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The Decline of Child Labor in the U.S. Fruit and Vegetable Canning Industry: Law or Economics?

Child labor in the U.S. economy declined significantly between 1880 and 1920. This case study of the fruit and vegetable canning industry examines variations in laws, technology, and income across states and time to assess the relative importance of legal and economic factors in reducing the employment of children. The authors find that economic factors, especially a technologically driven shift toward a greater demand for adult labor, were relatively more important. While economic development was often a precondition for legal restrictions on child labor, compulsory schooling and child labor laws restricted the employment of children in technologically backward canneries.

The use of child labor in the United States declined drastically between 1880 and 1920. During that time, the proportion of workers under the age of sixteen in U.S. manufacturing fell from 7 to 1 percent (see Table 1).¹ Both contemporary observers and historians of the Progressive Era have generally interpreted this phenomenon to be the result of the widespread adoption of laws restricting child labor and mandating school attendance.² More

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¹ The proportion of children in the work force stayed fairly constant at around 18 percent between 1880 and 1910 but fell to 8.5 percent by 1920. See Melvin Urofsky, "State Courts and Protective Legislation During the Progressive Era: A Reevaluation," *Journal of American History* 72 (June 1985): 63–91.

² Benjamin P. DeWitt, *The Progressive Movement* (1915; Seattle, Wash., 1968); Harold U. Faulkner, *The Quest for Social Justice, 1898–1914* (1931; Chicago, Ill.,

Table 1
Percentage of Children among All Workers for U.S. Manufacturing
and Fruit and Vegetable Canning Industry, 1879–1919

Year	Percent of Children in Manufacturing	Percent of Children in Canning	No. of Children in Canning
1879	7	18	5,804
1889	3	11	5,579
1899	3	9	3,160
1904	2	7	2,790
1909	2	7	11,035 ^a
1914	2	5	8,157
1919	1	3	4,193 ^a

^a Includes fish and oyster canning.

Source: U.S. Census of Manufactures, various years.

recently, however, economic historians have argued that the decline in child labor was primarily the result of long-run economic forces.³ In their view, the supply of child labor declined as family incomes rose, and the demand for child labor decreased as technological progress required a better-trained, more skilled, and more reliable labor force.

The U.S. fruit and vegetable canning industry provides a useful case study for exploring the relative importance of economic and legal factors in reducing child labor. On average, the proportion of children among cannery workers fell from 18 percent in 1880 to 3 percent in 1920, although percentages varied greatly among states. The average real income of adult cannery workers

1971); Elizabeth Brandeis, "Labor Legislation," in vol. 3 of John R. Commons et al., *History of Labor in the United States* (New York, 1935). The debate among historians of the Progressive Era about whether legislation was motivated by humanitarian concerns or by the need for social control does not concern us here; see Joseph F. Tripp, "Law and Social Control: Historians' Views of Progressive-Era Labor Legislation," *Labor History* 28 (Fall 1987): 447–83.

³ The most complete version of this argument can be found in Clark Nardinelli, *Child Labor and the Industrial Revolution* (Bloomington, Ind., 1990); but see also Allen Sanderson, "Child-Labor Legislation and the Labor Force Participation of Children," *Journal of Economic History* 34 (March 1974): 297–99; Claudia Goldin, "Household and Market Production of Families in a Late Nineteenth Century American City," *Explorations in Economic History* 16 (April 1979): 111–31; Claudia Goldin and Kenneth Sokoloff, "Women, Children, and Industrialization in the Early Republic: Evidence from the Manufacturing Censuses," *Journal of Economic History* 42 (Dec. 1982): 741–74; Thomas J. Keil and Wayne M. Usui, "The Family Wage System in Pennsylvania's Anthracite Region: 1850–1900," *Social Forces* 67 (Sept. 1988): 23–45.

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rose over the period, though it also fluctuated widely among states. The degree of technological progress was uneven across urban and rural canneries, across crops, and across departments within canneries. Similarly, legal restrictions on the use of children in the canning industry developed unevenly across states and in some cases even within states across counties.⁴ These variations allow us to assess the relative impact of economic and legal forces on the decline in child labor.

The Usefulness of Child Labor in the Early Canneries

Compared with manufacturing in general, the seasonal canning industry was slow to complete the adoption of mechanized continuous processing and slow to implement the regular hours and time-rate payment systems associated with that technology. Even though canning was one of the earliest industries to begin the implementation of continuous processing, mechanized line production long remained incomplete and partially diffused.⁵ Some crops such as peas were conducive to continuous processing, whereas others such as peaches were not. Urban canneries with access to a variety of crops and the potential for a long season adopted new machinery as it was invented, but isolated rural canneries processing one crop over a short season retained older production techniques. Cookrooms, which processed the relatively uniform input of foodstuffs already filled into cans, adopted mechanization fairly quickly, whereas preparation rooms, which had to deal with the highly varied physical aspects of different crops, were slower to mechanize. Thus, child labor remained useful and profitable for many canneries, particularly during the early period and for unmechanized preparation work. In rural canneries, more-

⁴ For an overview of U.S. child labor laws, see William F. Ogburn, *Progress and Uniformity in Child-Labor Legislation: A Study in Statistical Measurement* (New York, 1912), and Miriam E. Loughran, "The Historical Development of Child-Labor Legislation in the United States" (Ph.D. diss., Catholic University of America, 1921).

⁵ Alfred D. Chandler, Jr., *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, Mass., 1977), 295-96. See also Dianne Newell, "The Rationality of Mechanization in the Pacific Salmon-Canning Industry before the Second World War," *Business History Review* 62 (Winter 1988): 626-55 for an excellent example of the "halting and incomplete diffusion of mechanization and continuous-process technology in the salmon-canning industry," representing "the sort of combined and uneven development that apparently was a widespread occurrence in the early industrial era" (p. 654).

over, child labor was used for many tasks even as late as 1918, as the following example from a report on a Maryland cannery shows:

Sometimes the smaller children, who had to stand on boxes to reach the peeling tables, worked with their mothers or other relatives, and their earnings were added to older members of the family. Others worked independently, and proudly exhibited the number of checks earned.

While the adults worked steadily, the children were allowed considerable freedom in coming and going, especially those who were imported with their parents and lived in the labor camps. This was even more noticeable in the corn-husking sheds, where smaller children were more often found than in tomato canneries. Those too small to husk corn sometimes assisted their mothers by "silking the corn," removing husks, and pushing the corn within their mothers' reach.

The boys and girls who were time workers usually labeled cans and rolled them down the chute and inspected cans passing on conveyors. Boys were sometimes employed on time rate to do trucking, hauling and removing skins, and general laboring work, such as carrying baskets of tomatoes to steamers or to the peelers, and piling baskets, cans and cases. . . . Sometimes children as young as 7 or 8 were regarded as good workers by their parents, and worked with the steadiness and speed of adult workers.⁶

In the 1880s, cookroom workers were drawn from craft labor markets, but preparation workers, who shucked corn, cut peaches, skinned tomatoes, podded peas, and then filled cans with these prepared fruits and vegetables, were usually drawn from a casual labor market. During peak-season labor shortages, in order to utilize all available labor—including children—for the quick processing of perishable crops, owners tolerated a wide range of worker productivities by paying piece rates.⁷ Furthermore, at many canneries in the 1880s and at rural canneries well into the twentieth century, preparation workers frequently came in family groups. Immigrant families from the cities often migrated to rural canneries for the entire summer to find employment for the whole family.⁸ Mothers who wished to work in canning often brought their

⁶ U.S. Department of Labor, Children's Bureau, *Administration of the First Federal Child-Labor Law* (also Legal Series no. 6 and Industrial Series no. 6) (Washington, D.C., 1921), 97–98.

⁷ Martin Brown and Peter Philips, "The Decline of the Piece-Rate System in California Canning: Technological Innovation, Labor Management, and Union Pressure, 1880–1947," *Business History Review* 60 (Winter 1986): 574–80.

⁸ For Italian families in Buffalo, N.Y., this is described in detail by Virginia Yans-McLaughlin, *Family and Community: Italian Immigrants in Buffalo, 1880–1930* (Chi-



Photograph by Hine

A mother nursing her baby while she hulls berries for a Delaware cannery. Her other children beside her, also at work. The little four-year-old Mabel started working the summer before. Many very young children work all day.

Mother and Children at a Delaware Cannery, c. 1912 • The original caption for this Lewis Hine photograph indicates what the picture was meant to highlight, the prevalence of both on-the-job daycare and child labor in canning. Also obvious are the presence of a very casual labor process and the absence of capital invested in preparation work. This Delaware cannery was similar to the Maryland country canneries described in the case study. (Photograph reproduced from Florence Kelley, "A Privileged Industry," *Twentieth Century Magazine* 6 [July 1912]: p. 33.)

children along, partly to supplement family income and partly as a form of on-the-job child care. As a New York cannery investigator reported in 1908, "Mothers [took] their nursing infants with them into the sheds and children from four years upward [were] found actually at work."⁹ Many cannery operators appreciated this custom, because it raised the effective supply of available labor dur-

ago, Ill., 1982), 184–201. See also Mary S. Callcott, *Child Labor Legislation in New York: The Historical Development and the Administrative Practices of Child Labor Laws in the State of New York, 1905–1930* (New York, 1931), 168: "Italian and Polish families, who move out from the large cities to spend the summer months at the canneries, take their children with them. . . . they can find employment for every member of the family, no matter how young, who can 'nip' a bean."

⁹ Quoted in Callcott, *Child Labor Legislation in New York*, 168.

ing peak-season labor shortages. Permitting children in the canneries allowed their more productive mothers to accept employment, and parental authority on the scene muted the playful and sometimes irritating irregularity of child labor.

The age at which a child became a useful worker and not merely an appendage of the mother depended on the crop being processed and the technology in use. In the 1880s, all fruits and vegetables were prepared by hand; older children worked on their own, but young children often just helped their mothers.¹⁰ The small batches of produce minimized potential damage from a child's inattention, and piece rates ensured against over-paying the child worker. Employers, however, did not prefer children over older workers.¹¹ One Baltimore canner in the 1880s expressed his view of productivity ranking by age and sex as follows:

[L]abor [is] often scarce. . . . Women and larger sized children are preferable for piece work; small children [are] not desirable on account of waste. Piece work is unsuitable for men, as the spectacle of able-bodied and strong men sitting down all day hulling peas, peeling tomatoes, peaches &c., is a not very elevating one; nine times out of ten, men who are willing to do such work are shiftless and lazy.¹²

Clearly, canners preferred older workers when they were available, but the "small children" referred to as wasteful and undesirable were less than ten years old and probably less than eight or nine.

Table 2 presents an age profile of children working in canneries compared with those in agriculture and in all manufacturing in 1900. Of the laboring children between ten and fifteen, the percentage of younger workers in agriculture is much higher than the percentage of those in canneries and manufacturing—39 percent were twelve or under in agriculture, compared with 17 and 11 percent, respectively, for canneries and manufacturing. The canning industry, however, employed a greater proportion of young children relative to all children than did manufacturing and a greater proportion of all children relative to adult workers than did

¹⁰ *San Francisco Examiner*, 4 Sept. 1881, 1.

¹¹ Representatives of the Cutting Packing Company in San Francisco in 1870 explained that they employed Chinese after they had experimented with hiring white boys but found them playful, inattentive, and less productive. *San Francisco Evening Bulletin*, in J. S. Hittel, "Scraps," Bancroft Library, University of California, Berkeley.

¹² Maryland, Bureau of Industrial Statistics and Information, *Third Biennial Report, 1888-89* (Annapolis, Md., 1890), 37 and 59.

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Table 2

Percentage of Children under Sixteen by Age and Sector/Industry and
Percentage of Children among All Workers by Sector/Industry, 1899

<i>Child's Age</i>	<i>10</i>	<i>11</i>	<i>12</i>	<i>13</i>	<i>14</i>	<i>15</i>	<i>Percentage of Total Work Force under 16</i>
Agriculture	11	12	16	17	20	23	4
Canning	2	6	9	15	28	40	10
Manufacture	2	3	6	12	29	49	4

Source: U.S. Bureau of the Census, *Twelfth Census of the United States: 1900*, Special Reports, "Occupations at the Twelfth Census" (Washington, D. C., 1905), Tables LXI, LXV, and 32.

either agriculture or manufacturing.¹³ Few laws restricted the use of children in canning in 1900. The data in Table 2 may well reflect the cannery operator's opinion that "larger sized" children were preferable, but because of the technology of the time, cannery operators hired relatively more and younger children than did manufacturers in general.

Thus, child labor within the canneries was functional to the extent that canning was a seasonal industry facing periodic labor shortages; a rural industry dependent on seasonal local and migrant family labor; a piece-rate industry in which slow workers were not overpaid and incompetent workers could be identified easily and forced to bear the cost of damage to raw materials; an unmechanized industry in which little of the capital equipment could be idled or damaged by slow or incompetent workers; and an industry with a discontinuous labor process in which the work of one individual or family group did not affect the productivity of other preparation workers.

