Chapter 4

RAILS, TELEGRAPHY

AND THE BEEF NETWORK OF G.F. SWIFT & COMPANY

> *"I was determined to eradicate the waste of buying cattle which had passed through the hands of too many middle men and against which too many charges had accumulated."*
>
> Gustavus Swift, 1890

> *"We followed a few years after Mr. Swift. We had to learn the methods of dressed beef and experiment. The methods have been gradually growing. We have perfected them year by year, learning something every year as to how to do the business better."*
>
> P.D. Armour, 1889

> *"... all along this east side of the yards ran the railroad tracks, into which the cars were run, loaded with cattle. 'And what will become of these creatures?' cried Teta Elzbieta. 'By tonight,' Jokubas answered, 'they will all be killed and cut up; and over there on the other side of the packing houses are more railroad tracks where the cars come to take them away.'"*
>
> Upton Sinclair, 1906

Gateway to Innovation

In 1879, architects Daniel Burnham and John Root, pioneers of the Chicago architectural avant-garde of the late nineteenth century, completed a commission for the Union Stockyard Company to build a monumental entry to the Company's sprawling facility on Chicago's southwest side. When it was built, the Gate of Burnham and Root celebrated the ascendancy of a particular industry -- meat packing -- and a particular place -- Chicago, which had evolved into "the great bovine city of the world" (Wade, 1987: 56-57). The gateway, however, proved to be more than a celebration of previous accomplishment. It was both homage to industrial creativity in the recent past, and prophecy of creativity to come.

During the previous two years, Gustavus Swift had initiated a series of experiments in shipping slaughtered beef from Chicago, to New England in his own refrigerated rail cars. While not the first to try this technique -- the Chicago Board of Trade had already conceded in 1876 how such shipments represented "important traffic" (Taylor, 1917: 684-685) -- Swift was the first firm aiming to build a

business around such a system. By 1878, Swift, undaunted by the skepticism of other meat packing firms that dressed beef shipments would fail as a business model, began forging an extremely innovative, though still experimental system for slaughtering beef in one location, and selling the dressed beef in markets located great distances from the point of slaughter. This innovation would have decisive consequences. It transformed the entire meat packing industry within the next decade, and recast the organizational and territorial pathways for the accumulation of profit in the U.S. economy of the late nineteenth century.

Communications and Creative Destruction

Central to the innovation of Swift was a new type of business organization for mastering the control needed to produce and distribute the highly perishable dressed beef product. Such control in turn, hinged on the development of the rail and telegraph system (Chandler, 1992: 264; (Chandler, 1977: 392: 402). Through trial and error, Swift essentially learned how to incorporate rail and telegraph technology as the primary technological element in building a new type of business organization for production and distribution of fresh beef. Although surprisingly neglected by Schumpeter, the dressed beef enterprise of Swift is among the most innovative business breakthroughs of the late nineteenth century. As an upstart among more established firms such as Armour, Swift assumed this entrepreneurial role and built this organization by developing a new product -- beef slaughtered and butchered in one location and sold in another -- and more fundamentally, a new *process* for making and selling this new product.[1] In engineering these changes, the Company occupies a position of centrality in what Schumpeter insisted was the essence of capitalist development – "creative destruction" -- rooted in the phenomenon of innovation and technological change.

What Swift succeeded in destroying was the market structure and system of beef production, consumption and sale prevailing before 1875. In this system, local butchers slaughtered cattle and sold

[1]On dressed beef as a new *product* see Kujovich (1970: 462).

beef to consumers living nearby creating a highly localized structure of markets for cattle slaughter and beef consumption. Long distance shipments of live cattle from West to East, which co-existed with this pattern and provided supplies for local butchers, did little to undermine the fundamentally localized relationship of cattle slaughter and beef consumption. In these conditions of market localization, myriad intermediaries -- wholesalers, jobbers, and merchants -- were the dominant actors, creating numerous -- and according to Swift -- inefficient steps in the process of beef production, slaughter, and final sale to retail butchers and consumers.

By exploiting the rail and telegraph system to undersell existing butchers in local markets and make this new product affordable, Swift created the demand in distant markets for his product innovation (Destler, 1946: 42).[2] As a supplement to this project of market creation, the Company built a brand name, Swift "Premium," and connected its brand to the newly discovered power of advertising in a concerted campaign to strengthen consumer preferences for Midwest-slaughtered beef among an initially skeptical public (Neyhart, 1952: 154; Cockburn, 1996). With its ever-increasing share of the beef consuming market, Swift disrupted the relationships of supply and demand between buyers and sellers of beef that gave the beef trade and beef markets their local character. At the same time, as Swift overturned the localized patterns of cattle slaughter and beef consumption, the Company essentially destroyed the intricate system of intermediaries formerly prevailing in the beef trade. In place of these actors emerged a new type of business organization for coordinating the system of cattle slaughter and beef sale.

