

American Behavioral Scientist

<http://abs.sagepub.com>

From Big Shoulders to Big Macs

Louis P. Cain

American Behavioral Scientist 2003; 47; 168

DOI: 10.1177/0002764203256182

The online version of this article can be found at:
<http://abs.sagepub.com/cgi/content/abstract/47/2/168>

Published by:

 SAGE Publications

<http://www.sagepublications.com>

Additional services and information for *American Behavioral Scientist* can be found at:

Email Alerts: <http://abs.sagepub.com/cgi/alerts>

Subscriptions: <http://abs.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

From Big Shoulders to Big Macs

LOUIS P. CAIN

Loyola University of Chicago; Northwestern University

Chicago's economy changed over the 20th century from one known for its physical prowess to one known for its mental prowess, from a manufacturing center to a service center. It remained the home of multinational corporations, but in many cases, their production was moved elsewhere. The meatpacking industry is representative of the Chicago economy at the start of the 20th century, whereas McDonald's is consistent with what it had become by the end of the century. It is shown that many of the elements of the McDonaldization hypothesis were present a century ago, particularly in the problems faced by the meatpacking industry.

Keywords: *Chicago; economy; McDonaldization; meatpacking*

The year was 1954, and the United States' economy had entered another phase of its evolution. Well before the turn of the 21st century, the tertiary (service) sector would grow to employ almost three quarters of the labor force, but that was not clear when Ray Kroc began his fateful trip to California. As the exclusive distributor of a five-spindled milkshake maker called the "multimixer," Kroc traveled to San Bernardino, California, to visit the hamburger stand of Dick and Mac McDonald, where eight multimixers were in use. He quickly suggested that they open additional stands, reasoning that he could sell multiple multimixers at each site. The McDonald brothers were not averse to the idea but they were not interested in taking on the responsibility for operating additional stands. Kroc was, and a year later the first of his McDonald's hamburger stands opened in Des Plaines, Illinois. Over time, new products were added. Some were developed at corporate headquarters in Oak Brook, Illinois; some were suggested by franchisees and owner-operators. Both the Big Mac and the Egg McMuffin are examples of the latter.

Des Plaines and Oak Brook are a relatively short distance geographically from the old Chicago Union Stock Yards, but they are relatively distant in time. When the first McDonald's opened, the place Carl Sandburg described as "hog butcher for the world" was beginning to wind down its operations. The "Big Five" American packers at the turn of the 20th century had relinquished the title

Author's Note: *The author thanks Chiaki Moriguchi and David Surdam for the comments on earlier drafts of this article.*

AMERICAN BEHAVIORAL SCIENTIST, Vol. 47 No. 2, October 2003 168-186

DOI: 10.1177/0002764203256182

© 2003 Sage Publications

to others with their operations in places such as Iowa and Nebraska, closer to the animals.¹ On Christmas Day 1970, what little was left of the Stock Yards closed forever.

In the middle of the 19th century, the Chicago metropolitan area was focused on the confluence of Lake Michigan and the Chicago River. The business center was on Lake Street near the river, the city's port. After the Chicago Fire of 1871, it would move to State Street, closer to the rail terminals. Chicago's unique position on the nation's railroad net colored its growth through World War II.² In Chicago, as elsewhere, firms grew in one place (e.g., GE in Schenectady, Firestone in Akron, Ohio, National Cash Register in Dayton, Ohio). In the second half of the 20th century, firms moved from locations relatively close to the central city's rail (and water) hubs out to suburban locations near the Interstate Highway System and the airport. They also began to produce in more than one location, lest a fire or an atomic bomb eliminate their entire ability to produce. These changes reflect the comparative advantage of transportation and the impact of world events. Firms also began to geographically separate their headquarters operations and production facilities. Corporate headquarters, in particular, moved to suburban "campuses" with access to the Interstate and airports. This gives them ready access to anywhere and, in a global economy, production takes place everywhere. Oak Brook became a center for both retail trade and corporate offices. What remains in the central city are those firms that require face-to-face contact with their clients (accounting, banking, insurance, law).

The demise of Chicago's Stock Yards and the growth of McDonald's clearly illustrate the economic changes that took place over the 20th century. The "city of the big shoulders" had come to rely more on its brains than its brawn. McDonald's corporate headquarters in Oak Brook are in DuPage County, near O'Hare Airport, not downtown near the train terminals or the Chicago River. The first section below discusses those economic changes. The next three sections show that elements of the McDonaldization hypothesis were present a century ago in the story of Chicago's meat packers (see Ritzer, 1996). The assembly line and the search for scale economies, the subjects of the second and third sections, are associated with a routinization of production and a "dehumanization" of work. The fourth section discusses how the meat packers had to change consumption patterns if they were to be successful. The final section discusses some of the consequences of this economic change. As we will see, the shift from brawn to brains has been most pronounced in the city of Chicago where, only 150 years ago, animals wandered the streets to feed on household wastes prior to slaughter.

I

Changes in Chicago mirrored those in the nation (the material on the national economy can be found in Hughes & Cain, 2003). At the time of the first census in 1790, approximately 95% of the population was involved in primary (agricul-

ture, mining, fishing, forestry) production. By 1900, the proportion in primary production had fallen to 37.5%; it is just more than 2% today. By 1900, the proportion in secondary (manufacturing, raw-materials processing) production was 35.8%; it is 24.7% today. The tertiary (service) sector grew from 23.6% of the civilian labor force in 1900 to 73.0% today, growth that truly has been remarkable.³ Similar changes were occurring in Chicago. Table 1 reports employment data for the six-county Chicago metropolitan area in the northeast corner of Illinois.⁴ Manufacturing's share of local employment in these industries fell by more than half, whereas that of services more than doubled.