¹³ The data in Table 2 are occupational data from the Census of Population which does not provide data on children under age ten. In these reported data for 1900, fruit and vegetable cannery workers are aggregated with meat canning and packing as well as fish canning. To minimize the effect in Table 2 of meat and fish packing and canning employment on our estimate of child labor in fruit and vegetable canning, we have restricted our sample to California, Maryland, and New York, leading fruit and vegetable canning states. This yields a sample of 362 children. In Table 2, manufacturing data for canneries in the entire country in 1899 show that 9 percent of all fruit and vegetable cannery workers were under the age of sixteen. Our selected states occupational data generate a comparable 10 percent children among all cannery and packing workers.

Economic Factors and the Decline of Child Labor

Two distinct business strategies emerged in the late nineteenth century canning industry: one for the countryside, another for the cities. The differences were related to variations in the type and variety of raw produce available and were reflected in the degree of mechanization that canneries adopted. Rural canneries sought to exploit monopsonistic buying power in the local fruit and vegetable markets of isolated farming areas. They bought surpluses of perishable crops, canned them locally, and shipped them to distant urban markets later when fresh fruit was not abundant. Because isolated local product markets had short and erratic seasons, rural canneries minimized their investment in buildings and equipment that would stand idle for most of the year and accustomed themselves to family and child labor that entailed irregular and, on average, low productivity.

Urban canners, in contrast, sought to reduce the seasonality of production and to extend the workday within the season in order to utilize fully their considerable capital investment in equipment and to exploit the marketing advantages accruing to producers who shipped in volume and provided a variety of products. By canning each crop over a long period and by processing many different crops over the entire season, canners were able to make full use of their mechanized cookrooms.¹⁴ In San Francisco, Baltimore, and other cities strategically located within major produce-growing areas, canners competed with consumers for the large quantities and the great variety of fresh produce drawn from a wide range of growing regions. For instance, in the early 1880s, a San Francisco cannery, Cutting Packing Company, canned fruit, vegetables, honey, preserves, jams, jellies, soups, sauces, and vinegar, as well as meats and salmon. This allowed for an off-season (November to April) employment of two hundred workers and a peak-season (May to October) employment of six hundred.¹⁵

The different circumstances of urban and rural canneries meant that, throughout the last quarter of the nineteenth century, a wide range of cookroom equipment remained in use, from the simple open kettles found in small rural canneries to the high-

¹⁴ "Cutting Packing Company," manuscript, c. 1882, no author but probably J. S. Hittel, in Hittel, "Scraps," Bancroft Library, University of California, Berkeley.

¹⁵ *Ibid.* This seasonality ratio of 3.0 corresponds roughly to figures for California and Maryland in 1899 (see Table 3).

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capacity pressure cookers and open-trough continuous cookers connected to conveyor systems used in urban canneries. Reflecting this variation in cookroom mechanization, capital investment per cannery establishment in the city canneries of Baltimore and San Francisco in 1880 was roughly double that in rural canneries in Maryland and California, and this differential widened through the turn of the century.

Mechanization in the city canneries started in the cookroom, where the key innovation was a pressure cooker, Shriver's kettle. Invented in 1874, it speeded up cook times and ensured safer canning of nonacidic vegetables.¹⁶ Seven to eight hundred were in use by 1889, according to the Warfield Manufacturing Company, which owned the patent.¹⁷ The mechanized cookroom equipment demanded a smooth and continuous stream of raw fruit into the preparation room and of prepared fruit into the cookroom. Consequently, even though preparation workers in city canneries were not using appreciably more equipment than those in rural canneries, employers required workers who would work steadily for long hours as well as a long season. As employers began to mechanize the cookroom before 1900, especially in urban canneries, they also began to select their labor more carefully and to exclude children from the group who qualified for preparation work.

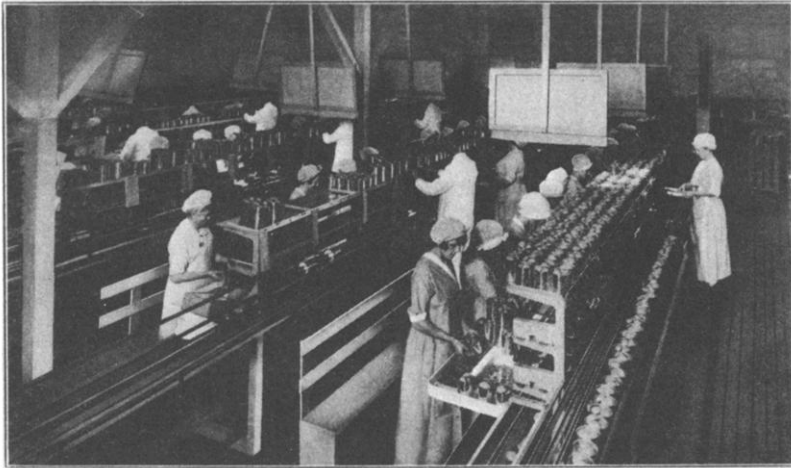
Gradually and unevenly, beginning in the 1890s, preparation work was also being mechanized. Mechanization of the cookroom had spawned a capital-goods industry in canning whose participants were well aware of the profits to be made from workable, labor-displacing devices in preparation. Warfield, an early leader in the canning capital-goods industry for cookrooms, also sold various preparation machines: a corn steamer (1878), a green corn cutter (1881), a can syruper and briner (1882), a pea huller (1884), a corn silker and cleaner (1889), and a corn can-filler.¹⁸

With the exception of an unpatented dump-scaldler for tomatoes, however, machines for soft fruits were noticeably absent

¹⁶ Martin Brown and Peter Philips, "Craft Labor and Mechanization in Nineteenth-Century American Canning," *Journal of Economic History* 46 (Sept. 1986): 743-56. The best description of in-place cookroom technology just after the Civil War is U.S., Commissary General of Subsistence (Thomas Wilson, author), *Notes on Canned Goods* (Washington, D.C., 1870).

¹⁷ *The Canning Clan* (New York, 1937), 21-30; S. Davies Warfield, *Reference Book of the Warfield Manufacturing Company, Manufacturers of Special Machinery* (Baltimore, Md., 1889), 48.

¹⁸ *Ibid.*



Cherry-Stemming at a California Packing Corporation Cannery, Santa Rosa, about 1917 • Although this work was done by hand, the labor process is much more regimented than in the example from Delaware, with women working in uniforms at standardized tables. Men brought the fruit to the women and removed both prepared cherries and waste. Even before this preparation task was mechanized, increased capital investment in the cookroom induced employers to standardize women's work and to eliminate child labor. (Photograph reproduced from California Industrial Welfare Commission, *The Regulation of the Fruit and Vegetable Canning Industry of California* [Sacramento, Calif., 1917], p. 64.)

from the Warfield catalogue in 1889.¹⁹ Mechanization of preparation work faced two fundamental obstacles: the fragility and lack of uniformity of some produce and the short seasons of many crops. Within each crop, individual pieces of fruit could vary widely in their shape and durability. Early progress was made in pea podding and corn shelling, because these crops presented relatively hard and uniform inputs for mechanical preparation.²⁰ Products such as applesauce, sauerkraut, and tomato catsup did not demand the retention of the initial crop's shape and consequently could be mauled in the mechanical process without undue concern. In contrast, soft whole fruits such as tomatoes, peaches, and pears resisted the ministrations of mechanization and continued to require the careful attention of hand laborers. By 1904, leading canning machinery companies were listing pulp machines for

¹⁹ Ibid.

²⁰ Edward F. Keuchel, Jr., "The Development of the Canning Industry in New York State to 1960" (Ph.D. diss., Cornell University, 1970), 143–52; U.S. Commissioner of Labor, *13th Annual Report*, "Hand and Machine Labor" (Washington, D.C., 1899), 2: 1058–80.

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tomato catsup, can-filling machines for tomatoes and apples, string bean cutters, lye peach peelers, apple and peach parers, cherry seeders, and all-purpose slicers along with the older pea and corn preparation machines. Many of the newer devices were hand-driven. Machines for tomato peeling, peach pitting, or pear peeling, as well as those for other soft-fruit preparation steps, remained entirely absent.²¹

Moreover, across crops, variations in annual volume and length of season induced variations in the demand for mechanization. Minor crops with short seasons such as berries received less innovative effort than major crops with long canning seasons such as peaches, which were the subject of considerable research effort. Thus, mechanization of preparation work occurred primarily in areas that grew crops amenable to mechanization such as Wisconsin and New York (peas), in areas with long growing seasons for major crops such as California (peaches), and in strategically located cities that processed a variety of crops over a long season, where machines such as conveyors applicable to the preparation of a variety of crops were especially favored. As early as 1904, platform-conveying peeling tables with seating capacity for seventy to two hundred peelers were advertised for \$750–1,100.²²

The uneven development of mechanization across crops and the limits of transportation, which created isolated rural produce markets, helped to sustain the economic viability of smaller, less mechanized canneries. As more capital-intensive technologies were developed and as transportation networks improved, however, the profitability of the small, unmechanized rural cannery was threatened. The New York Factory Investigating Commission (FIC) reported in 1913:

What information we have seems to indicate that some of the canneries are making handsome profits. "We never fail to make money in the canning business," said the owner of one factory. On the other hand, there are some canneries with poor methods and antiquated management where profits are undoubtedly small. The report of one investigator is as follows:

²¹ Sprague Canning Machinery Company (Daniel G. Trench & Company, Agents), *General Catalogue of Canning Machinery and Canner's Supplies* (Chicago and Hoopeston, Ill., 1904); Huntley Manufacturing Company, *Monitor Catalogue* (Silver Creek, N.Y., n.d.); Berger, Carter & Company, *Canning Machinery and Supplies* (San Francisco, Calif., n.d.). Copies of these catalogues are in the authors' possession.

²² *Ibid.*

“Small factory with many old-fashioned methods, such as blanching in small tubs. Caps are put on cans on a table, and cases are carried by hand to soldering table where three men do the capping by hand (the work of one capping machine). Manager said he made less money each year and could no longer compete with big canneries.”²³

Throughout the period 1880-1920, canners could choose among a wide range of labor- to capital-intensive technologies. However, the factors that favored labor- and child-intensive technologies—monopsonistic buying power in short-season, isolated, rural produce markets and the absence of effective and economical labor-displacing machinery—were disappearing with the development of an improved transportation system and an expanding capital-goods industry.

Just as cookroom mechanization had increased the demand for steady, day-long labor in preparation, the introduction of mechanized preparation equipment further narrowed the employer's tolerance for slow, idle, or incompetent workers in preparation. Many cannery operators of the period recognized that, despite the advantages of recruiting labor from migratory family networks, child workers themselves were becoming liabilities rather than assets in the production process. Arthur I. Judge, editor of *The Canning Trade*, the leading industry trade paper, commented in 1913, after the introduction of conveyor belts and automatic scalding tables into tomato preparation:

As the operation of “skinning” tomatoes draws the lowest class of help, it is often found necessary to allow the women to bring their children of all ages, from babes in arms to 6 and 8 years. Some factories would tell you they could not operate if they excluded the children because the mothers would have to stay home. This is true, but unfortunate. . . . Other lines of business have the same troubles, but they do not permit the children to play around their mothers, much less help in the work, and the canners will have to take the same action.²⁴

As early as 1889, a Baltimore canner wrote to the Maryland Bureau of Industrial Statistics and Information that the employment of children was primarily designed to induce the employ-

²³ New York State, *Second Report of the New York State Factory Investigating Commission* [hereafter, FIC, *Second Report*] (Albany, N.Y., 1913), 2: 861.

²⁴ Arthur I. Judge, “A Clean Tomato Cannery,” *The Canning Trade* 36 (27 Jan. 1913): 29.

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ment of their mothers: "Do not care for child labor at all, but in our business we are often compelled to employ children and, to a certain extent, take care of those not able to labor, in order to get the women."²⁵

This rationale for the employment of children became more common over time. A Maryland State Board of Labor and Statistics inspector, engaged in establishing child care as an alternative to illegal child labor during the First World War, reported:

The [Baltimore] canners, as a unit, were insistent that they did not want the children in the canneries, but in order to hold the mothers were obliged to suffer the presence of the children. They claimed the children were a great source of the waste of material, were continually hampering the workmen by being in their way, and that there was danger of possible injury to these children by coming in contact with machinery is readily understood.²⁶

However, though child labor became increasingly incompatible with industrial development and was seen as a liability by the more mechanized canners, it still provided a significant asset for poor families. The same Baltimore inspector reported that "many foreign mothers were only too anxious to avail themselves of the services of their children of tender ages."²⁷ Furthermore, on-the-job child care was seen as a necessity: "When the inspectors remonstrated with the mothers and endeavored to impress upon them the fact that they, as well as the employers, would be prosecuted if they insisted on bringing the children into the canneries, they would inevitably ask, 'What shall we do with them while we are at work?'"²⁸ In a letter to the State Board of Labor and Statistics, a representative of the Booth Packing Company in Baltimore estimated that the availability of child care at a school in the canning district of the city would increase by 15 percent the number of women ready for preparation work.²⁹

Maryland cannery inspectors proclaimed greater cooperation from canners than from parents in excluding underage children from the canneries:

²⁵ Maryland, *Third Biennial Report*, 58.