The Network of Swift

The organization built by Swift for producing and marketing freshly slaughtered beef in high volumes over a national territory represented a revolution in *logistics*. This revolution elevated the role of *process* innovation as the route to profitmaking in the industry, and transformed the business of meat

[2]In his study of 43 entrepreneurial leaders of the 19th century classified under 24 categories, Destler notes that five entrepreneurs of the period – Swift and Armour in meat, McCormick in reapers, Pillsbury for flour, and Duke with cigarettes, -- were notable for creating public demand for their essentially new products (Destler, 1946: 29, 42).

packing by shifting the emphasis away from production and more toward distribution (Aduddel and Cain, 1973: 97). This process innovation pioneered by Swift, in turn, consisted of four fundamental elements.

The core of the Company's innovative advance was the creation of a geographically dispersed network of branch distribution houses for selling dressed beef to the firm's final customers, retail butchers. This network of branch distribution houses played the pivotal role in securing the demand necessary for the Company's dressed beef business to operate on the basis of high volumes. Through direct interaction with retail butchers, these branch houses provided the bridge between volume production with its economies of scale, and mass consumer demand that Swift had actually helped create. Furthermore, the system of branch houses enabled Swift to bypass the traditional intermediaries in the cattle and beef trade. The result was a more *direct* route to the customer. By eliminating wholesalers who had dominated the beef trade prior to Swift, the direct system of moving beef from producer to the retailer through the branch houses removed bottlenecks that had formerly constrained volumes, and increased levels of throughput necessary for Swift's system to operated profitably. Perhaps most importantly, this elimination of intermediaries enabled Swift to out-compete existing business models of the beef trade based upon localized slaughter and long-distance shipments of live cattle. This direct distribution system was in effect, a nineteenth century form of disintermediation. It emerged as a pioneering example of institutional change within a wider reorganization in the nation's wholesale networks as the mass production economy expanded, and as vertically integrated manufacturers assumed a more dominant role in marketing their own products (Porter and Livesay, 1971).

Secondly, the high-volume system of cattle procurement, slaughter and (dis)assembly on the front end of the network represented a *pull* system. Customer orders for cuts and grades of beef placed at branch houses by retail butchers and telegraphed daily to Swift headquarters were the basis for procurement orders of cattle supplies at the various stockyards to satisfy customer demand. Such a system "pulled" cattle supplies through the network as orders were received instead of pushing finished product out of disassembly factories for sale to customers on the basis of demand forecasts. From its headquarters in Chicago, Swift & Company relied on telegraphic communication with its purchasing

agents at the major livestock markets of St. Louis, Kansas City, St. Joseph, St. Paul, and Fort Worth where the Company had slaughtering facilities, to convey orders to its buyers, and receive messages on available cattle supplies. Swift, in effect, used the telegraph to balance cattle demand and supply in real time in this pull system while the railroad acted as the fulfillment mechanism for transporting supplies and finished product.

Third, this network organization incorporated a new structure of ownership and control over the adjacent steps in the production and distribution of fresh beef. A formerly-disaggregated, locally-oriented, and small-scale activity had given way to an industry with production networks controlled by vertically-integrated, large-scale enterprises. As the first vertically-integrated meat packing firm, Swift was the forerunner of large-scale, nationally-oriented business organizations. Along with five other packing firms, Swift was part of an oligopoly dominating the meat industry, a pattern that would characterize numerous other industries of the period (Chandler, 1977).

Finally, this production and distribution network created a new geography of economic activity incorporating tendencies of territorial spread *and* localized concentration. For the first time in history, shipments of fresh beef were transported great distances in refrigerated rail cars. Such shipments of fresh beef helped establish the foundations of a more uniform and integrated national marketplace "annihilating space" in the process (Cronon, 1991: 207-259). At the same time, however, as Swift was extending its network through the proliferation of branches throughout the continent, the Company was concentrating economic activity in new locations. First Chicago, and later other cities in the Midwest where Swift (along with other packers) expanded disassembly operations, became placed-based concentrations of meat slaughtering. Assuming the status of late nineteenth century industrial districts first observed systematically by Alfred Marshall, these concentrations of slaughtering emerged as command centers of newly created, continentally organized industrial empires, gateways to a new territory of profitmaking.

Early Meat Packing

In order to grasp the innovative and transformative impacts of Swift's production and distribution network on the rest of the industry, it is imperative to understand the nature of the industry in which Swift initially operated.

Until the last quarter of the nineteenth century, cattle slaughtering and fresh beef distribution was under the control of local butchers (Clemen, 1923: 225). By 1890, however, local butchers in most locales had become little more than retail conduits for a trade dominated by nationally organized firms. The network pioneered by Swift played the decisive role in this transformation by challenging the two most fundamental attributes of early meat packing: 1) the decentralized market structure of the industry; and 2) the dominance of pork over beef.

In challenging these attributes, the network of Swift recast the relationships between actors in the meat industry, while creating a new type of firm, a more far-flung market geography, and a pattern of economic growth based upon high-volume, long-distance throughput. How the meat industry evolved from a locally-oriented activity focused overwhelmingly on pork, to a national activity in which beef rivaled pork in importance, and how, as the beef industry expanded, the practice of shipping beef in carcass form great distances assumed ascendancy over live cattle shipments, are the central themes in the Swift story of innovation and economic change.