Throughout the 20th century, there has been an unprecedented increase in the educational attainment of the population. The result is that the unskilled sectors failed to increase as fast as did the others. At the turn of the 21st century, more Americans are participating in the labor force, both in absolute and in percentage terms, than ever before in our history, roughly two thirds of the population.⁵ The typical pattern of industrial development has been characterized by rising productivity that leads to a reduction in the number of persons employed in the primary sector and a tapering off of the proportion of the labor force employed in the secondary sector. In some sense, it is the jobs that require relatively little education that have been replaced by the massive expansion of the tertiary sector, an expansion that is rooted in education of all kinds. Claudia Goldin (2001) refers to the 20th century as the "human-capital century." In 1940, the White population had completed slightly more than 8 years of school on average; by 1970, that had increased to 12 years. In 1998, almost half of White high school graduates age 18 to 21, more than a third of Black graduates, and almost a quarter of Hispanic graduates were enrolled in some form of higher education.⁶ Goldin documented what she termed the "Great Transformation" in American education, the period between 1910 and 1940 when the high school movement made education available to far more teenagers than was true in most other countries (see Goldin, 1998, 1999; Goldin & Katz, 2001).⁷ This set the stage for the massive increase in college education that took place after World War II. Table 2 shows the increase in the share of each county's population between mid-century and 1990 that completed 4 years of high school (HS) and 4 years of college.

Throughout American economic history, labor has been the relatively scarce factor, especially in comparison to land and natural resources. Consequently, it had a relatively higher price than other factors and, from the first, American entrepreneurs attempted to conserve on the use of labor. In his trail-breaking book *American and British Technology in the Nineteenth Century: The Search for Labour-Saving Inventions*, Sir John Habakkuk (1962) argued that the origin of the need for labor-saving machinery in America was initially the worker's "opportunity cost"—the availability of a viable alternative on the frontier in places such as Chicago (for a qualification of the Habakkuk thesis, see Uselding, 1972). Cheap land, wrote Habakkuk, meant that American manufacturing wages had to be high enough to keep workers from "going West." Eastern employers could not hire all the workers they needed at going wages; they had to

TABLE 1: Division of Industrial Employment

	1950	%	1997	%
Manufacturing	885,363	0.420	594,764	0.198
Transportation	240,817	0.114	108,148	0.036
Wholesale trade	97,776	0.046	258,217	0.086
Retail trade	377,559	0.179	398,282	0.132
Finance, insurance, real estate	109,179	0.052	317,911	0.106
Services	398,436	0.189	1,333,587	0.443
Total	2,109,130		3,010,909	

SOURCE: U.S. Department of Commerce, Bureau of the Census (1950, 1997).

TABLE 2: Educational Attainment

	1950		1990	
	High School	College	High School	College
Cook County	0.078	0.016	0.449	0.139
DuPage County	0.094	0.029	0.492	0.200
Kane County	0.065	0.023	0.369	0.102
Lake County	0.065	0.031	0.419	0.158
McHenry County	0.060	0.021	0.373	0.093
Will County	0.054	0.016	0.346	0.077

SOURCE: U.S. Department of Commerce, Bureau of the Census (1950, 1990).

pay more to attract additional workers. Use of machinery by relatively unskilled workers raised their productivity and, thus, justified the payment of higher wages by profit-maximizing employers. However, there was a paradox. As a consequence, when measured by its wage, labor became even more "scarce" and the inducement "to save labor" was even greater. A rapidly increasing industrial labor force was also a "high-wage" labor force because of rising productivity (Habakkuk, 1962, Chap. 3).⁸

As this system became more general, it proved profitable for American industrialists to hire workers at wages higher than were typically paid in Europe and to buy machinery at higher interest rates. As technological change made capital more productive, both the interest rate and the level of investment increased. The American economy, because of efficient technology, became one of high wages, high interest rates, high profits, and rapid growth.

The question of which technology to choose, indeed the larger question of technological change, involved the adoption of a technical apparatus as well as the development of knowledge, organization of production, labor force, marketing, finance, and much else.⁹ If the change was a fundamental one, say from slaughtering animals to teaching people how to cook hamburgers, other related activities had to adjust to fully exploit the change. Jobs changed and institutions

adapted. There were major locational consequences involving such things as population movements, the development of an appropriate supporting social infrastructure, and a learning-by-doing process to integrate the technological switch into society at large. This is the process that has been at work in Chicago since World War II.

Marginal improvements were made all along the line that committed the economy to the new technology. Older methods and organizations (meatpacking) disappeared as new processes (fast-food restaurants) diffused. Over time, a whole new system evolved; associated economic activities developed in ways congenial to the new technology, making it increasingly productive socially and more efficient economically. In a way, the first technical switch set the tone for subsequent development. If factor prices changed back toward the old ratios, indicating marginal advantages from a return to older techniques, Paul David argued that the economy most likely would not revert to its old ways.¹⁰ It would be more profitable to continue making cost-saving improvements in what had become a new, and then a general, way of economic organization.

The consequence of these changes in Chicago, and in the United States, is clear. Over the 20th century, real per-capita income quintupled and industrial production and agricultural output rose apace. The calculation of aggregate income based on the concept of gross domestic product only goes back to 1929, but that is sufficient to make the point. In 1929, real disposable personal income per capita was \$5,516 in 1996 dollars. In 2000, it had grown to \$23,640, a greater than four-fold increase. Using only the endpoints, this is an annual increase in excess of 2% more than the rate of inflation, implying a doubling every 35 years or so.¹¹

A final feature of the 20th-century transformation was the movement of firms and population away from locations near water and rail transportation on expensive central city land and toward automobile, truck, and air transportation on less expensive suburban land. Table 3 shows the movement of population away from the city of Chicago. The growth of DuPage County at the intersection of several interstate highways and proximate to O'Hare Airport is of particular interest. At the turn of the 20th century, the five collar counties had but 11.8% of the region's population, only 12.9% in 1950, but that has grown to 33.6% today. The city of Chicago had 92.4% of Cook County's population in 1900 and 80.2% in 1950; it is but 53.9% today. The growth of these suburban areas has led to a dramatic increase in their manufacturing, retail sales, and service sectors, with DuPage County, home of McDonald's, the clear leader.¹²