²⁶ Maryland, State Board of Labor and Statistics, *Twenty-Sixth Annual Report* (Baltimore, Md., 1917), 99-100.

²⁷ *Ibid.*, 99.

²⁸ *Ibid.*, 100.

²⁹ *Ibid.*, 102.

[Canners] are almost unanimous in the opinion that this law has done them a great good, for without fear of arousing the displeasure of the parents, little children can at present be kept out of the cannery. . . . Many canners do not hesitate to seek the assistance of the inspector in dealing with the troublesome parents who insist on bringing into the work room children under the legal working age [twelve years]. Indeed, some canners, of their own accord, have fixed a 14-year age limit for the cannery workers, and a few have excluded all workers under 16, claiming that by excluding such workers waste of material is reduced from 10 to 25 percent.³⁰

It was in the interest of cannery inspectors to emphasize cooperation with canners. As one inspector reported, "The only way to better the conditions in this territory is to bring about a closer co-operation between the employer and the Bureau." However, the same inspector's reports of noncooperation constitute evidence that some rural canners still found child labor functional.

One thing to be resented by the inspector is an attempt to assist children working illegally to make a hasty retreat. On approaching a particular [rural] cannery, a worker at the front door was seen to give a "high sign," and the children darted to the rear exit. Since it is the duty of the inspector to know conditions as they really are, and not as the employer would have them represented, the inspector ran to the rear door on the outside of the cannery in time to catch the youngsters tumbling forth, with bags tied around them, skinning knives still in their hands and greatly bespattered with tomato juice and skins. They admitted they had been working, and said they had met with no opposition in their desire to do so. The parents of these children were sought out and their responsibilities in the matter explained. By this time, the employer, greatly excited, appeared on the scene. Nothing uncomplimentary to the inspector remained unsaid. It was stated in no unmistakable terms that the race to reach the escaping youngsters had been most undignified and unladylike.³¹

Thus, while Baltimore cannery operators not only supported laws restricting the employment of young children but also voluntarily added to those restrictions, rural cannery operators continued to hire children, either for their own contributions to production or as lures to attract their mothers.

We have only indirect evidence regarding the attitudes of chil-

³⁰ Maryland, Bureau of Statistics and Information, *Twenty-Fourth Annual Report* (Baltimore, Md., 1915): 210.

³¹ *Ibid.*, 213-14.

dren working in the canneries and of their parents. Parents appear to have been motivated by desires for both higher family incomes and on-the-job child care. An inspector for the FIC took a job doing preparation work in a New York cannery in order to assess the attitudes of women toward restrictive legislation on women's work hours.

This afternoon I sat next to a new girl who began work yesterday. She was wondering how much she could earn, and a woman told her the law was now being enforced and we could not be allowed to make over \$6 per week; she expressed great dissatisfaction at this and thought the law stupid. Mrs. B who works at my table says she would gladly work every evening until 9 p.m. . . . The very low wages which are paid in the canning industry unquestionably largely explains the desire of the women to work long hours.³²

The low wages and incomes of adult cannery workers may have strongly influenced the desire of families to let their children work in canneries, both to augment family income with their own wages and to facilitate the wage-work of their mothers. There is no direct evidence, however, on whether parents withdrew their children from cannery work as family income rose.

The Uneven Development of Child Labor Law

"Are perishable fruits and vegetables more important than perishable women and children?" This question resounded from one end of California to the other during the session of the legislature in 1911.³³

This quotation illustrates the fierce legal battles over child labor laws that occurred in many states throughout the period 1880–1920. Although legal restrictions on the use of child labor increased during these decades, they did so unevenly across states and in some cases across counties within states. In 1879, only seven states restricted the age of children in manufacturing, and among them the average minimum age was eleven. By 1909, forty-

³² FIC, *Second Report*, 2: 878.

³³ Florence Kelley, "A Privileged Industry," *Twentieth Century Magazine* (Boston, Mass.) 6 (July 1912): 228. Kelley answered the rhetorical question in the following way: "In the end, however, the legislature showed that it held perishable fruits and vegetables in higher esteem than perishable women and girls, by exempting the canning industry from the provisions of the eight-hours law. In the child labor law, these industries had already been exempted."

three states had legal limits on the minimum age for work in manufacturing, and the average minimum was fourteen years.³⁴ In addition to age limits, restrictions on the use of child labor in manufacturing included maximum limits on daily and weekly hours of work and proscription of child employment in specified occupations regarded as immoral or dangerous. Furthermore, compulsory schooling laws required that children be able to read and write and attend school up to a certain age or grade level before they were allowed to work. In 1879, seven states had compulsory school attendance laws for children below an average age of twelve. By 1909, twenty-eight states had compulsory schooling laws that applied, on average, to children below the age of sixteen.³⁵ Thus, throughout the period of this study, the supply of child labor to manufacturing was increasingly restricted by law.

As the legal noose tightened around child labor, however, legislated loopholes developed that particularly favored the seasonal canning industry. In 1909, seventeen of the twenty-eight states with age restrictions on child labor in manufacturing based on compulsory schooling laws exempted school vacation periods. Seven had exemptions for rural areas and small cities, and four exempted industries with perishable products.³⁶ Laws also varied in the penalties they imposed, in their enforcement and compliance characteristics, and in their definitions of factories and manufacturing establishments. In rural areas, canning often benefited from agricultural exemptions and lax enforcement. The history of New York law restricting the age of minors in manufacturing illustrates particularly well the dynamics of cannery exemptions from child labor legislation.

In 1886, New York passed a law prohibiting the use of children below the age of thirteen (soon raised to fourteen) in manufacturing.³⁷ By 1896, vacation work permits were available, which effectively lowered to twelve the age of legal labor within seasonal cannery work. We do not know how vigorously this law was enforced in the case of canning, but by 1903 the cannery lobby was attempting to have the industry excluded altogether from New

³⁴ Ogburn, *Progress and Uniformity*, 71.

³⁵ *Ibid.*, 132–34.

³⁶ *Ibid.*, 83.

³⁷ Loughran, "The Historical Development," 57; Ogburn, *Progress and Uniformity*,

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York factory legislation.³⁸ Unsuccessful in this attempt, the canners next sought exemption through pressure on the judiciary. By 1905, the attorney general of New York ruled that preparation work in canning, referred to as “shed” work, did not come under the state’s definitions of and restrictions on child labor in manufacturing. In a letter to the New York commissioner of labor, he explained his ruling: “If the employment is in sheds devoid of machinery, in the open air, unconnected with a factory, and not subject to the discipline and hours governing factory employment, I am of the opinion that such employment is legal, providing it does not conflict with the provisions of the Compulsory Education Law. . . . ”³⁹ The commissioner of labor elaborated on this ruling in a letter to the New York Canners Association:

Keep the sheds distinctly separate from the factory by a substantial barrier. Do not let women and children in the sheds enter the factory for any purpose. Do not wall the sheds to make of them buildings or rooms. Have *no* active machinery in them; where conveyors are used, run them *to* but not *into* the sheds in which the children are employed. In short, keep the sheds essentially agricultural and as little like factories as possible. Where for any reason any of the sheds have any material amount of idle machinery in them, box the machinery or keep the children in other sheds.

Send all children out of the sheds at dark. By employing them after dark, or permitting their mothers to keep them in the sheds after dark, you introduce a condition that is not agricultural and makes the sheds like factories.

Children in the sheds must be really free to quit working at will. Foremen must never urge them on, nor urge the women in charge of them not to leave when they otherwise would. Nor should these women be allowed to coerce the children to work when they are tired or restless. . . .

After the beginning of the school season employ no children between the ages of seven and sixteen. . . . One of the most serious charges against you is that by employing children in the sheds you keep them away from school for many months.⁴⁰

In short, canning was exempted from New York law because the industry, by its seasonal nature, did not interfere with the requirements of education, and the generally unmechanized preparation work did not expose children to the regular, sustained, and some-

³⁸ Callcott, *Child Labor Legislation in New York*, 164.

³⁹ FIC, *Second Report*, 2: 763.

⁴⁰ *Ibid.*, 767–68.

times dangerous discipline associated with the mechanized continuous processing emerging in manufacturing. Yet a 1908 pamphlet written by an investigator later employed by the New York Factory Investigating Commission claims: "One woman, a Mrs. T—, had two girls seven and nine years old, with her. She began work at 5 A.M. and worked to-night till 9:30. The two little girls worked the same length of time. They complained of being tired when their mother had gone for beans, and said their limbs ached. They did not leave for meals but ate bread, etc., in the shed."⁴¹ The infamous 1911 fire at the Triangle Shirtwaist Company in New York City gave new impetus to labor law reform and led to the establishment of the Factory Investigating Commission, which was empowered to examine labor conditions for women and children in cities and towns. Later, the commission's purview was extended to include the countryside, which brought canning under the agency's jurisdiction.⁴² Investigators found that most child labor in New York canneries was employed in corn husking and bean snipping.

Meanwhile, the march of machinery into the preparation rooms and sheds had already begun. In 1913, the FIC visited thirty-three canneries that employed a considerable number of children; they found fourteen with machinery and eight that ran the machinery while children were present. Of these thirty-three canneries, eleven had processing sheds connected to the cookroom; eleven sheds were within twenty-five feet of the cookroom building, and five were over a half-mile away. Eighteen of the thirty-three sheds had some power, structural, or conveyor connection between the preparation shed and the more factory-like cookroom.⁴³ Of sixty-eight New York corn canneries investigated in 1912, one-third employed children, but of the top ten corn canneries by volume canned, only 20 percent employed children, apparently because of differences in mechanization. The more advanced canners were voluntarily "eliminating child labor in the sheds."⁴⁴ For instance, an official of one of these corn canneries told the FIC in 1912 that his company intended to install husking machines in 1913 and thus "eliminate child labor entirely."⁴⁵

⁴¹ Quoted in Callcott, *Child Labor Legislation in New York*, 169.

⁴² *Ibid.*, 177–78.

⁴³ FIC, *Second Report*, 2: 131.

⁴⁴ Callcott, *Child Labor Legislation in New York*, 175.

⁴⁵ FIC, *Second Report*, 2:139–40.

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Bean snipping was less amenable to mechanization at the time, and thirty-six (or 59 percent) of the sixty-one string bean canneries investigated employed children, including 80 percent of the largest canneries. Two of the top ten bean canneries and 10 percent of all the bean canneries investigated also sent beans home for families to snip and string. This unusual use of home work is a strong indication of lagging mechanization in bean snipping.⁴⁶

In 1913, with the urging of the FIC and under strong public pressure, the New York legislature redefined "factory" to include "any mill, workshop, or other manufacturing or business establishment and all buildings, sheds, structures or other places used for or in connection therewith."⁴⁷ Some canners responded by putting their child preparation workers in tents:

An inspector found under these tents 211 children under sixteen years of age without employment certificates, 180 under fourteen, and a few under ten. Four separate prosecutions were brought against the canners in the expectation that the law would be interpreted so as to apply also to tents, but in this the Department of Labor suffered disappointment. Every case was dismissed.⁴⁸

But only those canneries with discontinuous, nonmechanized production processes could use tents, and canners using advanced technologies were probably not fighting to forestall restrictions on child labor. During the same year in which they were brought within the definitions of the Factory Act, canneries were exempted from hours restrictions on women's work during the summer.⁴⁹ Canners with mechanized preparation rooms had a strong interest in long hours for the women operating machinery such as corn huskers in order to utilize that equipment fully. The same reason that led some canners to eliminate child labor voluntarily and to be indifferent to child labor restrictions—full utilization of capital—would lead them to oppose vigorously restrictions on adult female labor hours. Thus, canners would be unified about restrictions on women's hours and divided about restrictions on child labor. This dichotomy may well explain why reformers were able to achieve passage of a child labor law but not a women's hours law.

⁴⁶ *Ibid.*, 141–42.

⁴⁷ Callcott, *Child Labor Legislation in New York*, 181.

⁴⁸ *Ibid.*, 182.

⁴⁹ New York, Commissioner of Labor, *Report 1914*, "Special Report on Canneries" (New York, 1914), 132.