Markets and Meat

Prior to the railroads and the refrigerated railcar, meat packing as an activity distinct from the slaughter and consumption of animals on farms, was undertaken by innumerable small firms that supplied local markets (Clemen, 1923: 173; Yeager, 1981; Walsh, 1978; 1982). The geography and market structure of the industry was a mirror image of the highly-variegated, localized markets that dominated the economy of the U.S. in the early 19th century (Pred, 1966: 163-167). Virtually every town had its own slaughtering facility, usually located on the outskirts where urban and rural boundaries met, that provided for local consumption (Clemen, 1928: 440). Large cities had multiple facilities. New York

actually had more than 200 abattoirs servicing the various neighborhoods. Slaughtering and the consumption of beef were thus reflections of localized markets that, in the absence of well-developed interregional transport and communications links, were largely self-contained.

Under these conditions, the overwhelming influence on slaughtering and meat packing was seasonality. Grazing and feeding of cattle and hogs began during spring thaws and lasted through the autumn. Slaughtering occurred at the end of the grazing and feeding season while animals not yet mature were held and fed on corn during the winter. Because fresh meat was perishable, it had to be consumed quickly after it was killed, or preserved by salting, smoking or curing. Meat preservation occurred in the winter since the meat had to remain cool to prevent spoilage while the cure mixture penetrated the flesh, a process that lasted several weeks. Cured meat was eventually shipped on river boats during the spring thaw (Yeager, 1981: 5). This seasonal activity, undertaken by numerous small producers, supplied local market environments under the guidance of the so-called "Invisible Hand" (Yeager, 1981: 1).

During the first half of the nineteenth century, consumption of pork far exceeded beef. The reason was that pork was more easily preserved and more-readily eaten in preserved form than beef. In addition, hogs were less expensive to raise than cattle (Yeager, 1981: 4). Fresh beef was available but conditions for the consumption of beef had severe restrictions. In the absence of rapid overland transportation, beef had to be butchered and sold close to where it was raised and slaughtered or it would spoil. This constraint limited the distance that slaughtered beef could be transported. Rarely did slaughtered beef, whether killed on farms or in abattoirs on the outskirts of towns, travel more than fifteen miles to market.

Although river steamboats widened the meat trade after the 1820s, the growth occurred in the trade for cured, rather than fresh meats. Because cured meats consisted overwhelmingly of pork, the expansion in meat packing stemming from steamboats occurred in pork packing. Hauling of live cattle on steamboats for slaughter and sale in locales distant from where animals were raised, was simply not technically or economically feasible (Yeager, 1981: 4-5). The alternative to hauling live cattle was to ship freshly-slaughtered beef by steamboat. Even this new form of transport, however, did not represent a

sufficient technological advance to alter the local character of the beef industry. In the absence of refrigeration technologies, river steamboats did not provide enough speed to widen the market for freshly slaughtered beef. As a consequence, fresh beef remained a local product that could not be traded over long distances. Pork packing undertaken by numerous small and medium sized firms, and the transport of cured pork by river steamboats, dominated the packing business in the early part of the nineteenth century.[3] There was little in the way of an organized fresh beef industry in the U.S. Cattle slaughtering for fresh beef was more an agricultural activity in which cattle merchants and local butchers acted as intermediaries for delivering beef from farms to consumers.

Organization of the Early Beef Trade

Given the constraints imposed by distance and available transport, urban consumers in the population centers of New England and the Middle Atlantic States could avail themselves of fresh beef from two basic sources.

One source was cattle raised on Eastern farms in relative proximity to urban areas. Networks of Eastern cattle farmers, cattle merchants, and urban wholesale and retail butchers organized the beef trade that brought beef to Eastern cities from nearby cattle farms. Sometimes the farmer would slaughter the cattle and sell the carcass to a wholesaler who delivered it to wholesale or retail butchers for further butchering and sale. At other times, the farmer would sell live animals to a wholesale agent who would drive the live animals to a local abattoir for slaughtering, or deliver them to a local wholesale butcher for slaughter and sale to retailers. Still another possibility was for the farmer himself to drive his stock to the local abattoir or to wholesale butchers for slaughter and sale. These networks of farmers, cattle merchants, and butchers became relatively well-entrenched within localities.

[3]In 1843-44 over 96 western towns in Ohio, Kentucky, Indiana, Illinois, Iowa, and Missouri were involved in pork packing (Yeager, 1981: 4). Because of the role played by riverboats in the pork-packing trade, the overwhelming majority of these pork packing operations were located along rivers, primarily the Ohio, Mississippi, Illinois and Wabash river systems (Yeager, 1981: 5; Walsh, 1978).

In addition to these local networks, the other source for fresh beef was cattle made available in the East as a result of the much-celebrated, long distance cattle drives. The importance of cattle driving as a source of Eastern beef consumption stemmed from the fact that cattle raising had steadily migrated during the course of the nineteenth century from East to West. Cattle farming was extremely land intensive. Consequently, the raising of cattle gradually moved from the population centers of the East toward the frontier in search of open pasture. This migration increasingly separated the location of the country's cattle population from the human population and provided the fundamental stimulus for cattle driving. At their peak in the 1840s, cattle drives transported animals from Texas, the Great Plains, and the grain belt states to the Eastern population centers on time-consuming and arduous journeys often exceeding 1000 miles (Clemen, 1923: 174-179). Drives were seasonal beginning anywhere from late February until June and terminated at eastern stockyards between April and August.