II

The routinization of production was a feature of American production from an early date. At London's Great Exhibition of 1851, American products such as

TABLE 3: Chicago Metropolitan Area Population

	1900	%	1950	%	2000	%
Cook County	1,838,735	0.882	4,508,792	0.871	5,376,741	0.664
Chicago	1,698,575	0.815	3,620,962	0.699	2,896,016	0.358
Suburbs	140,160	0.067	887,830	0.171	2,480,725	0.307
DuPage County	28,196	0.014	154,599	0.030	904,161	0.112
Kane County	78,792	0.038	150,388	0.029	404,119	0.050
Lake County	34,504	0.017	179,097	0.035	644,356	0.080
McHenry County	29,759	0.014	50,656	0.010	260,077	0.032
Will County	74,764	0.036	134,336	0.026	502,266	0.062
Total	2,084,750		5,177,868		8,091,720	

SOURCE: U.S. Department of Commerce, Bureau of the Census (1900, 1950, 2000).

TABLE 4: Percentage of Employed Workers by County

	<i>Manufacturing</i>		<i>Retail Trade</i>			<i>Services</i>			
	1997/		1997/			1997/			
	1950	1997	1950	1950	1997	1950	1997	1950	
Cook County	0.892	0.621	0.696	0.895	0.615	0.687	0.879	0.704	0.801
DuPage County	0.023	0.122	5.364	0.023	0.166	7.140	0.029	0.123	4.305
Kane County	0.030	0.069	2.315	0.025	0.050	1.991	0.032	0.042	1.332
Lake County	0.027	0.107	3.952	0.028	0.097	3.525	0.037	0.078	2.078
McHenry County	0.007	0.039	5.333	0.009	0.027	3.030	0.007	0.020	2.940
Will County	0.021	0.041	2.002	0.020	0.044	2.228	0.017	0.033	1.953

SOURCE: U.S. Department of Commerce, Bureau of the Census (1950, 1997).

McCormick's reaper, Colt's revolver, and Singer's sewing machine were on display (Rosenberg, 1972). They were noted for their practicality, cheapness, and utility. What had become known as the "American system of manufacturing"—simplicity of design, standardization, interchangeable manufacture, and large-scale output—had taken over in light consumer goods.¹³ Later, it would work its way into heavy industry, into machine-making, and indeed, into nearly the entire economy. By the end of the 19th century, American industry contrasted sharply with European in terms of labor productivity, output per unit of labor. Eventually, the United States would become a nation where an unskilled teenager, potentially even one working at McDonald's, might earn as much as a skilled worker elsewhere in the world.

One way in which labor productivity was increased was through the operation of an assembly line. The first U.S. step in this direction was taken by Oliver Evans, who built a flour mill outside Philadelphia in 1784-1785 that was run by gravity, friction, and waterpower. Grain was moved through the mill's several levels by buckets and leather belts without the intervention of any human effort

apart from guiding and regulating. The mill could handle 300 bushels an hour. It was an assembly line more than a century before Henry Ford's Highland Park (MI) factory that housed the first automotive assembly line in 1913.

With Ford's assembly line, American experimentation with interchangeable manufacture, labor-saving specialization, and capital-intensive and resource-using choices of technology triumphed. Mass production changed industry completely. In the model year that began in the fall of 1913, the Ford Motor Company shipped 248,307 completed automobiles from its plants, one car every 36 seconds. Ten years later, the Ford assembly line reached its peak production: a Model T every 15 seconds. The "American system" reached its zenith on Ford's assembly line but the change had begun before the turn of the 20th century.

The "American system" was a crucial part of the meatpacking industry. A complex division of labor, a routinization of production, became a major source of scale economies (Cain & Aduddell, 1973). As early as 1837, meat slaughtering and packing had evolved specialized occupations with descriptive names such as knockers, bleeders, scrapers, and gutters. Under these early methods, 20 men could dress 620 hogs in an 8-hour period (Clemen, 1912; see also Hounshell's, 1984, discussion of the moving assembly line prototype). After the introduction of refrigeration and the consequent widening of the market, larger plants made further division profitable. Conveyor belts moved the animals, and more men performed more minute operations. By 1904, 157 men were engaged in handling the cattle killed by two knockers and one sticker; within these 157 men, there were 78 distinct occupations.¹⁴ To keep this many men busy, a large volume of animals was necessary. The economies of scale could only be realized if there was a large throughput.

The logic of the assembly line exists in many present-day industries, even those in the service sector, such as fast-food restaurants. Techniques have been developed to assure that the Big Mac one buys in Chicago is identical to that in Oak Brook or San Bernardino. Those involved in food preparation (production) perform the same steps in each facility. They are a different group than those who take the order (marketing), who are also trained to perform identical steps—to smile, be friendly, and suggest a piece of pie for dessert. Today's assembly line appears to be cleaner and safer than those of a century ago, but McDonald's is as representative of the "American system" today as the meatpackers then.

III

The McDonaldization hypothesis associates the search for scale economies, such as the assembly line, with a routinization of production and a "dehumanization" of work. According to Alfred Chandler, both scale economies emerging from "continuous process production technology" and reductions in

transportation costs were motivations to create giant-sized corporate enterprises. In those few industries where such forces prevailed between 1870 and 1900 (e.g., such as tobacco products, steel, and meatpacking), giant corporations appeared. In industries not subject to decisive improvements in transport costs and the opportunity for such scale economies, the size of individual plants and their management organizations changed little (Chandler, 1977).¹⁵

The literature generally argues that in the late 19th century, physical capital and human skill were substitutes. On the other hand, as Claudia Goldin and Lawrence Katz note, it is more common to find these two considered complements today. They view the process of technological change as having occurred in two stages. The first consists of installing the machines; this requires the use of skilled machinists as complements to the machines. The second stage is the use of the machines by unskilled labor. The machines substitute for the skilled labor (e.g., a weaver) that formerly produced the good. Their research reveals that the more capital-intensive industries, the ones using batch and continuous-process technologies, the ones emphasized by Chandler as requiring more managerial and professional workers, were also the "high-education" industries (Goldin & Katz, 1996, 1998). The routinization and deskilling of work for the less skilled was accompanied, even overwhelmed, by an expansion of work for the educated.