The legal history of child labor restrictions in New York illustrates how the canning industry benefited from agricultural exemptions and from lax enforcement in rural areas. However, it also shows how these agricultural exemptions began to be repealed, as preparation work became more mechanized and as hours became longer and more regular—in short, as preparation workers became more like factory workers. Thus, the legal restrictions that constrained less-mechanized canneries were induced in part by the industrial development of the more advanced canneries.

Case Studies of California and Maryland

Maryland and California were the two leading cannery states during the period 1880-1920. Until 1900, Maryland had the highest output of canned fruits and vegetables, but California moved into first place above Maryland in the early years of the twentieth century. The most important canning crops in 1909 were (in declining order of total value) tomatoes, corn, peas, beans, and soft fruit (peaches, pears, apricots, and cherries). In 1909 Maryland was the leading producer of canned tomatoes, accounting for 41 percent of national production; California was the leading producer of soft fruit, accounting for 79 percent of these products.⁵⁰ Reform movements against the employment of children were active in both states, especially between 1910 and 1920, and both states passed laws limiting child labor. Although canneries were specifically exempted from many of the provisions of these laws, at least until 1916 in California and until 1918 in Maryland, the decline in the employment of children in the canneries of the two states predates 1916.

California • Figure 1 shows the percentage of child labor under the age of sixteen for fruit and vegetable canneries in San Francisco and in California from 1880 to 1924. For the state as a whole, there is no indication of steady decline in the employment of children until about 1910. After that, the data show a strong

⁵⁰ For more details, see Edward F. Keuchel, Jr., "Master of the Art of Canning: Baltimore, 1860-1900," *Maryland Historical Magazine* 67 (Winter 1972): 351-62, and U.S. Bureau of the Census, "Manufactures: 1909, Statistics for Canning and Preserving," *Thirteenth Census of the United States: 1910, Bulletin* (Washington, D.C., 1913), 16-19.

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downward trend into the 1920s. For San Francisco, the decline clearly started much earlier, and by 1910 the city canneries had eliminated most of their child labor. Child labor data have to be interpreted with considerable caution, however. As contemporary observers remarked, it was extremely difficult to obtain accurate figures on children employed. Often “[t]heir names do not appear on the payrolls; their work is either paid for in their mothers’ name, or they are given merely a number, and are not distinguished from adults in the office records.”⁵¹ The New York FIC also argued that child labor figures were inherently inaccurate:

At several factories which were known to employ considerable numbers of children only a few were found at work when inspection was made. . . . At one cannery, when the inspector put in an appearance at 5:30 A.M., approximately two hundred children of all ages were hurried away, so that records of their ages could not be made. These children were apparently already working. At another factory, upon the inspector’s appearance fourteen children ran out at the command of the Italian “boss.” All appeared and probably were under ten years of age. This factory pretended to use no children under that age.⁵²

Most of the available evidence indicates that child labor figures for rural canneries are even more understated than those for city canneries. Thus, the difference between the two may be even more pronounced than reported in the official figures.

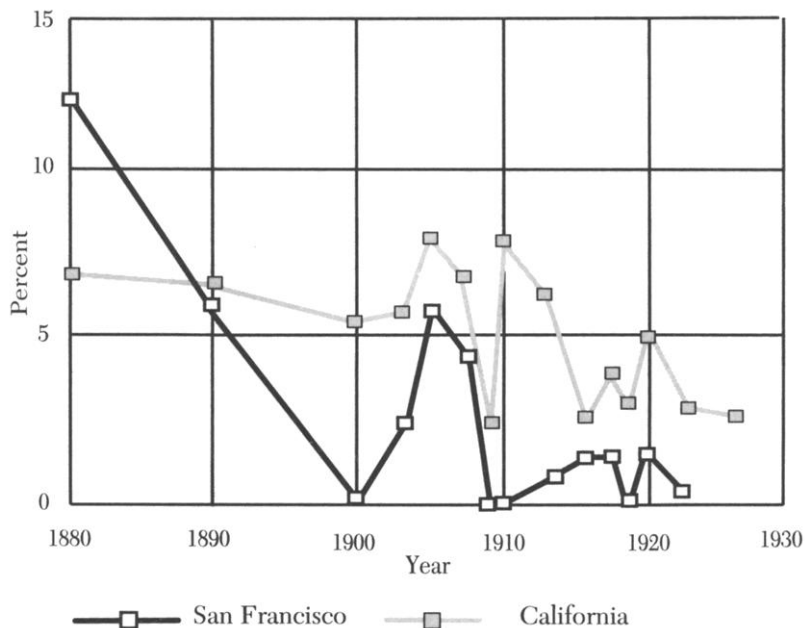
The data in Figure 1 are consistent with the hypothesis that industrial development was a major factor in the decline of child labor in the canneries. The San Francisco canneries were larger and more mechanized, processed more crops, and ran longer production seasons than the rural canneries of California. The average value of capital per establishment for San Francisco canneries in 1899 was \$86,000, compared with \$33,000 for California as a whole. By 1909 this number had risen to \$197,000 for San Francisco, compared with \$93,000 for the state, and by 1919 to \$393,000 and \$210,000, respectively.⁵³ Prior to 1909, the difference in capital intensity between the urban and rural canneries reflected the greater mechanization of cooking and capping in the

⁵¹ Callcott, *Child Labor Legislation in New York*, 169.

⁵² FIC, *Second Report*, 2: 775.

⁵³ *Ibid.*, 20; U.S. Bureau of the Census, “Manufactures: 1919, Statistics for Canning and Preserving,” *Fourteenth Census of the United States: 1920*, Bulletin (Washington, D.C. 1922), 22.

Figure 1
Child Labor in San Francisco and California Canneries, 1880–1925



Sources: U.S. Bureau of the Census, "Manufactures of the United States," *Tenth Census of the U.S.: 1880*, vol. 2 (Washington, D.C., 1883), 393; U.S. Bureau of the Census, "Manufactures, Part 2: Statistics of Cities," *Eleventh Census of the United States: 1890*, vol. 6 (Washington, D.C., 1895), 534–37; U.S. Bureau of the Census, "Report on Manufacturing Industries in the United States, Part 1: Totals for States and Industries," *ibid.*, 199; U.S. Bureau of the Census, "Manufactures: States and Territories, Part II," *Twelfth Census of the United States: 1900*, vol. 8 (Washington, D.C., 1902), 52–53; U.S. Bureau of the Census, "Manufactures, Part III: Reports on Selected Industries," *Twelfth Census of the United States: 1900*, vol. 9 (Washington D.C., 1902), 482; U.S. Bureau of the Census, "Manufactures, Part 2: States and Territories," *Census of Manufactures: 1905*, vol. 2 (Washington, D.C., 1905), 76–77; U.S. Bureau of the Census, "Canning and Preserving," *Census of Manufactures: 1905*, Bulletin (Washington, D.C., 1906), 26; California Bureau of Labor Statistics, *Twelfth Biennial Report: 1905–1906* (Sacramento, Calif., 1906), 166–72; California Bureau of Labor Statistics, *Thirteenth Biennial Report: 1907–1908* (Sacramento, Calif., 1908), 92–113, 197; California Bureau of Labor Statistics, *Fourteenth Biennial Report: 1909–1910* (Sacramento, Calif., 1910), 214–40, 338; U.S. Bureau of the Census, "Manufactures: Report by States, with Statistics for Principal Cities," *Thirteenth Census of the United States: 1910*, vol. 9 (Washington, D.C., 1912), 106–7; U.S. Bureau of the Census, "Manufactures: 1909, Statistics for Canning and Preserving," *Thirteenth Census of the United States: 1910*, Bulletin (Washington, D.C., 1913), 22; U.S. Bureau of the Census, "Report by States, with Statistics for Principal Cities and Metropolitan Districts," *Census of Manufactures: 1914*, vol. 1 (Washington, D.C., 1918), 134; U.S. Bureau of the Census, "Canning and Preserving," *Census of Manufactures: 1914*, Bulletin (Washington, D.C., 1917), 26; California Bureau of Labor Statistics, *Seventeenth Biennial Report: 1915–1916* (Sacramento, Calif., 1916), 189, 275; California Industrial Welfare Commission, *The Regulation of the Fruit and Vegetable Canning Industry of California* (Sacramento, Calif., 1917), 112–13; California Bureau of Labor Statistics, *Eighteenth Biennial Report: 1917–1918* (Sacramento, Calif., 1918), 148, 229; U.S. Bureau of the Census, "Report for States with Statistics for Principal Cities," *Fourteenth Census of the United States: 1919*, vol. 9 (Washington, D.C., 1923), 132–33; U.S. Bureau of the Census, "Canning and Preserving," *Fourteenth Census of the U.S.: 1919*, Bulletin (Washington, D.C., 1922), 22; California Bureau of Labor Statistics, *Nineteenth Biennial Report: 1919–1920* (Sacramento, Calif., 1920), 160, 248; California Bureau of Labor Statistics, *Twentieth Biennial Report: 1921–1922* (Sacramento, Calif., 1922), 163, 240.

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city canneries. The post-1909 development reflects the swifter diffusion of the new continuous cooker into the San Francisco canneries as well as the more intensive adoption of preparation machinery there. Mechanization of both the cookroom and the preparation processes was associated with long-season, multicrop canneries.

The city canneries had extended their seasons and intensified their workdays. A California Industrial Welfare Commission (CIWC) report on the 1916 canning season shows that the average season for San Francisco canneries was twenty-four weeks, compared to fourteen weeks for the rural canneries. All the city canneries handled at least two crops, whereas about 20 percent of the rural canneries processed only a single crop. The number of weeks in which work hours exceeded sixty was also higher for the city canneries. According to the CIWC, "The city canneries are the long-hour canneries."⁵⁴ They had early on experienced the adverse cost of child labor and had begun to employ a more regular and robust (that is, adult) work force for longer hours and seasons.

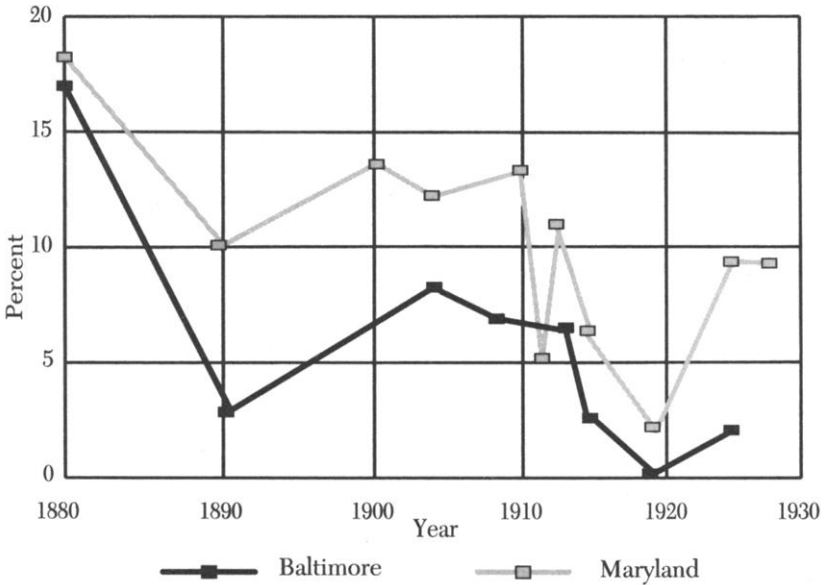
The pattern of the California state data—almost no decline in child labor before 1910 and a significant decrease thereafter—is also influenced by the composition of the canning industry. Average cannery plant size in California declined between 1890 and 1909 but began to increase sharply thereafter.⁵⁵ Before 1910, small rural canneries had a comparative advantage over the large urban canneries. Later, with rapid growth in demand and improved transportation systems, the large urban canneries, enjoying the advantages of economies of scale, capital-intensive technology, and access to the urban labor market, regained the comparative advantage. This dynamic is reflected in the California state data on the prevalence of child labor. Before 1910, when small, rural canneries were on the rise, the decline in child labor is insignificant; after 1910, with the resurgence of the large, urban canneries, the decline is much more pronounced (see Fig. 1).

Maryland • The pattern of child labor in Maryland canneries is similar to that in California in many respects. Figure 2 shows the percentage of child labor for Baltimore and Maryland canneries.

⁵⁴ California Industrial Welfare Commission [hereafter, CIWC], *The Regulation of the Fruit and Vegetable Canning Industry of California* (Sacramento, Calif., 1917), 111–12.

⁵⁵ See Sources for Figure 1.