Six principal actors played essential roles in cattle-driving (Cleman, 1923: 63-65). First was the cattle "grazer" who raised the stock. Cattle "feeders" then purchased the stock in the fall and fattened the animals on corn during the winter months in corn belt states such as Illinois for marketing in the East during the following driving season. "Drovers" would drive the live animals to the East. At the end of the driving process, cattle was consigned by drovers to Eastern cattle merchants. Slaughtering of these animals took place sometimes under the control of these cattle wholesalers at Eastern stockyards employing wholesale butchers, other times by large wholesale butchers in their own shops. Finally, wholesale butchers would distribute dressed sides to retail butchers who in turn, would process the dressed carcasses for final sale to retail customers. The boundaries between these actors, however, often overlapped.

Despite the high visibility of cattle drives and the creation of institutions along the trails for accommodating cattle traffic such as livestock pens for animals and hotels and taverns for drovers, beef still remained a subordinate product to pork. Pork packing tied to river conveyance was the overwhelmingly dominant trend in the packing business (Walsh, 1978: 9). As late as 1870, cattle slaughtering and beef packing, as an industrial activity, was still extremely small compared to pork.

Overall, the industry, with an output of $62 million in 1870, ranked as the eleventh largest in the nation.

Table IV-1

Size of Beef and Pork Packing Industries (1870)

	# Establishments	Employees	$ Output (millions)
Beef Packing	36	435	$ 1.95
Pork Packing	206	5,551	$56.43
Misc. Meat	17	499	$ 3.76

Source: Ninth Census Volume III, The Statistics of the Wealth and Industry of the United States (Washington: Government Printing Office, 1872), Table VIII(c), p. 458.

Rails and Cattle

During the 1850s, and after the Civil War, as railroads began to replace water as the primary means of conveyance for commodities, a profound transformation occurred in the beef trade. Railroads made possible the large-scale, long-distance shipment of live cattle. This development, in turn, reinforced an already-evolving geographical separation between cattle grazing areas of the West, and the population areas of the East. With railroads as transport, and with the telegraph providing information on cattle prices and supply and demand conditions, the East became more viable as a market for long distance cattle shipping from the Western range.

The Stockyards

In Eastern cities, demand for fresh beef had outstripped the supply available from local cattle farms, or through drovers.[4] Rail transport enabled cattle from the West to be shipped "on the hoof" to these burgeoning urban markets. Consequently, the 1850s and the period immediately following the Civil

[4]Clemen charts the westward migration of cattle raising during the 1840s, 50s, and 60s, and the corresponding increase during these same decades in what he termed "minimum class" states i.e. states with cattle populations insufficient to satisfy their own cattle demand (Clemen, 1923: 64-68).

War, witnessed the advent of a new business activity in the form of Eastbound rail shipments of live cattle. It also brought a new and powerful actor into the cattle and beef business -- the railroads.

In elevating Chicago to a position of primacy within the nation's transport system beginning in the1850s, the railroads created a new geography of concentration for the cattle trade. At this location emerged a huge cattle market and point of transshipment for the movement of cattle from the West, to Eastern slaughtering markets. Decisive in this process was the establishment in 1865 of the Chicago Union Stockyard Company. Capitalized at $1 million, the stockyard was spearheaded by the railroads and supported by Chicago meat slaughtering firms with nine railroads subscribing $925,000, eight Chicago meatpackers contributing $50,000, and the public purchasing shares worth $25,000 (Wade, 1987: 48-49). The aim of this project located five miles southwest of downtown Chicago, was to create one, large-scale centralized stockyard accessible to all the railroads as well as livestock dealers and meatpackers. Such a consolidated stockyard facility was entirely without precedent (Wade, 1987: 50). Upon opening in 1865, the Chicago Union Stockyard was enormously successful both as a market *place* for the cattle trade, and as a conduit for Eastbound cattle traffic. By 1867, cattle was being driven from the ranges to so-called, "cowtowns" of the West such as Abilene, Kansas. These were essentially railheads where the animals were consigned to cattle merchants and then shipped by rail to Chicago.

Central to this new system of cattle shipment was an entirely new institutional actor, the cattle commission house, which acted as a critical intermediary in the trade.[5] Cattle commission firms were consignees operating in the Chicago stockyards. They helped make the market at the Union Stockyards by absolving cattle farmers and drovers of the need to travel with their stock to Chicago to secure their sale. Instead, cattle commission houses, working through local cattle merchants or their own agents in Abilene and other western shipping points, paid cash for delivery of stock prior to actual sale in the Chicago market, and made a commission on the sale as a market maker. This system created new incentives for cattle farmers and drovers to make cattle available for sale to the Chicago market. In

[5]Information in this paragraph on the advent of the cattle commission houses and their centrality in the cattle trade taken from Clemen, 1923: 86-91.

conjunction with the opening of the Union Stockyards, cattle commission houses provided critical institutional supports for Chicago's cattle market and enabled it by 1870 to become "the great bovine city of the world" (Wade, 1987: 57).

One Step Forward…

Despite advances in shipping cattle made possible by the railroads and the Union stockyard facilities in Chicago, the new business of cattle shipping was not without problems. Three issues confronted cattle shippers at the Chicago market aiming to transport cattle by rail from sources of supply in the West to places of demand in the East.