American society embraced change and improvement in the 19th century. New products and techniques multiplied as the economy grew (for more detail, see Uselding, 1977). In iron and steel, the basic changes were dramatic. First, the expansion of output was accompanied by the development of astounding scale economies. According to Peter Temin, a "good" American blast furnace of 1860 produced 7 to 10 tons of pig iron per day. By 1910, that figure was 500 tons, and it was being produced more efficiently with a different technology (for perhaps the best modern study, see Temin, 1964). Two great innovations, the Bessemer converter and the Siemens open-hearth furnace, occurred in succession. The Bessemer converter, invented in 1856, was successfully introduced in the United States after the Civil War, and it made the American steel industry the world's largest. Andrew Carnegie dominated the steel industry on the basis of the Bessemer converter.¹⁶ However, no sooner had the Bessemer triumphed than it was outstripped by open-hearth technology.

Carnegie freely scrapped his massive Bessemer plants to install open-hearth furnaces and, in the process, was reported to have opened a board meeting with, "Well, what shall we throw away this year?" (Temin, 1964, p. 259). Technological change produced rapid obsolescence and a competitive economy forced firms to either adopt new innovations or find their product become less attractive to consumers.¹⁷ If new inventions are introduced into the stream of economic life, older, less-efficient processes must be retired, and Carnegie was not afraid to make such changes.

In a competitive market, as output expands and prices fall, the gains mainly accrue to the most efficient producers and to consumers. For example, price

levels fell over the final third of the 19th century. Steel rails sold at \$120 a ton in 1873 and were as low as \$17 a ton in 1898. The real price of rails fell from \$96 a ton in 1873 to \$22 a ton in 1898, a fall of more than 75%. A similar circumstance developed over these years in the meat packing industry. As noted, the development of refrigeration proved to be a source of scale economies as manifested by the increasing division of labor. However, the most distinctive source of scale economies came from the utilization of animal by-products (Federal Trade Commission, Food Investigation, 1919b, pp. 91-93, 199-235; see also Pierce, 1940, pp. 123-128). Given Clemen's definition of a by-product ("As a general rule, a packer considers as a by-product everything of value produced on the killing floor other than dressed meat"), then 20% of a steer's and 10% of a hog's live weight emerge from processing as products other than dressed meat (Clemen, 1927).

In the early days of Chicago operations, only the hide was sold. The head, blood, hair, offal, and the like of slaughtered animals were thrown into the Chicago River. The resulting abomination led the city fathers to require the packers to remove and bury these wastes. A distinctive feature of meat slaughtering wastes is that they have to be processed before they have value.¹⁸ When volume is small, the losses from processing are often greater than the cost of disposal. If disposal is free, that is, if wastes can be discharged into a river or fed to hogs, the losses from processing by-products are avoided. So when the city made disposal costs unavoidable, the packers tried to find ways of processing by-products that would recover the costs of handling them. By 1900, any firm's profit position was strongly correlated with the proportion of by-products on which that firm could show a return. The 1918 accounting records of Swift & Company show that 21.3% of the total sales derived from beef was attributable to by-products. For Armour & Company, the 1916 accounting records report the comparable figure to be 27.3% for beef and on the order of 10% for pork (Federal Trade Commission, Food Investigation, 1919b, p. 72).

The pioneer in vertical integration was Armour & Company (Pierce, 1940, p. 140).¹⁹ In 1884, Armour purchased the Wahl Brothers glue works in Chicago and began funneling a large quantity of bones and low-quality hides into this plant. The same year, Armour hired a chemist to investigate the various alternative uses of animal wastes. Eventually, all the large packers were involved in such activities as soap production as well as selling hides to the leather industry and tails to the paintbrush industry. By 1900, most by-products were processed by the packers within their own organizations. In fact, the large packers began buying the wastes of small packers who did not have the equipment to process them. The packers could obtain the raw materials at low cost and, therefore, earn a good return in spite of the expenses incurred for additional equipment. Furthermore, the large packers could use their existing marketing and distribution channels to promote demand. Consequently, the industry reached a position where a live steer cost the packers more than the receipts they realized from the sale of dressed beef.²⁰ If for no other reason than this, by-product processing was

a significant source of scale economies in meat packing. Armour, notes William Cronon (1991), "built his empire on waste" (p. 253).

IV

Mass production necessitated some attempt to control consumption. Mass production went hand in hand with mass distribution, mass marketing, and a large population of consumers with relatively homogeneous tastes. At the same time these dramatic changes were occurring on the supply side of the market, demand was rising apace. Demand in America became demand for mass-produced, standardized products. In the early 19th century, Americans wanted factory-made products to free their own labor for more immediate work in agriculture and extractive industry. If a machine-made tool wore out, and if it had been profitably used, a new one would be purchased to replace it. Simple designs sufficed; the need was for immediate availability. As Ames and Rosenberg asked, "Who used a shotgun in England, and who used one in America?" In England, the shotgun was a prestige item, a weapon used to shoot birds. In America, it was a tool, like the shovel or axe, used by settlers everywhere (Ames & Rosenberg, 1963). The American consumer of durable goods was not interested in frills. For example, quality clothing cost money and clothing could easily be replaced, perhaps in a new style:

The material, being expected to last for a single season, is purchased in a quality to do that, and no more. The next season the customer supplies himself again. . . . This habit of almost constant change is said to run through almost every class of society, and has . . . a great influence upon the character of goods generally in demand which . . . are made more for appearance, and less for actual wear and use, than similar goods are in England. (Habakkuk, 1962, p. 123)

American consumers bought tools that worked, no matter what the appearance of those tools. They bought good-looking, factory-made clothes, no matter whether they wore well or not. In both cases, the question was simply price and use. These are examples of consumers getting what they want *if they intend to use it up and buy something else*. In neither case would it appear accurate to argue that demand was manipulated by the producer. Both tools and textiles were ideal for factory production and, doubtless, are the origin of America's contemporary "throw-away economy," a phenomenon that has not been choreographed by producers.