Figure 2
Child Labor in Baltimore and Maryland Canneries, 1880–1930



Sources: U.S. Bureau of the Census, "Manufactures of the United States," *Tenth Census of the United States: 1880*, vol. 2 (Washington, D.C., 1883), 253–54, 393; U.S. Bureau of the Census, "Manufactures, Part 2: Statistics of Cities," *Eleventh Census of the United States: 1890*, vol. 6 (Washington, D.C., 1895), 50–53; U.S. Bureau of the Census, "Report on Manufacturing Industries in the United States, Part I: Totals for States and Industries," 198; U.S. Bureau of the Census, "Manufactures, Part III: Reports on Selected Industries," *Twelfth Census of the United States: 1900*, vol. 9 (Washington, D.C., 1902), 483; U.S. Bureau of the Census, "Manufactures, Part 2: States and Territories," *Census of Manufactures: 1905*, vol. 2 (Washington, D.C., 1905), 412–13; U.S. Bureau of the Census, "Canning and Preserving," *Census of Manufactures: 1905*, Bulletin (Washington, D.C., 1906), 27; U.S. Bureau of the Census, "Manufactures: Report by States, with Statistics for Principal Cities," *Thirteenth Census of the United States: 1910*, vol. 9 (Washington, D.C., 1912), 482–83, 486–87; Maryland Bureau of Statistics and Information, *Twenty-First Annual Report* (Baltimore, Md., 1913), 42; Maryland Bureau of Statistics and Information, *Twenty-Second Annual Report* (Baltimore, Md., 1914), 76–84; U.S. Bureau of the Census, "Report by States with Statistics for Principal Cities and Metropolitan Districts," *Census of Manufactures: 1914*, vol. 1 (Washington, D.C., 1918), 584; U.S. Bureau of the Census, "Canning and Preserving," *Census of Manufactures: 1914*, Bulletin (Washington, D.C., 1917), 26; U.S. Bureau of the Census, "Report for States with Statistics for Principal Cities," *Fourteenth Census of the United States: 1919*, vol. 9 (Washington, D.C., 1923), 582–83; U.S. Bureau of the Census, "Manufactures: 1919, Statistics for Canning and Preserving," *Fourteenth Census of the United States: 1920*, Bulletin (Washington, D.C., 1922), 22; U.S. Department of Labor, Children's Bureau, *Children in Fruit and Vegetable Canneries: A Survey in Seven States* (Washington, D.C., 1930), 104–5, 134.

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Again, child labor declined earlier and to a larger degree in the city canneries of Baltimore than in the canneries of the state as a whole. As in California, this is consistent with the differential pattern of mechanization at the Baltimore canneries, which were, on average, larger and more capital-intensive than Maryland's canneries overall.⁵⁶

In 1909, the average value of capital per firm was \$76,000 for Baltimore canneries but only \$18,000 for Maryland canneries as a whole. The respective figures for 1919 were \$156,000 and \$51,000.⁵⁷ Even as late as 1925, the rural canneries were substantially less mechanized than those of Baltimore. According to a U.S. Children's Bureau survey of Maryland canning in 1925, "Canneries in Baltimore are generally substantial buildings with modern machinery and equipment." The same study reports that ". . . many county canneries had little modern equipment. . . ." For example, only about one-third of rural Maryland tomato canneries employed conveyor belts to move the product from the scalding to the peeling stage and from the peeling to the can-filling stage or used Link-Belt tomato tables.⁵⁸ Thus, mechanical equipment that had been introduced as early as 1903 and that was standard for modern tomato canneries around 1925 was not yet present in the majority of rural Maryland canneries by that year.⁵⁹

As in California, average cannery size in Maryland declined from about 1880 to about 1910 and then increased rather sharply.⁶⁰ Here, too, this phenomenon reflects the relative advantages of small rural over large urban canneries in the earlier period. As in the case of California, it helps to explain why there is no obvious statewide trend of declining child labor in Maryland canning until after 1910, whereas for Baltimore the decline begins at an earlier date.

Comparison between Maryland and California • An inspection of Figures 1 and 2 reveals striking similarities in the trends for child labor between California and Maryland and between Baltimore and San Francisco, but there is also an obvious difference in

⁵⁶ For a detailed account of the importance of Baltimore as the dominant cannery city during the early period, see Keuchel, "Master of the Art of Canning."

⁵⁷ U.S. Bureau of the Census, *Thirteenth Census*, 16-19; U.S. Bureau of the Census, *Fourteenth Census*, 22.

⁵⁸ U.S. Department of Labor, Children's Bureau, *Children in Fruit and Vegetable Canning: A Survey in Seven States* (Washington, D.C., 1930), 90-91.

⁵⁹ *The Canning Trade* 25 (2 Feb. 1903): n.p.

⁶⁰ See sources for Figure 2.

the levels of child labor between the two states. For comparable years, child labor is less prevalent in California than in Maryland and less prevalent in San Francisco than in Baltimore. This evidence is consistent with our interpretation of the roles of mechanization and seasonality and with their differential patterns in the two states. California and San Francisco canneries were larger and more capital-intensive than Maryland and Baltimore canneries. Table 3 shows that, after 1899, California canneries also display a lesser degree of seasonality than Maryland canneries, a finding consistent with the argument that increased mechanization motivated cannery owners to extend their seasons.

There were other notable differences in canning between California and Maryland, which are complementary and consistent with our explanation of the decline of child labor in the two states. The predominant crops in California were peaches and other soft fruit, whereas the predominant crop in Maryland was tomatoes. In Maryland in 1925, over 90 percent of the girls and over 70 percent of the boys working in canneries were employed peeling and packing tomatoes.⁶¹ A 1919 advertisement for the Link-Belt tomato-peeling table proclaims:

THERE ARE NO DRONES IN THIS HIVE. Idleness has no place in this cannery. Every individual's work is regulated mechanically. There are no delays—no waiting periods—no loafing. For the ever moving pace setting Link-Belt Peeling Table regulates the operations of each individual as a flywheel regulates the speed of an engine.

The virtues of this machine may well have been exaggerated by the advertisement. Significantly, however, the illustration accompanying the text showed only adults at work around the Link-Belt table.⁶² The difference in crop mix, by itself, cannot explain the different degrees of child labor in California and Maryland. Contemporary accounts indicate that Link-Belt tables and other powered conveyor systems were used almost universally in California tomato canneries as early as 1916.⁶³ It is apparent that California tomato canneries were, on the average, much more capital-intensive than those of Maryland, even though Maryland was the leading tomato-canning state. Because of the favorable climate, the

⁶¹ U.S. Department of Labor, Children's Bureau, *Children in Fruit and Vegetable Canneries*, 88.

⁶² *The Canning Trade* 42 (24 Feb. 1919): 29.

⁶³ CIWC, *Regulation*, 174.



The Link-Belt Sanitary Peeling Table • Used in the tomato-peeling process, this mechanism afforded “a continuous movement of tomatoes.” Such machinery required both an investment in a large, covered work space and laborers able to work at a steady pace to gain the efficiencies of the system. (Photograph reproduced from Berger and Carter Company, *Catalog* [San Francisco, Calif., 1917], p. 52.)

tomato season was much longer in California than in Maryland; thus, there was a larger annual return to capital equipment in tomato canneries in California than in Maryland.

In peach canning, the lye peeler and the continuous cooker were widely diffused in California prior to 1910. The long processing season made possible by climate and fruit variety favored the diffusion of this mechanization there. These mechanical innovations in peach canning necessitated regularized, predictable production in the fruit preparation stage, particularly in the large urban canneries that ran long production days and seasons.

To ensure more efficient production in the hand preparation stage, the more capital-intensive California canneries equipped their preparation rooms with fairly elaborate stationary tables and, in some cases, specially designed chairs. This put floor space at a premium and made low-productivity child labor wasteful, even under the piece-rate system. The 1916 CIWC report on canning recognized this constraint:

The employment of many children makes efficient factory organization impossible. . . . The employers have found that it does not pay.

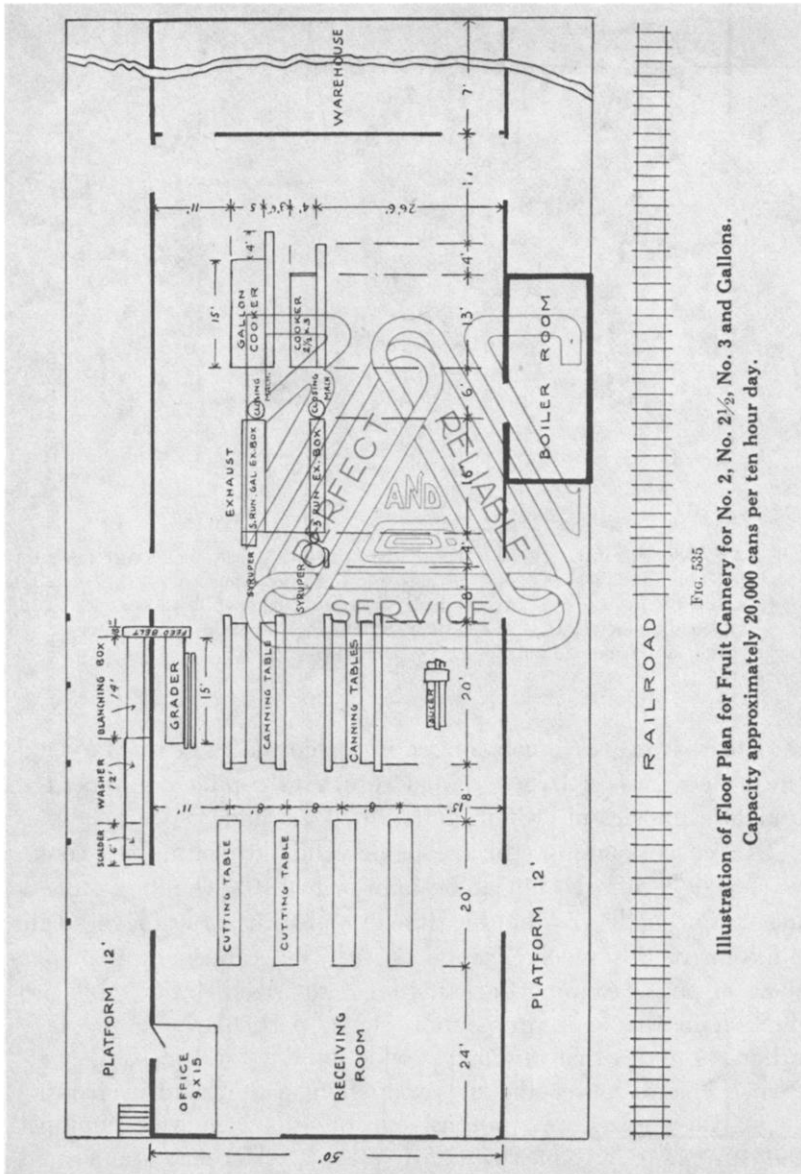


FIG. 535

Illustration of Floor Plan for Fruit Cannery for No. 2, No. 2½, No. 3 and Gallons.
Capacity approximately 20,000 cans per ten hour day.

Cannery Floor Plans • These two floor plans for moderate and medium-size canneries in 1917 illustrate the relation between increased investment in cookroom machinery and the regularization, intensification, and partial mechanization of preparation work (cutting and can-filling). The smaller cannery operated one standard-can and one gallon-can automatic cook line. The larger cannery ran four standard-can lines plus one gallon-can line. Consequently, capacity was approximately four times greater in the larger cannery than in the smaller one (80,000 versus 20,000 cans; the lines for gallon-size cans would run only occasionally and would not significantly influence the overall