The first problem facing cattle buyers and shippers stemmed from the system of intermediation in the cattle trade that had emerged following the creation of the Union Stockyards and the cattle commission houses. After 1865, localized cattle merchant networks that had formerly dominated the trade, gave way to a more geographically dispersed and more numerous set of wholesale actors who entered the trade as adjuncts of the consignment system being perfected by cattle commission houses. As a consequence, myriad new jobbers, merchant wholesalers, consignees, and commission agents became part of the cattle shipping business facilitating the movement of cattle from collection points such as Abilene to delivery points at Eastern slaughterhouses. While this network made cattle distribution more efficient overall, the numerous exchange points in the network, between sources of cattle supply and shipper-buyers of cattle at the Chicago stockyards, and between cattle shippers and retail butchers in the East, drove down margins for the business as whole. Shippers of live cattle purchased at Chicago for shipment East were therefore positioned within a selling chain with numerous steps that provided them with meager returns.

Secondly, the cattle shipper confronted technical problems in successfully shipping live cattle on existing cattle trains. Cattle had to be fed and watered along the route. In addition, animals invariably lost weight during these trips, bringing in less money for cattle shippers at the point of sale. These difficulties, however, were far from the most onerous. A Report by the Massachusetts Railroad

Commissioners in 1870 describes in detail the ultimate risk facing cattle shippers in transporting cattle long distances by train:

> Cattle trains yield the road to most others and pass hours on the sidings; the animals are without food or water and often with insufficient ventilation in summer or shelter in winter; they are jolted off their legs and goaded till they struggle up, for they can not be permitted to lie down. They thus arrive at their destination trampled upon, torn by each other's horns, bruised, bleeding, having in fact suffered all that animals can and still live. Under the most favorable circumstances they leave the train panting, fevered and unfit to kill; under the least favorable, a regular percentage of dead animals is hauled out of the car (quoted in Clemen, 1923: 195).

Finally, adding to the logistical challenges of shipping live cattle was perhaps an even more formidable obstacle – the fact that roughly sixty per cent of the animal was inedible. This unusable part of the cow placed a freight cost burden on cattle shippers without the possibility of a return. As a result, the business of shipping live cattle was far more lucrative for the Railroads. By the late 1850s, cattle shipments had emerged as the rail industry's most profitable eastbound trade (Chandler, 1988: 230). Upon completion of the Chicago stockyards, this trade expanded even more rapidly. Consequently, this was a business that the Roads aimed to protect.

In order to maintain the cattle trade at profitable rates, the major livestock-carrying Railroads entered into pooling arrangements during the 1870s. The most notable of these agreements was the "Evener System" in which the Roads and the largest cattle shippers worked in concert.[6] Although the largest cattle shippers benefited from such cartel agreements, the fundamental problem of shipping live cattle -- the freight charges levied on the inedible portion of the animal -- remained unresolved even for the large cattle firms.

Furthermore, despite cooperation between the largest cattle shippers and the Roads, these two groups did not meet in the marketplace as equals. The size of the Railroads and their control over such a

[6]The Evener System was devised by the three livestock-carrying railroads, the Erie, the Pennsylvania, and the New York Central to divide the live cattle and hog traffic, guarantee each Road an agreed-upon portion of shipments, and stop the competitive rate-cutting. Each Road selected two major livestock shippers as "eveners." If a Road was unable to secure its quota of shipments through the normal distribution of livestock traffic, the eveners made up the quotas. As a reward for balancing the distribution, the eveners received a rebate of $15 per carload of livestock. The system existed from 1875-1879 when it broke down owing to the expansion of the dressed beef traffic (Yeager, 1981: 30-40).

vital transportation service provided them with the power to maintain freight rates over cattle shippers.[7] Overcoming the cost problems posed by rail shipments of livestock compelled Swift to conceive of the production and sale of beef in a completely different way.

In this reconceptualization, the idea of slaughtering and butchering meat in the West and shipping the dressed beef to the East over the rail system without spoilage, was the basic problem that Swift would try to resolve. The key obstacles facing Swift in trying to overcome this problem were thus time and distance; the window of time before the meat spoiled, and the distance between the disparate locations of slaughter in the West and sale in the East. His solution was both technological and organizational.

Through trial and error, Swift came to understand that the solution to overcoming the barriers in shipping dressed beef was an integrated production and distribution strategy. On the technical side, the route to this integrated strategy was to link breakthroughs in refrigeration, to the transport and communications infrastructure of rails and telegraphy. Organizationally, Swift confronted two issues. On the one hand, he had to confront the power of the railroads to set freight rates. Secondly, Swift somehow had to bypass the expanding channel of intermediaries in the rail-based cattle and beef trade. Dressed beef shipments on a large scale were incompatible with the organizational channels of distribution that had emerged in the cattle and beef trade Porter and Livesay, 1971: 168-173). Many of these distributors in the East were incapable of handling dressed beef while others were openly hostile to the product fearing the competition that dressed beef represented to their businesses with live cattle. Ultimately, the key to resolving these problems resided in the creation of a new type of business enterprise.

