes that distinguish American mechanical production are the result of the contract system in our large workshops" (W.C. Church, "American Arms and Ammunition," *Scribner's Monthly*, 19 [1880], 443, cited in Williamson, *Winchester*, 86).

³³Fitch, "Report," 650.

³⁴Williamson, *Winchester*, 89.

³⁵Williamson, *Winchester*, 86, 135. "One needs but look at the long list of eminent American mechanics and tool makers who got their training at Whitney's or Robbins and Lawrence's, or Colt's, or Browne and Sharpe's, to realize the value of the system. Whether or not it was because it created intimate association between contractor men, the fact remains that in the nineteenth century armories and precision machine shops, probably more than in any other

Charles Fitch, writing in the *Tenth Census*, reached similar conclusions about the industry:

. . . the fact remains that the increased fineness and accuracy required in the manufacture of fire-arms demands the most skillful and experienced oversight, and unskilled labor can only be employed with the best results upon limited portions of the work. Thus we find that at most of the larger armories the greater proportion of the operatives draw the wages of skilled men.³⁶

Contradicting this view, however, is Merritt Roe Smith, the leading authority on Harpers Ferry Armory. When the Armory introduced inside contracting in 1809, the formal apprenticeship system was replaced by a non-contractual training program and the amount of skill imparted to workers depended upon the willingness of the master to teach them. Thus “the development of expertise remained minimal” and it severely restricted a youth’s mobility from one job to another.³⁷

Although a source of information for Harold Williamson’s work on Winchester, John Duncan observed that inside contracting

has a tendency to develop a body of alert overseers who are always often the men to see that they are not wasting time either through laziness or incompetence. The system when it operates makes men work, but it has the unpleasant disadvantage of developing slave-driving habits. Many men will not stand for such treatment; and unless the work is of such a nature that a rather low type of worker can be employed and taught the tasks to be done, the company is liable to have a great deal of trouble with its labor under this contract system.³⁸

This reduced need for skilled laborers would stem from the creation of new machine tools and interchangeable parts manufacture, both prevalent in those firms using inside contracting. John Hall’s Rifle Works at Harpers Ferry, which Smith termed the “tap-

industry in America, innate capacity had opportunity to express itself and to reap rewards.” Constance M. Green, “Light Manufactures and the Beginnings of Precision Manufacture,” in Harold Williamson, ed., *The Growth of the American Economy*, 2d ed. (New York, 1951), 208.

³⁶Fitch, “Report,” 622. Nelson also concluded that “in the arms industry, as in others, jobs assigned to contractors involved difficult precision work and demanded highly skilled workmen and close supervision.” He implies, but does not clearly state, that the “highly skilled workmen” include the contractors’ employees. *Managers and Workers*, 36.

³⁷Smith, *Harper’s Ferry*, 64.

³⁸John C. Duncan, *The Principles of Industrial Management* (New York, 1920), 219.

root of modern industrialism," demonstrated the effect of the changing technology on personnel needs:

[Hall's] system would have been impossible without self-acting machinery. . . . Hall's cutting machines not only functioned without any mechanical guidance but also ceased operation once the work piece was finished. This enabled a laborer to tend as many as three or four machines simultaneously. Since their management required no mechanical skill, any reasonably alert individual could learn the job within a short period of time.³⁹

Contractors also faced the prospect of reduced demand for their skills because of technological change. Although cotton and textile manufacturers rarely used inside contractors, A.F.C. Wallace noted that some mule spinners' in Rockdale operated as contractors; yet by the early 1840s, new nearly automatic mules reduced the need for the spinners former skills. He approximated more closely the passive machine-minders who worked in the spinning and weaving rooms.⁴⁰

There was, however, a key difference between Hall's Rifle Works and the Rockdale factory. Although Hall provided the production machinery, contractors were encouraged to improve this machinery and, in turn, their output and profits. Whereas in Rockdale, owners provided machinery which, although improving the income of some contractors, led to the dismissal of others and altered the nature of the work process.