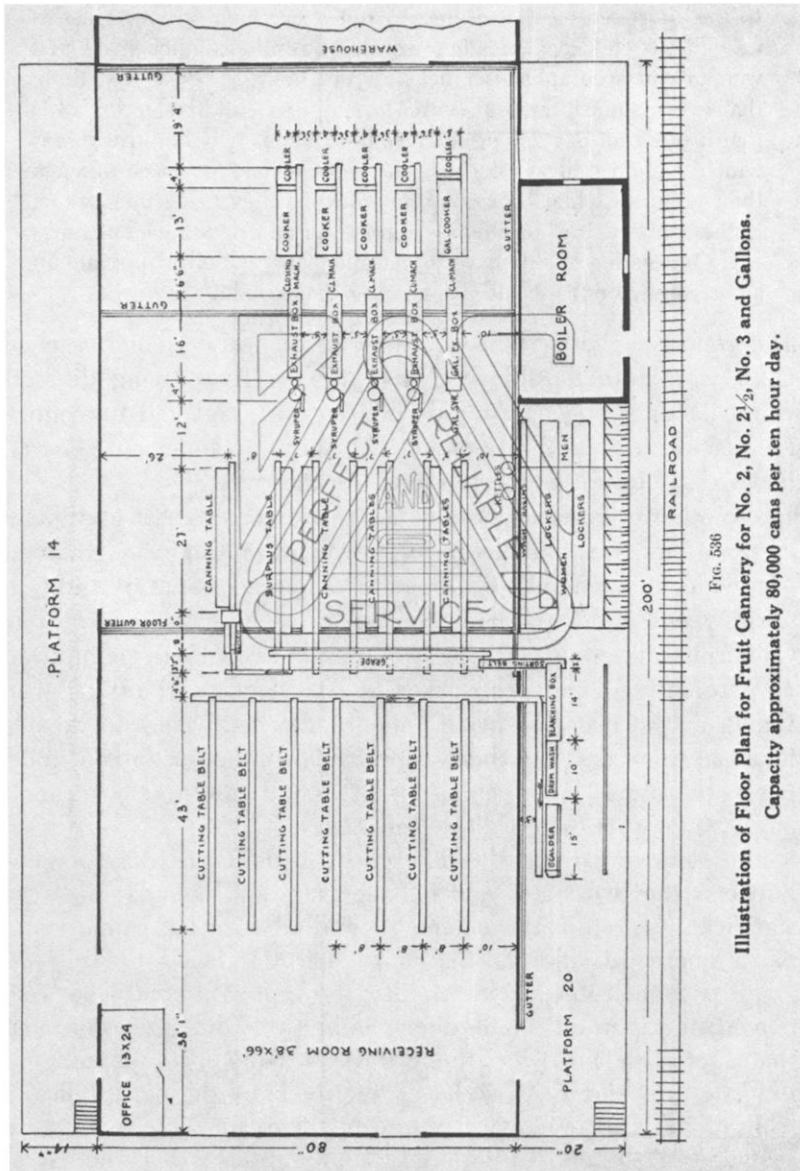


FIG. 536
 Illustration of Floor Plan for Fruit Cannery for No. 2, No. 2 1/2, No. 3 and Gallons.
 Capacity approximately 80,000 cans per ten hour day.

capacities). Whereas the smaller cannery used a 160-foot run of wooden tables for cutting, the larger cannery used a 301-foot run of metal tables with basins and a cross-belt carrier that automatically conveyed fruit or tomatoes. From the space allocated for cutters, we know that the larger cannery envisioned employing twice as many cutters to prepare four times as much fruit. Because no automated machinery was available to prepare the fruit, this increase in output could come only from steady labor effort by the most productive workers (that is, adults) free from distractions (that is, children). (Photograph reproduced from Berger and Carter Company, *Catalog*, pp. 48-49.)

In the short season that canneries run every inch of floor space is valuable. A child occupies in a working position as much space as a woman and accomplishes much less per hour. . . . The first thing that every superintendent says who employs children under 16 is that it does not pay. Then he gives the reasons why he hires them, which is almost always because the women have no place to leave their children when they come to work, so they bring them along to the cannery. The problem is mainly that of providing a day nursery. Quite a few plants have found out that it is better to maintain a day nursery outside the plant rather than inside.

The report suggests, however, that in the rural canneries child labor was more feasible and acceptable: "In outlying districts where labor supply is limited children are employed to a much greater extent than in the cities. The country cannery in general, however, does not aim at the long work day."⁶⁴

Another difference between the two states was that multiplant corporations were much more prevalent in California than in Maryland. For example, by 1914 only 13 percent of Maryland canneries were under corporate ownership, whereas 57 percent of California canneries were. In 1914, corporate canneries employed 45 percent of all cannery workers in Maryland and 88 percent in California.⁶⁵ Corporate firms undoubtedly had access to greater financial resources, and this was probably another factor contributing to the use of more capital-intensive and child-saving technology in California than in Maryland.

In summary, then, the differences in industrial development between the two states and between city and countryside were significant factors in the extent of child labor in the canneries of San Francisco, California, Baltimore, and Maryland.

It is conceivable, however, that the supply of child labor also played an important role in determining these differences or even that supply factors were the primary driving force behind the industrial development we have described. By the early 1900s, a wide range of technologies, from capital- to labor-intensive, were available to canners. In both Maryland and California, the use of labor-intensive and child-using technologies were concentrated in rural areas, whereas capital-intensive and child-saving technologies predominated in Baltimore and San Francisco. Ironically,

⁶⁴ *Ibid.*, 65–67, 114.

⁶⁵ U.S. Bureau of the Census, "Canning and Preserving," *Census of Manufactures: 1914*, Bulletin (Washington, D.C., 1917), 12.

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however, in both states the rural canneries had to import a significant amount of their child labor from the cities. In 1913, the Maryland Bureau of Statistics and Information reported the existence of 313 rural canneries in the state. Forty-five percent of these canneries were at least partly dependent on Baltimore labor, including 19 percent that were fully dependent on workers from that city.⁶⁶

Similarly, the California Bureau of Labor Statistics reported in 1913:

[O]ne manager of a large California cannery said: "A firm can take no chances on its labor supply. Before a plant is ever established in a country district a careful canvass of the labor situation is made." The men who later act as foremen are the principal agents in such a campaign. They ascertain the available number of helpers in the immediate district, the number obtainable from nearby towns, and they get, and keep, in touch with the "movers" and "campers" who leave the cities in the canning seasons for the work in various country canneries. The work of the foremen is effectively supplemented by want advertisements inserted in the small town papers and in the big city dailies. . . . the city dailies were running urgent advertisements. The following were taken at random:

WOMEN AND GIRLS.—Do you want to spend two months in the country and earn good wages, with steady work in a fruit cannery? Tents furnished. Working now.

WANTED.—Women and girls for factory work in country; commencing immediately and steady until November 1; no experience necessary; good wages. Cottages and tents furnished. Call at once.

We want women and girls immediately for fruit cannery work; no experience necessary to earn big wages; tents furnished; tell your friends and go at once.

. . . the managers of country canneries did not depend to so great an extent upon help from the large cities as did the country canneries of Maryland. The surrounding country, dotted with small ranches, was counted on for much of the labor.⁶⁷

If the supply of child labor relative to adult workers had been the decisive element in the canners' choice of technology, the rural canneries should have been first to implement child-saving

⁶⁶ Maryland, Bureau of Statistics and Information, *Twenty-Second Annual Report* (Baltimore, Md., 1914), 77.

⁶⁷ California Bureau of Labor Statistics, *Special Report: Labor Conditions in the Canning Industry* (Sacramento, Calif., 1913).

technology. Yet, the rural canneries clung to child-using technologies, while the urban canneries steadily moved away from them. The potential cost advantage to city canneries from locally available child and family labor apparently was swamped by other industrial development factors that favored the adoption of capital-intensive technology. This technological development, rather than the withdrawal of children from the labor market as a result of rising family income, was the primary force behind the decline of child labor in the canneries.

California Law • The third factor that might help explain the extent of child labor in California and Maryland canneries is state and federal child labor law. The first California child labor law that applied specifically to manufacturing was enacted in 1889. It set the minimum age at ten years and limited work to ten hours a day and sixty hours a week. In 1901, the minimum age was raised to twelve, and maximum hours were lowered to nine a day and fifty-four a week. In 1905, the minimum age for manufacturing was raised to fourteen, but minors twelve to fourteen were allowed to work during vacations if they obtained a vacation permit from local school authorities; this made twelve the effective minimum age for cannery work. Canneries were also exempted from the maximum hours provisions. In addition, "horticultural pursuits" were exempted entirely from child labor laws, and many canneries passed through this loophole.⁶⁸ Laws mandating minimum school attendance, passed in 1911 and 1913, also specifically exempted canneries. After 1915, children under sixteen were still allowed to work during school hours if they obtained a certificate verifying their ability to read and write English from local school authorities.⁶⁹

Around 1913, various social reform groups in California began to focus attention on industries that had been more or less exempted from the provisions of California law governing wages, hours, and conditions of employment for women and children. The California Bureau of Labor Statistics was enlisted in this reform movement, and it produced several lengthy reports documenting the alleged need for more regulation of labor conditions

⁶⁸ Loughran, "The Historical Development," 15-17.

⁶⁹ California Bureau of Labor Statistics, *Fourteenth Biennial Report: 1909-1910* (Sacramento, Calif., 1910), 19-24; *Fifteenth Biennial Report: 1911-1912* (Sacramento, Calif., 1911), 22-23; Franklin Hichborn, *Story of the Session of the California Legislature of 1911* (San Francisco, Calif., 1911), 249; Hichborn, *Story of the Session of the California Legislature of 1915* (San Francisco, Calif., 1916), 176.

in the canning industry. As a result, the California Industrial Welfare Commission was created in 1913. The first order covering the canning industry, issued by the CIWC in 1916, restricted the hours of work for all employees under eighteen to eight hours a day and forty-eight hours a week. The order also set minimum piece-rate payments for all crops and made them applicable to minors as well as to women workers.⁷⁰

The CIWC order, though not banning the employment of children outright, placed serious constraints on hiring them through its wage and hours provisions. The CIWC itself recognized that the wage and hours provisions would increase the cost of employing children, even within the context of integrative technology. The 1916 CIWC report states: "If a cannery is operating beyond eight hours it is a difficult problem to permit any considerable part of the working force to leave before the general closing. All of the time work of the men and women goes on the same and has to be charged against the output lessened by so much as the minors' work represents."⁷¹ That is, child labor and adult labor are technologically complementary to some degree, so when children leave, total cannery productivity falls.

Two federal laws were of minimal relevance to California. The first, passed in 1916, was applicable to producers of canned goods that were shipped interstate and required a minimum working age of fourteen. However, it did not become operative until September 1917, and in June 1918 it was declared unconstitutional. The second federal law, passed in 1919, imposed a tax of 10 percent on the net profits of any cannery employing children under fourteen. It was effectively weaker than the existing CIWC regulations, and in any case it was declared unconstitutional in 1922.⁷²

It seems likely that the CIWC regulations contributed to the declining trend of child labor in the California canneries after 1916. By that time, however, the city canneries had already eliminated most of their child labor. Thus, the burden of the CIWC regulations probably fell more heavily on the small rural canneries than on the city canneries. With less advanced technology, the rural canneries had been able to tolerate more children; located in remote locations with limited labor markets, they had to rely on

⁷⁰ CIWC, *Regulation*, 51-57 and 143-50.

⁷¹ *Ibid.*, 114.

⁷² Loughran, "The Historical Development," 89-93.



Hunt Brothers Company, Hayward, Cal. Children with kindergarten teacher. No child labor here.

Daycare Services at a California Cannery • Although daycare services for cannery workers were probably a wartime-only phenomenon, this 1917 experiment at Hunt Bros. cannery underscores the lengths to which larger canners in California would go to get mothers into the canneries and to keep their children out. (Photograph reproduced from California Industrial Welfare Commission, *The Regulation of the Fruit and Vegetable Canning Industry of California*, p. 66.)

recruiting migratory labor, often family groups with children, brought in from urban locations.

The differing impacts of the regulations may help explain why the legal restrictions on child labor in California canning after 1916 were relatively stringent. The large corporate canning firms had their industrial base in the more urban and technologically advanced canneries. The small, independent canneries were typically rural, isolated plants. Thus, it was in the interest of the corporate segment of the California canning industry to impose an across-the-board ban on child labor that would exact a relatively high cost from the small-scale, technologically backward, and rural segments. There is clear evidence that corporate leaders worked closely and cooperatively with the CIWC to formulate, monitor, and enforce the commission's regulations. The first CIWC order was formulated in consultation with representatives from three large corporate canners of the era, including two precursors of the giant Del Monte Corporation.⁷³ All CIWC regulations were relatively well enforced through an agreement between the canners

⁷³ Ibid., 38; William Braznell, *California's Finest* (San Francisco, Calif., 1982), 163.

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and the commission that established the CIWC as the monitoring agency, with financing coming directly from the canning industry. In its 1923 *Adkins* decision, the U.S. Supreme Court found state minimum wage laws unconstitutional. Yet, the California law was never challenged in court, and the CIWC continued to operate. It was probably beyond the financial means of small rural canneries to undertake such a legal challenge, but the giant corporate leaders of California canning could easily have gone to court. That they did not do so provides further evidence that corporate California canners found the CIWC regulations acceptable.