Such an enterprise had to possess the capability of coordinating and controlling the various activities of procuring and slaughtering cattle, shipping dressed beef long distance, and distributing the dressed beef in these geographically dispersed market areas. Only with such an organization could Swift integrate production and distribution and achieve the volumes necessary to make his dressed beef project

[7]On this point, the Senate Committee investigation on the Transportation and Sale of Meat Products concluded that: "The enormous power wielded by the Trunk Line Association is almost incalculable. Every pound of freight and every head of cattle and hogs going either way across the continent must pay tribute to the roads comprising this vast combine" (U.S. Senate, 1890: 17).

feasible. While the integrated beef slaughtering and marketing corporation pioneered by Swift represented the solution to this challenge, the initial steps leading to the creation of this organization actually began as experiments with the technology of refrigerated transportation. In these experiments, Swift was able to take advantage of earlier precedents in the technology of refrigeration.

Early Refrigeration

By the close of the 1860s, the idea of adapting principles of refrigeration to transport systems for shipping perishable items was particularly compelling to early visionaries in the meat industry who influenced Swift. Initial efforts to ship refrigerated beef, however, were small-scale and seasonal, dependent largely on cold weather. In 1868 Henry Peyton Howard made an experimental shipment in his own steam freighter but soon discovered that weather conditions in the Gulf area where he was operating were too unpredictable to sustain the business. Another pioneer, Thomas Rankin, shipped refrigerated beef from Denison, Texas to New York City in refrigerated rail cars but was forced to close his company after failing to achieve the large volumes necessary to make such a business profitable.

The most viable precedent for Swift in terms of refrigeration strategies came from the meat packing firm of George H. Hammond. In 1869 Hammond used a refrigerated rail car to ship eight tons of freshly-slaughtered dressed beef from Detroit to Boston on the New York Central and Boston & Albany Railroads. Building upon this success, Hammond expanded his business after 1870 distributing his meat through existing networks of wholesalers and commission merchants. His rail car, however, had serious shortcomings, forcing him to confine his shipments to the winter months, which kept his operation relatively small scale.

Because his business remained far too modest to compete with the live cattle shipment business, Hammond did not encounter resistance from the Roads. Nor did he meet with opposition from local Eastern wholesale butchers since he did not undercut them on price. His western dressed beef cost the same or slightly more than locally-slaughtered meat (Yeager, 1981: 54). Nevertheless, Hammond's business generated sufficient interest to lure other competitors into trying to perfect the system of grafting

the technology of refrigeration onto transportation networks for shipping dressed beef from West to the East.

Firms run by Nelson Morris and T.C. Eastman experimented with refrigeration systems of their own. Others in the cattle and butchering business soon followed. By 1877, the *Chicago Tribune* wrote how the dressed beef business was now a significant activity (Taylor, 1917: 549). Perhaps more importantly, the beef business in general, was in the beginning stages of a large-scale expansion. It was in this environment that Swift would launch his own experiments in refrigerated dressed beef shipments over the railroads.

Table IV-2

Cattle Slaughtered in Major Cattle Markets*
And U.S. Population

Year	Number Slaughtered	U.S. Population
1870	212,929	38,558,371
1875	391,842	
1880	741,992	50,155,738
1885	1,449,672	
1890	3,372,776	63,056,101
% Increase 1870-90	1,483 %	74 %

* Chicago, Kansas City, Omaha, St. Louis, and St. Joseph.
Source: Bureau of Corporations, 1905: 7.

Table IV-3

Comparative Expansion of Beef and Pork Packing
1870-1890

Year	Total Output ($ Millions)	# of Estab-lishments*	# of Employees*	Pork as % of Output	**Beef as % of Output**
1870	$62.1	259	6,485	90.8%	**3.2%**
1880	$303.6	872	27,297	61.8%	**27.8%**
1890	$564.7	1,367	44,812	42.1%	**34.4%**

Source: Ninth Census (1870), Table VIII (c); Tenth Census (1880), *Statistics of Manufactures*, Table VII, pp. 464-465; Eleventh Census (1890), *Report on Manufacturing Industries,* Table VIII, pp. 730-735.

Entrepreneurial Opportunity

Swift came to Chicago in 1875 to set up a cattle-buying office for his Boston-based wholesale meat business in which he was a partner with James Hathaway. As a newcomer to the Chicago packing business, he had limited capital and sought ways of competing with his more well established Midwestern rivals. At that time, refrigerated dressed beef shipments from the Midwest to the East, pioneered by Hammond and Morris, were expanding among other Chicago packers. Nevertheless, refrigeration techniques were still rudimentary. More importantly, there was no established business model capable of making the overland trade in dressed beef secure and reasonably profitable. The meat business was still dominated by live cattle shipments from the West through the entrenched channel of cattle merchants, brokers, and wholesalers.

This experience from 1875-77 of buying cattle in Chicago and shipping the animals East for his butchering business in Massachusetts, is what brought Swift into direct contact with the economics and logistics of the live cattle shipping business (Swift, 1927). Not only was Swift looking for ways to avoid freight charges on the sixty percent inedible portion of the animals, and eliminate the weight losses and bruising of the meat during shipment. Equally important to Swift was his determined effort to eradicate "he waste of buying cattle which had passed through the hands of too many middle men and against

which too many charges had accumulated"(quoted in Yeager, 1981: 59). Because Swift understood the problem of supplying Eastern markets with beef to be one of distribution -- the damage to cattle from rail transport, the exorbitant freight rates on cattle, and the numerous intermediaries in the trade -- he established as his objective the creation of a system for distributing his product differently. This objective, in turn, is what pushed Swift into experimenting with the idea of shipping dressed beef slaughtered in Chicago rather than shipping live animals.