Although our knowledge about the owner-contractor relationship is limited, what we know about the relationship between contractors and their employees is even more scarce. Harold Williamson's writings on Winchester provide most of the information on this subject; however, even Williamson noted serious problems in gathering information. Although wage-setting was the heart of the contractor-employee relationship, none of the Winchester contractors' wage rate books had been preserved. Williamson wrote sympathetically about inside contracting and gave the benefit of historical doubt to the contractors when explaining the relationship with their employees. He found suggestions in the records of contractors' piece-rates and incomes that rate cuts were not necessarily directly passed on to his employees. Rather

³⁹Smith, *Harper's Ferry*, 219, 240.

⁴⁰A.F.C. Wallace, *Rockdale*, 177, 381.

he suggests the contractors absorbed a part of the cuts themselves or were able to introduce methods that increased the productivity of the workers. Countering this move to reduce his employee's wages were social pressures and expectations. The contractors lived in the same neighborhood as their workers and their prestige and social status depended on the goodwill of this community. When wage reductions were passed on, the contractors could blame the factory owner.⁴¹ Other writers, however, have not been as sympathetic to the contractors. Instead, they conclude that the employees "often bore the brunt" when contractors' piece-rates were reduced and that inside contracting "invited petty tyrannies rather than an attitude of intelligent self-interest."⁴²

Notwithstanding a strong feeling of antagonism between management and contractors, strikes were rare under inside contracting. The system served as an institutional mechanism which "limited or often contained" the friction and antagonism between labor and management. Williamson found that employees were content with their jobs at Winchester and the low annual turnover and the "absence of labor strife give confirmation to this picture." For many years, in fact, contracting deterred union organizing at Winchester. Yet, Winchester management took advantage of a failed attempt at union organizing and radically altered the way in which hiring was done. This change was a key factor in ending inside contracting at the company.⁴³

Unions tended to view inside contracting much as they did all methods which used pacesetters and bonus foremen because their profits were derived from the "speculative margin of profit on the output of his fellows." However, they were not as "universally opposed" to a contractor who produced much of his own work and whose "gang merely attend upon him." In those instances the unions resisted the exploitative possibilities inherent in jobs without union protection, yet did not try to "limit the control of the craft worker over the work process."⁴⁴

⁴¹Williamson, *Winchester*, 90-91.

⁴²Navin, *Whitin*, 144-145; Nelson, *Managers and Workers*, 36-37.

⁴³Roland, "Six Examples," 996; Daniel Nelson, "The American System and the American Worker," in Mayr and Post, eds., *Yankee Enterprise*, 183-184; Williamson, *Winchester*, 90-91.

⁴⁴Carroll D. Wright, "Report on the Factory System of the United States," in *Tenth Census*, 19; Brody, "Labor," 272.

Why Inside Contracting Ended

Chandler described the changing factory as the “specific organizational response to the needs of production technology.” Yet proceeding to analyze the “modern industrial corporation,” he understates the importance of the inside contracting system. Chandler credits the New England manufacturers, particularly the firearms makers and, later, tool manufacturers, as being the most technologically innovative. These metal-working industries relied “more on their own industrial experience” and borrowed less of their technology from other industries or from abroad, and less of their organization methods from the railroads.”

He attributes these changes, however, not only to these skilled mechanics (inside contractors), but also to the factory owners. He blurs the distinction between the contractors and the owners, explaining that the “initial concentration on technology” left the owners (whom he refers to as “manufacturers”) little time to improve management methods. Instead of developing these methods they turned the day-to-day operations of the new factories over to the foremen of the several departments. He then asserts that these foremen “frequently became inside contractors.”

In other words, Chandler (a) significantly reduces the extent and duration of inside contracting; (b) attributes technological innovation to the owners who generally had little technical knowledge; and (c) asserts that owners used inside contracting as a form of factory organization because they devoted too much time to technology.⁴⁵

According to Chandler, owners benefitted from the system in two ways: one, they were able to pass on the problems of managing workers and, two, they did not have to work out accounting procedures to assure proper payment to the contractors because of the fixed piece rate. On the other hand, he asserts the system was inefficient from the owners’ perspective because they lost control over costs. Chandler argues that

The contractor had every incentive to conceal information on costs from the factory owners, as such information affected his own bargaining position. Nor did the contractor feel the need to coordinate flows so as to