Direct testimony from the CIWC and from corporate canners suggests that they shared the belief that the more “progressive” standards of the large corporate canners should be imposed on the industry across the board. For example, a CIWC report on sanitation in canneries argued, “If more than half of the establishments can maintain good to excellent sanitation . . . there should be no reason why the others can not do the same.” A 1920 letter from the Canners League of California to the National Consumers League, one of the reform groups that had campaigned for the creation of the CIWC, said:

In any large industry the majority of the units are managed by broadminded men who see the human as well as the business side of their work, but it is equally true that in any large industry, a certain percentage of units are administered by men who lack these elements. The effect of the work of the Industrial Welfare Commission has been to bring up the “low end” and in so doing has served to place competition on a better basis.⁷⁴

In fact, the “low end” was eliminated as the downward trend in average plant size was reversed, and the giant Del Monte and other corporations were assembled through successive mergers. A 1954 retrospective by the chief of the CIWC summed up the relationship between the canning industry and the CIWC: “In fairness to the industry it must be said that some of the most valuable assistance received by the Commission when this Order was being written was from some of the more progressive employers in the industry. They not only gave most generously of their time, but

⁷⁴ Letter from Preston McKinney, secretary of the Canners League of California, to the National Consumers League, 11 March 1920, CIWC Archives, San Francisco, Calif.

used the weight of their stature in the industry to help the Commission establish standards for working conditions.”⁷⁵

Maryland Law • Maryland passed laws in 1903 and 1906 prohibiting the employment of children under twelve and requiring all children between twelve and sixteen to secure a certificate stating that they could read and write English. Employment in all counties outside Baltimore City from 1 June to 15 October was exempt from this law. This provision clearly was designed to exempt all canning outside Baltimore from child labor restrictions. A new child labor law, which covered canneries, became effective in 1913. It prohibited the employment of children below the age of twelve and required vacation certificates for children between twelve and sixteen.⁷⁶ There is ample evidence, as late as the 1920s, that the certificates were easy to obtain or to falsify and that, in general, the law was poorly enforced and widely violated. There were no restrictions covering work hours for children in Maryland canneries.

Under the short-lived federal child labor law of 1916, inspections of Maryland canneries were carried out in 1917 and 1918. Widespread violations of the minimum-age (fourteen) statute, which was also incorporated into state law in 1918, were found. Maryland was also one of twenty-four states that fell under a federal inspection program pursuant to the child labor tax law of 1919. The 1920 inspections found continuing violations of the minimum-age restriction and evidence of undercounting of child labor by state inspectors. Inspections were hampered by the canneries' remote locations and by wary operators who chased children out of the canneries before the inspectors arrived on the scene.⁷⁷ After 1918, the state minimum age for cannery work remained fourteen in Maryland but, unlike California canning, the industry continued to be exempt from state laws that regulated the wages and work hours for women and children in other industries.⁷⁸

Canneries in the city of Baltimore, which fell under the

⁷⁵ CIWC Archives, San Francisco, Calif.

⁷⁶ Maryland, Bureau of Statistics and Information, *Sixteenth Annual Report* (Baltimore, Md., 1908), 13–20; Maryland, *Twenty-Second Report*, 76–77.

⁷⁷ National Industrial Conference Board, Inc., *The Employment of Young Persons in the United States* (New York, 1925), 67–68; U.S. Department of Labor, Children's Bureau, *Administration of the First Federal Child-Labor Law*, 94–99. See also text at footnote 31.

⁷⁸ U.S. Department of Labor, Children's Bureau, *Children in Fruit and Vegetable Canneries*, 97–98.

restrictions of the 1906 law, were the one exception to the pattern of exemptions in Maryland. Inspection of canneries and enforcement of the law were no doubt easier in Baltimore canneries than in the smaller, more numerous, and widely dispersed rural canneries. It is tempting to conclude that the observed differences in the prevalence of child labor in Baltimore compared to Maryland as a whole were due to the 1906 law. However, the analogous relationship found between San Francisco and California, where there was no difference in the law, throws doubt on this conclusion. Indeed, causation may well run in the opposite direction. Because Baltimore canneries were more technologically advanced than the rural canneries and because they depended less on recruiting workers from the migratory family labor pool, Baltimore canners were less likely to exert strong opposition to restrictions on child labor than rural canners. The fact that most of the decline in child labor in Baltimore canneries occurred prior to 1906 supports this interpretation. An 1889 letter from Fait & Winebrenner, Oyster, Fruit, and Vegetable Packers of Baltimore, to Thomas Weeks, chief of the Maryland Bureau of Industrial Statistics and Information, sheds light on why Baltimore canners did not strongly resist legal restrictions on child labor:

Dear Sir- . . . We think it would be quite a desirable object to be attained if women and children could only be made to stay out of factories, . . . but how this is to be accomplished we are unable to say. . . .

We do not see what we would be able to do in our particular line of business, without the employment of women and children; the busiest part of our season being when the children have school vacation, and unless they were employed they would be on the streets.

We have no suggestions to offer except that we think, *during the school term*, children under twelve years of age should be compelled to attend school and not work in factories, so they may learn at least how to read and write and get an ordinary education; but after they are twelve years of age, they should be allowed to labor, which is about the only age they are worth much.⁷⁹

This city canner found children under twelve of little use and better off in school. However, during vacations when schools were not caring for the children of women employees, child care was a problem for canners as well as for workers, and employment of

⁷⁹ Maryland, *Third Biennial Report*, 80-81; emphasis in the original.

children alongside their mothers provided a solution. We argue that for city canneries this solution became progressively less feasible because of changing technological requirements, so that by 1906 canners such as Fait & Winebrenner had less interest in resisting a prohibition on child workers under twelve.

In contrast, rural canneries were more dependent on child workers and on the mothers who came with them. In 1889, 36 Baltimore canneries each employed, on average, 362 women and children, 19 percent of whom were under eighteen. There were 152 rural canneries, each employing, on average, 42 women and children, 42 percent of whom were under eighteen. Not only were there proportionately more children in the rural canneries, but also the ratio of boys to girls was roughly even—48 to 52 percent—which suggests a work force of brothers and sisters. In the city canneries, the ratio of boys to girls was 39 to 71 percent, suggesting that child workers were not primarily from within family groups.

Urban women workers around 1900 were more likely to find acceptable daycare for their children during the summer months than were families migrating to work in rural areas. Thus, city canneries were less likely than rural canneries to lose their women workers when children were legally restricted from working during the summer, and Baltimore canneries were less directly dependent on child labor under the age of twelve.⁸⁰

If this is true, why was it not in the interest of Baltimore canners to impose a uniform child labor law on their rural competition? It probably was, but other forces militated against their doing so. Canning in Maryland was much less concentrated than in California, making agreement and consolidated action much harder to achieve. Furthermore, the potential cost of child labor regulations was higher for rural canneries in Maryland than for those in California, so it is likely that resistance to the implementation of a CIWC-type system would have been stronger. Rural canneries in Maryland were particularly backward technologically, allowing them to accommodate child labor easily. In addition, as product demand increased, these canneries outgrew their small local labor markets and became more dependent on migrant labor recruited from Baltimore. These migrant workers often came in family groups, and it was beneficial, from a labor recruitment standpoint,

⁸⁰ *Ibid.*, 113 and 187.

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for rural canneries to provide employment for children. A U.S. Children's Bureau report on the 1925 Maryland canning season noted:

Canneries in the city of Baltimore depend to a large extent upon resident labor. . . . Outside the city of Baltimore most of the Maryland canneries are in small towns and villages. . . . In many of these sparsely settled communities and in some of the larger ones it is impossible to get sufficient labor locally for work in the canneries during the six to nine weeks of the tomato or corn canning season. . . . Many [canners], including some of those in the larger towns as well as in the villages, supplement what local labor they can obtain by importing workers from Baltimore or from near-by counties for the season. . . . Ninety-nine of the 198 canneries outside Baltimore visited by the Children's Bureau inquiry imported migratory workers for the canning season of 1925. . . . The migratory workers in Maryland canneries are usually employed in family groups. . . .⁸¹

Clearly, the ability to accommodate child labor allowed rural canneries to utilize this labor recruitment system. The Children's Bureau concluded, "No doubt the mothers' desire to keep their children in sight has something to do with the employment of many of the young ones, but the extra money that the mother can make by having her children help her at the peeling table is a great inducement." One canning employer interviewed in 1925 by the U.S. Children's Bureau "apologized for the large number of small children he had employed at the time of the visit. He said he knew some of them were underage, but he had not wanted to turn them out because the parents were more willing to work if the children were employed."⁸²

This evidence does not mean that child labor was economically essential to all Maryland canneries but, for those rural canneries that could not depend on local labor supplies, it continued to be advantageous. Thus, we would expect child labor laws affecting canneries to be much weaker in Maryland than in California after 1918, when the early results of age and hour reform were in place. This was indeed the case, and the enforcement of even these weak laws was quite lax. The weakness of Maryland law is reflected in the prevalence of child labor in Maryland canning in the 1920s.

⁸¹ U.S. Department of Labor, Children's Bureau, *Children in Fruit and Vegetable Canneries*, 93-94.

⁸² *Ibid.*, 102, 103.

Unlike the city of Baltimore and the state of California, where the percentage of child labor fell substantially below the levels of the 1910s, for Maryland as a whole child labor remained as prevalent as in the 1910s. Even as late as 1929, 1,726 children below the age of sixteen were reported to be employed in Maryland canneries, somewhat above the 1925 level.⁸³

In summary, laws restricting the employment of children in Maryland were similar to those in California prior to 1916. After 1916, laws were more stringent in California than in Maryland, and this circumstance is reflected in the different patterns of employment of children by canneries in the two states in the 1920s. This does not mean that legal differences between the two states were the most fundamental factor in explaining the dissimilarities in child labor. Our evidence in these case studies suggests, rather, that economic labor demand factors were more important in explaining both the distinctive legal climate and the difference in the extent of child labor in the two states.

Quantitative Evidence

In this section, we explore quantitatively the relative impact of legal and economic factors on the proportion of child labor in the fruit and vegetable canning industry across all states. We collected the relevant data for all states in five-year intervals from 1899 to 1919 from the *U.S. Census of Manufactures* and from two detailed accounts of child labor laws.⁸⁴ Table 3 provides these data for the three states with the largest canning industries— California, Maryland, and New York—and for the national average across all states reporting canning-industry statistics. The number of these states ranged from a low of thirty in 1904 to a high of thirty-eight in 1909. The national average of the proportion of children among all cannery workers varied from a high of 13 percent in 1904 to a low of 3 percent in 1919. The variation among states in any year was often greater than the variation in the national average over time.

⁸³ *Ibid.*, 134.

⁸⁴ These are the only years in which all the variables that we have identified as crucial are available. They also are the most important years for the reduction of child labor in the canning industry. Information on laws comes from Loughran, "The Historical Development," and Ogburn, *Progress and Uniformity*.

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For example, in 1909 the percentage of children in the canneries ranged from 1 percent in New York to 14 percent in Maryland.

From these data, we created four variables that measure the relative employment of children, the degree of industrial development (labor demand), the income of cannery workers (labor supply), and the existence of legal restrictions on the use of child labor. Each of these variables has observations for each state reporting canning-industry statistics in each of the five years mentioned.

The dependent variable in this quantitative analysis is the proportion of children below the age of sixteen among all production-line workers employed in each state's canning industry during the peak season. By definition, this ratio is restricted to values between zero and one. The use of generalized least squares regressions, however, requires an unbounded dependent variable. We therefore transformed the proportion of children into the natural logarithm of its odds-ratio: $\ln(\text{proportion of children} / (1 - \text{proportion of children}))$. The values of this transformed variable can theoretically range from minus to plus infinity. Here, they range from -7.77 to $+1.18$, corresponding to the proportion of children, which varies from close to zero for several states and years to $.55$ in Mississippi in 1904.

In these case studies, we have identified the demand for and the supply of child labor as the two economic factors that could influence the extent of the employment of children. We argue that the demand for child labor is directly dependent on the degree of industrial development and the use of capital-intensive technology in each cannery. This is often measured by the capital-labor ratio. Our variable "Capital/Labor" is the real value of the capital stock divided by peak-season employment.⁸⁵ Its values range from $.12$ in Georgia in 1899 to 5.42 in Illinois in 1919. We expect this variable to be negatively related to the proportion of child labor.

Economists have argued that parents withdrew their children from the labor market as family incomes rose over time. The proper measure for this phenomenon would be family income among all families that would consider sending their children into cannery work. The historical record indicates that many children came with their families into the canneries. However, agricultural

⁸⁵ The capital stock data from the U.S. Census are deflated by a price deflator from U.S. Department of Commerce, *Historical Statistics of the United States, Colonial Times to 1970* (Washington, D.C., 1976).