Swift seemed to possess the drive, skills, and temperament for this entrepreneurial task. According to Charles Edward Russell, one of the most well-informed critics of the Beef Trust, the "chief founder" of what was to become the dressed beef industry, was

> big-boned, big-brained, resolute, indomitable, obsessed with that strange consuming passion for money-making that seems to be an exclusively American trait, a tireless worker, a devout Methodist, and of habits austerely and almost painfully correct…. He drifted westward to find some road to wealth. At the time Nelson Morris was experimenting with frozen meat in box cars, Swift was clinging desperately to the very skirts of the Chicago cattle market, a small speculator without capital or credit….He was poor but was slowly forging ahead.
>
> The frozen-meat experiment came under his notice and he gave to it the searching scrutiny of an alert and powerful mind….Mr. Swift studied this scheme and gradually unfolded in his mind a plan, having the prospect of enormous profits… (Russell, 1904: 23).

In response, Swift developed a business model linking four elements -- refrigeration, transportation, communications, and organization -- that succeeded in overcoming the most fundamental obstacles to the long distance trade in dressed beef. This business model, however, unlike that used earlier by Hammond, did not accommodate existing organizational actors and technical routines in the industry. It obliterated them and created a cost structure based upon a branch system of distribution and high volume throughput that exerted an irrepressible force on others aiming to compete in the industry.

Learning a New Business

Swift launched his system in a series of experiments linking transportation and refrigeration. From the proceeds of his cattle-buying activity, he acquired sufficient capital for the purchase of his own slaughtering plant, which he used for initial trials of refrigerated dressed beef shipments (Yeager, 1959: 81). For these early shipments, however, Swift used ordinary rail cars, shipping the dressed meat during winter months. He next rented refrigerated rail cars from freight companies that were experimenting with

the fresh fruit trade, but found supply of these cars too limited to make the trade practical. By 1877, Swift decided to try and perfect his own refrigerator car as a first step in creating a dressed beef business. He presented his idea to his partner, James Hathaway, but the latter regarded the scheme as unsound. The two dissolved the partnership. With proceeds of $30,000 from the sale of his stake to his one-time partner, Swift formed a new enterprise with his brother, Edwin Swift. The aim of the Swift Brothers was to launch a business for procuring, slaughtering, shipping, and selling dressed beef.

In 1878, Swift hired engineer Andrew Chase to help him perfect plans for an insulated and ventilated refrigerator car for the railroad. The design was highly innovative with unique features that resolved some of the technical problems such as moisture and ventilation plaguing cars built earlier for Hammond by William Davis. The central element of Chase's design for Swift was a unique cold blast system that provided automatic circulation of dry air through the cooling compartment. Ice bunkers positioned in the upper corners of the car, cooled the air, forcing warmer lighter air to escape through ventilators. An advantage of these ice bunkers was that they could be filled from the exterior making them easier and more efficient to operate.

When Swift approached the railroads of the Eastern Trunk Line Association to ask for assistance in building the cars, however, they rejected his request, fearing both the short and long-term consequences such cars might pose to them as livestock shippers.[8] Swift eventually found a builder in the Michigan Car Company, mortgaging his business as collateral for construction of ten cars. He then approached the Grand Trunk Railroad to enlist it as the carrier for his dressed beef. Unlike the Roads of the Eastern Trunk, the Grand Trunk Railroad had limited investments in the livestock trade and was therefore not threatened by Swift's undertaking. Although its route East went through Ontario and Quebec, the Grand

[8]The Eastern Trunkline Association was a cartel formed in 1877 of the major East-West Railroads which included the New York Central, Erie, Pennsylvania, Baltimore and Ohio. Its aim was to stabilize rates by pooling profits and traffic thereby removing incentives for "ruinous" ratecutting. By 1879 the Association included the major Roads operating east of the Mississippi. It also included the Grand Trunk, the major East-West Canadian Road that operated from Chicago to Boston via Detroit and Montreal. With no Canadian rivals, however, the Grand Trunk was able to circumvent the restrictions on ratecutting and traffic imposed by the Association, forging its own competitive pathway. The passage of the Interstate Commerce Act in 1887 eventually prohibited such pooling arrangements (See especially Chandler, 1965: 159-181).

Trunk shipped into New England where Swift intended to launch his initial dressed beef shipments. Furthermore, by giving the Grand Trunk his business, Swift offered the Road a product capable of competing with the lucrative livestock-hauling trade of the other trunk-line rail carriers. There was another good reason, however, for Swift to give his business to the Grand Trunk. A competing Road to Boston, the New York Central-Boston & Albany Road, carried the much-smaller dressed beef shipments of his competitor, George Hammond. Swift's refrigerated dressed beef shipments and the Grand Trunk Railroad were thus a natural combination.