⁴⁵Chandler, *The Visible Hand*, 244, 270, 271.

use expensive machinery more continuously and efficiently. The company, not he, paid these machinery costs.⁴⁶

Although Chandler does not provide evidence that this lack of control over costs exceeded the benefits (to owners) of inside contracting, he argues that the economic depression of the 1870s and the ensuing drop in demand and increased unused capacity in metal-working, led manufacturers "to turn their attention to reducing per-unit costs and improving the coordination of flows through the plant." In fact, as manufacturers turned their attention to organization, this "new interest led to beginnings of the scientific management movement in American history."⁴⁷ Chandler's discussion of this period is confusing, however, because he blurs these 30 to 40 years of transition and collapses them into a few paragraphs to describe the introduction of the shop-order and gain-sharing systems.

Chandler writes that inside contractors resisted the shop-order system of accounts which Metcalfe, Towne, Taylor, and others developed because it called for them to give information to the owners which they had little desire to provide. Although the owners of the metal-working factories agreed to the value of the procedures proposed by Metcalfe and others, the inside contractors (as well as other "strong and independent" foremen) often "stood in the way of getting the new systems installed." To get them to accept the procedures, manufacturers developed "gain-sharing plans." The manufacturers believed these plans provided incentives similar to those of inside contracting by assuring workmen as well as foremen higher pay for expanded output. At the same time they permitted the management to gain control over production.⁴⁸

Although Chandler concludes that the reorganization of the mass-producing metal factories in the early 20th century marked the "culmination of the movement for systematic and scientific management that had its beginnings in the economically depressed 1870s," he omits a half-century of workplace history.⁴⁹ In its place,

⁴⁶Chandler, "American System," 157.

⁴⁷Ibid.; Chandler, *The Visible Hand*, 272.

⁴⁸Ibid., 274, 275, 277.

⁴⁹Ibid., 278.

he inserts a theoretical history which assumes that this reorganization took place as an efficient, non-conflicting transition.

* * *

I am not arguing that Chandler's interpretation be dismissed; rather, that his theoretical explanation does not take full account of the historical record. Clawson, who focused on the class relations between the owners and contractors, concluded that there were two important reasons for the end of inside contracting. He argued that owners consciously abolished the system because it yielded, from the owners' perspective, too much profit to the contractors. These profits resulted, in part, from the contractors' control of technological change and from their ability to pass on owners' piece-rate cuts to their workers. Clawson also asserted that the system created "social anomalies" with contractors earning higher incomes and enjoying a higher social position than high company officials and these officials resented this status competition.⁵⁰

The evidence we have, although greatly limited in quantity, reveals a wide variety of reasons – from company to company and industry to industry – for the end of the inside contracting system besides Chandler's efficiency and cost control arguments and Clawson's class conflict arguments. A partial list of these reasons includes the following: external market pressures drove product prices down, reducing profit margins, and leading to tightened controls over piece-rates; reduced piece-rates led to reduced employees' wages and, subsequent, labor unrest which the owner used as an argument to end the system; owners made decisive changes in hiring procedures – with companies screening and, in some instances, making hiring decisions – which undermined the prestige of the contractors and their underlying power base; owners established minimum wage rates for all employees and this squeezed contractors between their declining piece-rates and the wages at a time when the contractors had nearly exhausted the technical changes they could make to save costs; with the contractor forced to cut his profits and the owner having better records of the contractor's expenses, the owner was able to reduce piece-

⁵⁰Clawson, 119–123.

rates and more easily absorb the benefits of technical changes which used to be shared with or absorbed by the contractor; finally, and perhaps crucially, new owner-employed managers came into the factory at the turn of the century and viewed inside contracting as “anachronistic” and “out of step” with the developing management movement and these managers were interested in applying their new techniques and management styles.

Thus we are left with a variety of reasons for the end of inside contracting. Chandler’s efficiency arguments and Clawson’s class arguments are surely on this list. Yet, more research is needed not only on the ending of the system, but new work on inside contracting will enrich our understanding of the origins of the modern industrial order and the relationship between management and labor.

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