In 1909, 4 years before he constructed the first assembly line, Henry Ford made his fateful decision concerning demand. The Model T, on which Ford expended so much technological attention, would be supplied to consumers in only one color: "Any customer can have a car painted any color that he wants so long as it is black." As Jonathan Hughes commented, "it was autocratic and characteristic of the man" (Hughes, 1986, p. 261). Withal, the Model T proved

an enormous success until the market was able to supply a car as reliable as Ford's, as inexpensive as Ford's, but with a choice of colors. American consumers prefer having a choice, and Eastern consumers were not predisposed to choose meat from Chicago.

The Chicago packers had to attempt to control consumption in their day much as McDonald's would like to do so today. The major packers constructed massive plants that could supply large quantities of meat, but with the throughput necessary to experience scale economies, demand could not be taken for granted. Prior to the development of refrigeration, the fresh meat industry was strictly local because of meat's perishability. The long-distance business was generally limited to pork, which was preferred as a cured product (ham, bacon). The Federal Trade Commission commented that

previous to the shipment of fresh meats under refrigeration, the packing business was necessarily in the hands of those butchers who slaughtered in or near the community where the meat was to be consumed. No concentration of the industry in the hands of the few was possible. . . . Without the refrigerator car ordinary improvements in transportation could have affected the packing business but very little. Cheaper transportation could not increase the market materially. Faster transportation could make but little difference, but regardless of the speed of the train the meat would spoil before it could be transported any great distance if mechanical refrigeration were not provided. (Federal Trade Commission, Food Investigation, 1919a, p. 33)

Slaughtering was a local industry prior to refrigeration. Large numbers of live animals were transported between the animal-producing West and the meat-consuming East. Refrigeration changed packing from a seasonal industry to a year-round one. With the introduction of the refrigerator car on the nation's rail network, slaughtering and packing became a national industry. The demand for beef rose to a position comparable to pork. Nevertheless, the dressed beef industry was not established on a national basis without a struggle; one result of this struggle would restrict entry into packing in later years.

There were three large groups opposed to the establishment of a dressed beef trade. They were the railroads, the consumers, and the local butchers. The railroads provided the strongest and best-organized opposition. Eastern railroads had a sizable investment in stock cars and the Vanderbilt railroads and the Pennsylvania Railroad had large investments in yards between Chicago and the East. These investments would be lost if the refrigerator car proved successful. Yet, these yards presumably represented salable land alongside railroad tracks, so the roads should have been able to dispose of the land at favorable prices, losing only their investment in pen construction. The railroads argued they would lose freight tonnage because dressed beef weighs less than the live animal. This emphasis on tonnage, which the railroads historically blamed on their stockholders, is a mystery; rates could be adjusted. And, after refrigeration, the Chicago packers became involved with such goods as butter, eggs, and cheese to fill

the bottom of the refrigerator cars. So, even though a dressed steer weighed only 55% of a live steer, the tonnage could have been recovered from products railroads had not handled previously. In retrospect, it is difficult to logically explain the railroad's opposition on economic grounds.

The second group opposing the introduction of dressed beef was the consumer. Clemen called this the "vague, but very real" public prejudice against Western beef. In part, this stemmed from the public's natural suspicion regarding anything new. In part, this was a manifestation of pride and trust in a local businessman, the local butcher. Perhaps it was irrational but it definitely was persistent. After dressed beef surmounted most of the obstacles it faced, Western beef still sold for a penny or so a pound less than Eastern beef.

Local butchers, the third group, took advantage of the public prejudice and industriously encouraged it (Pierce, 1940, p. 121). These butchers were aware that refrigerated dressed beef could undersell fresh beef, which they slaughtered themselves. They formed the Butcher's National Protective Association in 1886 when dressed beef receipts in the East reached what the butchers considered to be a significant volume. This organization's purpose was to discourage the consumption of dressed beef through antagonistic propaganda, thereby ruining the Chicago packers' business. The association presented historically valid arguments. For example, the Chicago packers had slaughtered meat under unsanitary conditions and did maintain a high price of beef artificially through collusion. The local butchers successfully encouraged state laws to prohibit the sale of meat slaughtered outside the state. When the U.S. Supreme Court ruled a Minnesota statute of this type unconstitutional, several other states had to readmit Chicago beef.

That Eastern consumers would come to accept Chicago dressed beef seems inevitable because of its lower price. *Ceteris paribus*, refrigerator cars had an economic advantage over stock cars even though stock cars were cheaper to build and maintain and live animals were shipped at a lower rate than dressed meat.²¹

Second, losses were incurred by shipping live animals, whereas no such losses existed on dressed meat shipments. Live animals bruised in transit could not command high prices. Third, the cost of re-icing refrigerator cars was no more expensive than the cost of unloading, feeding and watering, and then reloading live stock into stock cars.

Fourth, the marketing of by-products was enhanced and scale economies were realized when slaughtering took place in one central location rather than in several local markets. When a live animal was shipped to a local market, all the cuts of meat and by-products had to be distributed as best they could at that market, regardless of the relative demand in an adjacent market. With the centralization that refrigeration made possible, animals could be slaughtered and the dressed meat and by-products distributed from a point near the supply source. By-products were either utilized by the packer or sold to a nearby processor to save the freight charges.