Table 3
U.S. Canning Industry: Selected Data for the Three Largest States and All-State Averages, 1899-1919

State	Percent Children	Number of Establishments	Average Employment	Peak Employment	Seasonality Index	Capital/Labor	Yearly Wage	Value of Product	School Days	14-Year Age Law
1899										
California	7	136	7,486	24,935	3.33	0.40	\$656	\$32,309	0	no
Maryland	13	271	7,505	22,907	3.05	0.45	\$454	\$29,627	0	no
New York	6	511	5,518	16,421	2.98	0.93	\$655	\$22,166	160	no
ALL-STATE AVERAGE	11	52	1,039	3,799	3.65	0.43	\$495	\$3,396	54	6% yes
Number of States = 35										
1904										
California	6	167	7,138	18,300	2.56	1.06	\$818	\$54,933	160	no
Maryland	14	384	8,978	30,454	3.39	0.47	\$448	\$28,763	0	no
New York	3	549	6,618	17,495	2.64	1.17	\$664	\$26,738	160	no
ALL-STATE AVERAGE	13	61	1,080	3,697	3.42	0.68	\$534	\$4,870	75	8% yes
Number of States = 30										
1909										
California	2	196	7,757	15,034	1.94	2.29	\$913	\$67,520	160	no
Maryland	14	468	8,613	28,151	3.27	0.56	\$459	\$28,124	0	no
New York	1	790	7,075	17,198	2.43	1.73	\$743	\$439,057	160	no
ALL-STATE AVERAGE	9	92	1,474	3,819	2.59	1.60	\$582	\$8,046	87	16% yes
Number of States = 38										
1914										
California	6	205	11,029	29,767	2.70	1.38	\$870	\$110,734	160	no
Maryland	6	423	8,354	29,507	3.53	0.63	\$565	\$35,606	0	no
New York	1	864	6,439	19,876	3.09	1.19	\$839	\$30,230	160	no
ALL-STATE AVERAGE	5	85	1,357	4,450	3.28	0.89	\$554	\$8,190	106	27% yes
Number of States = 37										
1919										
California	3	303	19,575	49,228	2.51	1.56	\$944	\$189,956	160	yes
Maryland	2	406	7,645	25,002	3.27	1.00	\$490	\$28,422	160	yes
New York	1	515	4,835	11,015	2.28	2.60	\$704	\$26,535	160	yes
ALL-STATE AVERAGE	3	85	1,642	4,527	2.76	1.59	\$651	\$11,165	130	36% yes
Number of States = 36										

as well as cannery workers may have sent their children to work in the canneries. Average agricultural wages by state are not available, but average cannery wages during our time period tracked those in agriculture very closely.⁸⁶ Thus, we use real total annual wages paid to adult production workers in the canning industry divided by average adult employment as our variable, "Income," representing the supply of child labor in our regressions.⁸⁷ This variable ranges from a low of \$178 in Vermont in 1899 to a high of \$1,297 in Washington in 1909.

In the case studies, we have expressed doubt about the importance of the income-induced child labor supply in determining the percentage of children in the canneries. We have shown that city canneries used child-saving technology long before rural canneries did, even though child labor was more readily available in the city than in the country. Poor parents may well have wanted to send their children into cannery work in great numbers, but if canneries had little interest in hiring those children, the proportion of child labor would still be very low. Thus, we expected only a very weak negative relation between the percentage of child labor in the canning industry and the income of cannery workers.

Two types of laws imposed possible constraints on the use of child labor within the canneries. The first directly prohibited the employment in canneries of children under a specified age (labor law). The second required school attendance for a specified number of days during the year (school law). The variable "Laws" has the value of zero for each state and each year in which no fourteen-year minimum age law applicable to canneries was in force and/or in which no compulsory schooling law requiring 120 or more days of school was in effect. It has the value of one for each state and each year in which children under the age of fourteen were pro-

⁸⁶ Martin Brown and Peter Philips, "Industrialization, Unionization, and the Labor Market Structure in the California Canneries," *Industrial and Labor Relations Review* 38 (April 1985): 392-407.

⁸⁷ For 1899 and 1904, the Census of Manufactures provides wage data for adult workers. For 1909 through 1919 the Census merely provides total wages and lists separately the number of adults and children employed in canning. We calculated the average wages paid to adults in these years by exploiting the fact that child-adult wage ratios are fairly stable over time. The 1899 and 1904 data indicate that children in canneries were paid roughly 60 percent of adult wages. Armed with the assumption that children earned 60 percent of adult wages in the period 1909-1919, we divided total cannery wages paid in each of these years in a state by the total number of adults employed plus a discounted 58 percent of all children employed. This procedure minimizes the downward pull on average cannery wages resulting from increased numbers of children employed.

hibited from cannery work and a law requiring at least 120 days of school was operative.⁸⁸ Our "Laws" variable does not measure enforcement directly. However, by selecting only those states with high minimum-age standards and required school attendance, we disregard statutes that were on the books but had little effect. In our data, the variable "Laws" has a value of one in 90 of the 175 cases considered.

In Table 4, we report results from three alternative generalized least squares regressions in order to assess the relative impact of our economic and legal variables on the percentage of children in the canning industry across states and over time. In each regression, we weighted all observations by two factors. Because the dependent variable is derived from the proportion of children, which is bounded by 0 and 1, the distribution of possible errors around any observed ratio that is close to the boundaries will necessarily be asymmetric. The distribution of errors around middle values will be more normally distributed. Thus, we wish to give greater weight to those observations that are farther away from the boundaries of 0 and 1. Furthermore, total employment in the canning industry varies widely by state and year. Presumably, the more workers reported for any state in any year, the more likely the reported percentage of children will be an accurate measure of the actual percentage. We therefore wish to give greater weight to those observations that represent a large number of cannery workers. To meet these two goals, we weighted each observation by the square root of that observation's [(proportion of children)* (1 - proportion of children)* (peak-season total employment)]. The dependent variable in each regression is the natural logarithm of the odds-ratio of the proportion of children.

In regression 1, we assumed that legal restrictions were the only factor determining variations in the percentage of children employed in the canning industry across states and over time. The negative and statistically significant coefficient for the "Laws" variable suggests that legal restrictions indeed contributed to the decline in child labor. The coefficient of determination (adjusted R^2) suggests that slightly more than 20 percent of the variation in child labor across states and over time can be explained by variations in legal restrictions alone.

In regression 2, we assumed that only economic factors influ-

⁸⁸ Information regarding laws in force was derived from Ogburn, *Progress and Uniformity*, and Loughran, "The Historical Development."

Table 4

Alternative Explanations for the Relative Employment of Children in
the U.S. Fruit and Vegetable Canning Industry, 1899–1919

(Generalized Least Squares Regressions)

Dependent Variables:

Natural Logarithm of (Proportion of Children/(1 – Proportion of Children))

	1	2	3
<i>Explanatory Variable</i>	<i>Laws</i>	<i>Economic Factors</i>	<i>Laws and Economic Factors</i>
Income (Labor Supply)		-.00010 ^a (-.17)	-.00003 (-.06)
Capital/Labor (Labor Demand)		-.47 ^b (-.42)	-.41 ^b (-.37)
(Labor + School Laws	-.98 ^b		-.60 ^b (-.29)
Constant	-2.13 ^b	-1.59 ^b	-1.71 ^b
R ²	.22	.29	.35
No. of Observations	175	175	175

Note: Beta coefficients in parentheses

^a Statistically significant at the .05 level.

^b Statistically significant at the .01 level.

Sources: U.S. Bureau of the Census, "Manufactures, Part III: Reports on Selected Industries," *Twelfth Census of the United States: 1900*, vol. 9 (Washington, D.C., 1902), 482–91; U.S. Bureau of the Census, "Canning and Preserving, Rice Cleaning and Polishing, and the Manufacture of Beet Sugar," *Census of Manufactures: 1905*, Bulletin 61 (Washington, D.C., 1906), 14–33; U.S. Bureau of the Census, "Manufactures: 1909, Statistics for Canning and Preserving," *Thirteenth Census of the United States: 1910*, Bulletin (Washington, D.C., 1913), 22–23; U.S. Bureau of the Census, "Canning and Preserving," *Census of Manufactures: 1914*, Bulletin (Washington, D.C., 1917), 26–29; U.S. Bureau of the Census, "Canning and Preserving," *Fourteenth Census of the United States, Manufactures: 1919*, Bulletin (Washington, D.C. 1922), 22–23; U.S. Bureau of the Census, *Historical Statistics of the United States, Colonial Times to 1970* (Washington, D.C., 1975), 684–85; Josephine Goldmark, *Child Labor Legislation* (Philadelphia, Pa., 1908), 6–15; William F. Ogburn, *Progress and Uniformity in Child-Labor Legislation: A Study in Statistical Measurement* (New York, 1912); U.S. Department of Labor, Children's Bureau, *Child Labor Legislation in the United States* (Washington, D.C., 1915), 32–99; U.S. House of Representatives, Committee of Labor, *Child Labor Bill, H.R. 8234*, 64th Cong., 1st sess. (Washington, D.C., 1916), 208–33; Miriam E. Loughran, "The Historical Development of Child-Labor Legislation in the United States" (Ph.D. diss., Catholic University of America, 1921); U.S. Department of Labor, Children's Bureau, *Child Care and Child Welfare*, Bureau Publication no. 93 (Washington, D.C., 1921), 32–46; U.S. Bureau of the Census, "Population, 1920," *Fourteenth Census of the United States: 1920*, vol. 2 (Washington, D.C., 1923), 80–87.

enced the relative employment of children. Our measures of both labor demand (Capital/Labor) and labor supply (Income) are negatively related to the percentage of children employed. The beta coefficients for each variable (reported in parentheses) standardize the units in which these variables are measured, allowing us to assess their relative impact on the proportion of child labor. Their relative values ($-.42$ versus $-.17$) indicate that the use of capital-intensive technology had a much stronger impact on the decline of child labor than did child labor supply as measured by adult income. The adjusted R^2 of regression 2 suggests that economic factors, by themselves, account for almost 30 percent of the variation in child labor, a somewhat larger proportion than is explained by legal factors alone.

We have shown in our case studies that both economic and legal factors influenced the percentage of child labor in the canneries. In regression 3, therefore, we included all three explanatory variables. Because there is considerable interaction or collinearity among these variables, their combined ability to account for variations in child labor as measured by the adjusted R^2 is less than the sum of their separate results. This is to be expected. History is rarely linear and hermetically sealed into entirely separable processes. Nonetheless, regression 3 accounts for a larger amount of total variation in child labor than the earlier two regressions, and it allows us to assess the relative impact of all three variables on the proportion of children employed. The beta coefficients indicate that the degree of industrial development had the greatest impact on the relative employment of children. Legal restrictions were less influential, and the effect of rising adult incomes is barely measurable; the coefficient for the "Income" variable is negative, as expected, but it is not statistically significant.

Conclusion

Regression analysis is a blunt instrument with which to untangle the sequential, interrelated, and dialectical relations of law, economics, and history. Case studies present a wealth of detail to guide the historian in sorting out cause from effect in a particular instance, but they do not necessarily allow for broad generalizations. We have combined the two approaches in an effort to offset the weaknesses of each.

This article has explored the relative importance of economic supply and demand factors and legal restrictions in reducing child labor in the U.S. fruit and vegetable canning industry. A comparative study of California and Maryland found that child labor was virtually eliminated in technologically advanced urban canneries well before it was reduced in the technologically lagging rural canneries and well before the effective application of legal restrictions. The percentage of children employed began to decline earlier in the San Francisco and Baltimore canneries than in the country canneries. Yet, child labor moved from the cities to the countryside in search of employment. If the availability of child labor had been the crucial factor in the canners' decision to use child-saving technology, that technology should have been implemented first in the countryside rather than in the cities. We conclude that the elimination of child labor was not driven by a withdrawal of child labor supply from the industry.

The percentage of child labor in the Maryland and California canning industries began to drop before the passage of the first effective restrictive laws. Both states enacted laws around the same time, but the technologically less developed Maryland canneries were accorded more exemptions. The more advanced California canneries came under stronger laws, but they came under those restrictions willingly, as the economic need for child labor in those canneries waned. It was the few small, technologically backward canneries in California that bore the brunt of the California law.

Results from our regression analysis of the decline in child labor and its economic and legal determinants corroborate this story. We found that increases in the capital/labor ratio, representing labor demand, were strongly associated with lower percentages of children employed. We further found that rising income, representing a declining labor supply, showed only a weak negative relationship to the employment of children. We also found that legal restrictions, measured by the existence of minimum-age laws and compulsory schooling laws across states, had a negative impact on the employment of children.

Our case studies led us to expect that economic factors had a stronger effect on the extent of child labor in canning than legal restrictions. The results of our regression analysis, in particular the comparison between regressions 1 and 2 and the beta coefficients in regression 3, support this conclusion. Ultimately, however, eco-

conomic factors and legal restrictions are interwoven in the tapestry of a social reality that is more easily described by the detail of case studies than by the simplicity of regression modeling. In the case of the fruit and vegetable canning industry, located on the political and economic borderland between manufacturing and agriculture, legal restrictions were relatively ineffective as long as most canners had a substantial economic interest in the employment of children. The widespread exemptions for perishable commodities embedded in child labor laws and the slack enforcement of compulsory schooling laws in rural districts attest to the power of canner owners to evade legal restrictions. This phenomenon may have been peculiar to the canning industry, which could more easily claim the political protection and exemptions of agriculture than other less seasonal, nonfood-related industries. For eliminating child labor in the canning industry, we found that legal restrictions were of secondary importance compared with economic labor demand factors, which themselves might have affected the course of legislation. Whether our conclusions can be generalized to all industries awaits further study.