The triumph of dressed meat came around 1890 when Western beef became commonplace on Eastern tables. It would not have occurred in the absence of the meat packers' attempts to control consumption.

V

By the end of the 19th century, standardization and interchangeable parts had become characteristic of American manufacturing. Production for a national market had been the object of the growth and merger of industrial firms, increasing the drive for standardization of sizes in producer goods, consumer durables, tools, and clothing. These made mass production possible as the huge American market grew and eased the problems of industrial expansion by simplifying product design.²² The incentive to invest and expand output was there because the incomes that were produced were distributed in such a way that the product found profitable sales. Probably Adam Smith's most-quoted maxim has been, "The division of labor is limited by the extent of the market." In this case, the market was massively extended.

Between the Civil War and World War I, the American population grew by a factor of 2.93. Net national product in constant prices grew by a factor of 6. The average person in 1914 could buy 2 times as much as her counterpart in 1860, and there were nearly 3 times as many people. *Ceteris paribus*, the resulting increase of per-capita incomes was mostly available for the purchase of manufactured goods or services. *Ceteris paribus*, innovations in technology, together with steady labor force increases in a competitive market, were positive market conditions for Adam Smith's extended divisions of labor; they stimulated investment in new technologies to make new products. There were the great cyclical swings, but as Schumpeter argued, they actually *helped* the processes of growth in a capitalist economy. The massive expansion of American manufacturing seems to have been in the cards toward the end of the 19th century.

What was also in the cards was that American consumers demanded choice. They wanted locally butchered meat. They wanted automobiles in colors other than black. They wanted producers who would supply goods and services that matched their tastes and preferences; they rejected producers who would not. That is one reason why consumers were concerned about monopoly for all these years; it limited choice. Concern about monopoly affected the meat packing industry at the turn of the 20th century. One of the Federal Trade Commission's (FTC's) first studies, the five-volume report of their investigation of the meat packing industry, was published in 1919. The FTC argued that in addition to the control the five major Chicago packers had achieved within their packing and stockyard activities, they were in a position to monopolize the nation's food supply because they had taken control of wholesale distribution channels through their ownership of refrigerated cars. This reduced choice for retailers (see Cain & Aduddell, 1981b).²³ The packers, however, were not able to reach such a

TABLE 5: Employed Workers in Food Services and Drinking Places

	1950	1997
Cook County	66,894	149,248
DuPage County	1,190	30,991
Kane County	1,552	10,763
Lake County	2,202	18,124
McHenry County	691	5,065
Will County	1,288	8,550

SOURCE: U.S. Department of Commerce, Bureau of the Census (1950, 1997).

monopolistic position because, relatively soon thereafter, refrigerated trucks owned by others proved competitive with their refrigerated rail cars (see Cain & Aduddell, 1981a).

The automobile and the truck soon redefined the American landscape. The Interstate Highway System and airports pulled production and people away from their historic concentration in central cities. We saw the effect on people's choice of where to live in Table 3. The vast majority of Chicago's packing industry moved West to be in closer proximity to the animals. In 1900, the Chicago packers employed a little more than 11% of the manufacturing labor force in Chicago. The percentage was little changed in 1950, but by 1997, it was less than 1.5% of manufacturing employment in the six-county area.

In the early years, when people moved across country, they did so by rail, especially in the West, and they were greeted by places such as Fred Harvey's that served food to rail passengers. As the highways became more popular, restaurants opened near the highways to serve the traveling public. The quantity and quality of the food served at these "greasy spoons" was uncertain and folk wisdom developed that the place to choose was the place with the most trucks. Simultaneously, suburbanization was dependent on the automobile and new restaurants opened to serve the growing number of residents of "bedroom" communities in suburban Cook, DuPage, and the other collar counties. It is this market that the McDonald brothers were supplying in San Bernardino; it is this market that Ray Kroc supplied in Des Plaines. The idea that predictable food would be served quickly struck a chord with motorized consumers. In short order, "gut rows" developed throughout the country. New fast-food emporiums were located next to old greasy spoons to give the public a choice. No longer did the family have to decide on a single place to eat. Within a relatively short time, a family feast of fried chicken, tacos, hamburgers, and beef-flavored french fries could be assembled. With a little prior thought they could stop and pick up chicken a la king or egg foo young ordered by phone. It could all be washed down with something called a milkshake that contained nothing from a cow. Table 5 documents the growth in employment in this industry.

Other choices emerged as well, and people took to them. Supermarkets began supplying freshly made sandwiches, salads, and even fried chicken along with

the raw materials for fixing these delicacies at home. And for those interested in something a bit more adventurous, a bit more nutritious, and a lot more delicious, there was a veritable explosion in expensive restaurants.

This proliferation of choices emerged because economic growth provided the income. One of the curiosities of American economic history is that the search for labor-saving technological change has increased the quantity of available jobs, but the jobs created by this process require education. In many ways, we have become wealthier because we have become a more educated nation. Although jobs at McDonald's headquarters generally require an education, as do the managerial jobs in the local stores, many of the individuals representing the company to the public are still in the process of acquiring an education. These workers are "unskilled" because of youthful inexperience; very few are expected to hold such a position for their "career," although some may, because there are fewer opportunities for those whose comparative advantage lies in their "big shoulders." For most of the post-World War II decades, the number of job vacancies has been greater than the number of job seekers. A large proportion of modern unemployment results from the fact the job seekers lack the skills and the education for the job vacancies, and unfortunately, many of those seekers reside in those parts of the central cities from which firms have moved.

With additional education, we are better able to be "rational" producers and consumers in the economist's sense of rational, maximizing our objectives, whatever they may be. The ability to maximize requires an ability to process information that is in a constant state of change because the factors that contribute to decision making (e.g., technology, preferences, prices, information) are constantly changing. Each time something changes, producers and consumers have to consider the new trade-offs presented to them.

McDonaldization is not a new process; it seems reasonable to believe that it was present when Oliver Evans introduced a conveyor belt to his flour mill.²⁴ At the turn of the 20th century, the physically demanding jobs in meatpacking were "good" jobs. At the turn of the 21st century, a firm such as McDonald's is offering "entry level" jobs. Back then, consumers learned what the Chicago packers supplied and what their alternatives were. Similar to consumers today, they demanded choice. There is more information available today for those who wish to use it. For each Ray Kroc, there is a Julia Child. And there is someone else to provide nutrition information, someone to provide information on environmental impacts, someone to offer a critique of the final product, and so on.²⁵ Economists expect educated consumers will use the information to make rational choices for them.

In sum, the economic and technological changes of the past century have enriched Chicagoans, especially those who have invested in education. Many of these people moved from the city to the suburban ring, especially when their children reached school age. And they are much more likely to be working in the tertiary sector than elsewhere. Issues raised by the McDonaldization hypothesis (the routinization of production, the "dehumanization" of work, and the

changing of consumption patterns) were present when Chicago's meat packers were at their zenith. Today's Chicagoans, who earn their living with their brains, should be better able to cope with those issues, should be better able to make informed choices, than their brawny counterparts of a century ago. But each generation confronts these issues anew. Today's educated Chicagoan is more likely to be able to direct a visitor to the first McDonald's in Des Plaines or to the Hamburger University in Oakbrook than to where the "hog butchers for the world" once labored. Tour buses no longer include the Stock Yards on their itineraries. One of the few remaining public connections to that part of the city's history is found in the name of its NBA franchise, the Bulls.²⁶ All that remains to mark the Stock Yards site is the old main gate—now standing in a small square amidst a large, prosaic commercial and industrial park.

NOTES

1. The five major Chicago packers at the turn of the 20th century were Armour, Cudahy, Morris, Swift, and Wilson.

2. Chicago was the Western terminus for most of the important Eastern railroads and the Eastern terminus for most of the important Western roads.

3. The relative growth in white-collar occupations reflects both the growth of the tertiary sector and the fact that those occupations have increased within the manufacturing sector. Today, there are large numbers of physicists and chemists employed by the research and development departments of manufacturing corporations. There are more attorneys practicing within corporations as well as out of their own firms.

4. The table reports total employment in each of the designated sectors and the share of the total of the sectors reported. Going counterclockwise from north of Cook County, the geographical positioning of the other five are Lake, McHenry, Kane, DuPage, and Will.

5. The increase in labor force participation is, in part, a result of an increase in health and nutrition. However, the unemployment rate today is in the same range as a century ago.

6. Corresponding figures for Blacks are 5.4 years for men and 6.1 years for women in 1940; 9.8 and 10.3 years, respectively, in 1970 (U.S. Department of Commerce, 1975). The current data is taken from Table 292 of the U.S. Department of Commerce (2000). The White and Black percentages for 1998 increased substantially from what they had been in 1975; the Hispanic percentage decreased.

7. The high school movement originated in the late 19th century, but by 1910, only about 10% of America's young people had graduated from high school. Thirty years later, the percentage of 18-year-olds with a high school diploma exceeded 50%.

8. Louis Cain and Donald Paterson (1986) statistically reaffirmed that the pervasive biases in American industry were toward labor-saving and material-using technology.

9. Paul David (1975) added to Habakkuk's pioneering work by explaining why major departures in technology prove to be self-sustaining.

10. Setup costs, involving abandonment of all recent changes, are too high. Technologies abandoned in one economy need not be in another, and a technology can be improved over time in one area even if abandoned elsewhere.

11. Consistent data on the income distribution in the United States only go back to 1947, and there has been little change in the distribution for all races from that time.

12. Employment figures for these sectors on a county basis are presented in Table 4.

13. By 1871, Henry Burden's machines could produce 3,600 horseshoes an hour (Uselding, 1970).

14. This gang was involved in meat processing only; by-products were handled elsewhere by a separate set of men (*Report of the Commissioner of Corporation on the Beef Industry* [commonly known as the *Garfield Report*], 1905, p. 17).

15. Jeremy Attack (1985) showed that among those industries, the average firm in 1900 was nearly as large as the very largest plants in 1870.

16. Carnegie was the classic 19th-century American entrepreneur whose methods were characterized by the great economist Joseph Schumpeter as "creative destruction." It was Sir Henry Bessemer himself who convinced the young Carnegie that the "Bessemer's volcano" could work with American iron. Carnegie returned to Pittsburgh to install his first Bessemer works in the early 1870s.

17. Americans also took a different view of the purpose of blast-furnace linings. By raising air pressure in the blast, the amount of pig iron per charge could be increased, but the blast furnace linings were worn out more rapidly. The American iron masters raised the pressure, called "hard driving," and their profits, too. British observers were critical of the technique but the Americans could sell iron cheaper, even at the expense of new blast-furnace linings (Berck, 1978).

18. In 1850, some ingenious fellow hit on the idea of feeding the waste to the hogs.

19. Mention should be made of the firm of Wadsworth, Dyer and Chapin who began utilizing waste products as early as 1847. They boiled heads to produce tallow and turned necks and shanks into jerked beef that was shipped to the West Indies.

20. A profit calculation from Armour & Co. appears in Cronon (1991, p. 251); a list of by-products appears on page 250.

21. As noted, dressed meat weighs about 55% of the live animal, although the lower rates for live animals disguise this fact.

22. The new American technological advances were not universally adopted by its trading partners. For example, in clock and watch manufacturing, the Swiss copied American techniques but the British did not.

23. The Federal Trade Commission's conclusion reflected the title of Charles Edward Russell's (1905) muckraking book *The Greatest Trust in the World*.

24. It seems reasonable to argue that they were present when entrepreneurs introduced the "putting-out" system many years earlier.

25. One Chicago television station recently used as a tease for their primetime news cast a story that turned out to be little more than you get even more calories when you "supersize" a fast-food restaurant meal.

26. The franchise initially was known as the Chicago Packers and played its home games at the International Amphitheater located adjacent to the Stock Yards.

REFERENCES

- Ames, E., & Rosenberg, N. (1963). Changing technological leadership and industrial growth. *Economic Journal*, 73(289), 13-31.
- Attack, J. (1985). Industrial structure and the emergence of the modern industrial corporation. *Explorations in Economic History*, 22(1), 29-52.
- Berck, P. (1978). Hard driving and efficiency: Iron production in 1890. *Journal of Economic History*, 38(4), 879-900.
- Cain, L. P., & Aduddell, R. M. (1973). Location and collusion in the meatpacking industry. In L. P. Cain & P. Uselding (Eds.), *Business enterprise and economic change: Essays in honor of Harold F. Williamson* (pp. 85-117). Kent, OH: Kent State University Press.
- Cain, L. P., & Aduddell, R. M. (1981a). The consent decree in the meatpacking industry, 1920-1956. *Business History Review*, 55(3), 359-378.

- Cain, L. P., & Aduddell, R. M. (1981b). Public policy toward "The Greatest Trust in the World." *Business History Review*, 55(2), 217-242.
- Cain, L., & Paterson, D. (1986). Biased technical change, scale, and factor substitution in American industry, 1850-1919. *Journal of Economic History*, 46(1), 153-164.
- Chandler, A. D., Jr. (1977). *The visible hand: The managerial revolution in American business*. Cambridge, MA: Belknap.
- Clemen, R. A. (1912). *The American livestock and meat industry*. New York: The Ronald Press.
- Clemen, R. (1927). *By-products in the packing industry*. Chicago: University of Chicago Press.
- Cronon, W. (1991). *Nature's metropolis: Chicago and the Great West*. New York: Norton.
- David, P. (1975). *Technical choice, innovation and economic growth*. New York: Cambridge University Press.
- Federal Trade Commission, Food Investigation. (1919a). *Report on private car lines*. Washington, DC: U.S. Government Printing Office.
- Federal Trade Commission, Food Investigation. (1919b). *Report on the meat packing industry*. Washington, DC: U. S. Government Printing Office.
- Goldin, C. (1998). America's graduation from high school: The evolution and spread of secondary schooling in the twentieth century. *Journal of Economic History*, 58(2), 345-374.
- Goldin, C. (1999). Egalitarianism and the returns to education during the great transformation of American education. *Journal of Political Economy*, 107(6) 565-594.
- Goldin, C. (2001). The human-capital century and American leadership: Virtues of the past. *Journal of Economic History*, 61(2), 263-292.
- Goldin, C., & Katz, L. (1996). Technology, skill, and the wage structure: Insights from the past. *American Economic Review*, 86(2), 252-257.
- Goldin, C., & Katz, L. (1998). The origins of technology-skill complementarity. *Quarterly Journal of Economics*, 113(2), 693-732.
- Goldin, C., & Katz, L. (2001). The legacy of U.S. educational leadership: Notes on distribution and economic growth in the 20th century. *American Economic Review*, 91(2), 18-23.
- Habakkuk, H. J. (1962). *American and British technology in the nineteenth century: The search for labour-saving inventions*. Cambridge, UK: Cambridge University Press.
- Hounshell, D. (1984). *From the American system to mass production, 1800-1932: The development of manufacturing technology in the United States*. Baltimore: Johns Hopkins University Press.
- Hughes, J., & Cain, L. P. (2003). *American economic history* (6th ed.). Boston: Addison Wesley.
- Hughes, J. R. T. (1986). *The vital few: The entrepreneur and American economic progress*. New York: Oxford University Press.
- Pierce, B. L. (1940). *A history of Chicago* (Vol. I). New York: Knopf.
- Report of the Commissioner of Corporation on the Beef Industry. (Garfield Report)*. (1905). Washington, DC: U. S. Government Printing Office.
- Ritzer, G. (1996). *The McDonaldization of society* (Rev. ed.). Thousand Oaks, CA: Pine Forge.
- Rosenberg, N. (1972). *Technology and American economic growth*. New York: Harper & Row.
- Russell, C. E. (1905). *The greatest trust in the world*. New York: Ridgeway-Thayer Co.
- Temin, P. (1964). *Iron and steel in nineteenth-century America: An economic inquiry*. Cambridge, MA: MIT Press.
- U.S. Department of Commerce. (1975). *Historical statistics of the United States* (Series H 609, 617). Washington, DC: U.S. Government Printing Office.
- U.S. Department of Commerce. (2000). *Statistical abstract of the United States, 2000*. Washington, DC: U.S. Government Printing Office.
- U.S. Department of Commerce, Bureau of the Census. (1900). *Census*. Washington, DC: Author.
- U.S. Department of Commerce, Bureau of the Census. (1950). *Census*. Washington, DC: Author.
- U.S. Department of Commerce, Bureau of the Census. (1990). *Census*. Washington, DC: Author.
- U.S. Department of Commerce, Bureau of the Census. (2000). *Census*. Washington, DC: Author.
- U.S. Department of Commerce, Bureau of the Census. (1997). *Economic census*. Washington, DC: Author.

- Uselding, P. (1970). Henry Burden and the question of Anglo-American technological transfer in the nineteenth century. *Journal of Economic History*, 30(2), 331.
- Uselding, P. (1972). Factor substitution and labor productivity growth in American manufacturing, 1839-1899. *Journal of Economic History*, 32(3), 670-681.
- Uselding, P. (1977). Studies of technology in economic history. In R. Gallman (Ed.), *Recent developments in the study of economic and business history: Essays in honor of Herman E. Krooss*. *Research in economic history* (Suppl. 1, pp. 159-220). Greenwich, CT: JAI.

LOUIS P. CAIN is professor of economics at Loyola University of Chicago and adjunct professor of economics at Northwestern University. He is coauthor, with the late Jonathan Hughes, of *American Economic History*.