With a more technologically advanced refrigerator car and rail carrier in place, Swift began trial shipments of dressed beef from Chicago to New England in the winter of 1878. He established his first branch houses in Fall River in a partnership with D.M. Anthony who owned a wholesale butchering business there, and in Clinton where his brother Edwin managed the family slaughtering operation (Wade, 1987: 106). These two locations formed the early foundations of the Swift beef network (Map of 1878). By 1878-79 Swift was sending shipments of refrigerated dressed beef on the Grand Trunk Railroad from a small slaughtering facility leased from Hammond, to these two New England branches for distribution and sale.

MAP IV-1

Although Swift relied initially on the two branch houses in Clinton and Fall River for marketing dressed beef, his idea for expansion was to enlist existing wholesale butchers in New England as agents in a new system of distribution (Clemen, 1923; 235). His strategy was to secure the cooperation of these actors as a means of gaining entry into local markets. His tactic was to buy stakes in these butchering firms. In this way, local butchers would be able to remain independent while becoming distribution agents for G.F. Swift, handling Swift's dressed beef on a commission or consignment basis (Yeager, 1981: 61). He used this strategy of alliances to build branches and secure larger sales volumes. Consequently, the early expansion of branch houses in the Swift network came from these consignment arrangements with existing wholesale butchers. More than mere conduits for sales, these relationships built by Swift represented a concerted effort to stem potential opposition from butchers in New England to his expansion plans. Such opposition, however, was not long in coming.

The hostility of Eastern wholesale butchers to Swift stemmed from fear of being out-competed by the new product and ultimately displaced. By slaughtering in Chicago and avoiding freight charges of shipping live cattle, Swift was able to sell dressed beef from 75 cents to one dollar cheaper per 100 pounds in New York or Boston than butchers who slaughtered rail-shipped animals (Yeager, 1981: 62; Clemen, 1923: 235). This differential provided Swift with a cost advantage over most Eastern slaughterers of 3-5 percent for beef of equal quality. "You can ship about two cars and a half of live stock in one car as dressed product," explained Albert McCurdy, a livestock commission merchant at the Chicago stockyards, "so that the cost of transportation is greater on the live stock than it is on the dressed product in proportion" (U.S. Senate, 1890: 239). Although Swift's dressed beef business was not profitable at the outset of establishing his branch system -- he had high fixed costs initially for rail cars, and warehouses with cooling facilities – Swift was determined to maintain a pricing advantage over these competitors and endure possible losses in much the same way that modern firms use pricing to gain market share. Such price-cutting, however, was not only aimed at securing customers. Swift wanted to convince butchers of the "wisdom" in joining him in the dressed beef trade. While some of these

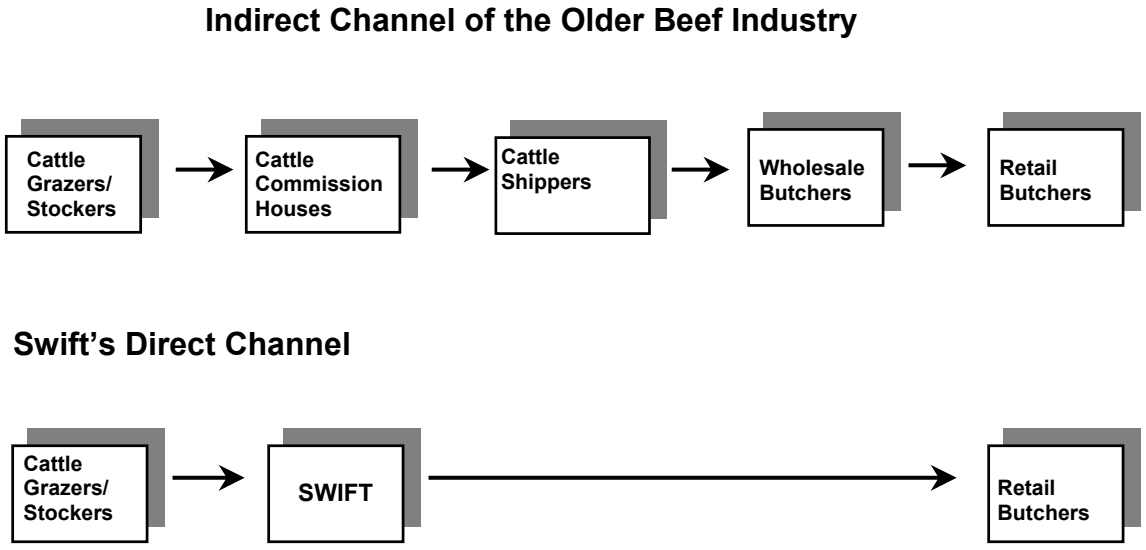
butchers joined Swift, on occasion, his tactics, in the face of resistance, were combative and ruthless.[9] Yet, even wholesale butchers with a more open approach to doing business with Swift were reluctant to handle the product because they were unwilling to make necessary investments in refrigerated warehouses for storing the dressed beef. Such butchering firms, while not actively opposed to the new product, rebuffed Swift's overtures because they refused to pay what Swift regarded as a fair price for dressed beef, fearing that the product, in the absence of refrigeration, would spoil before they could sell it. Their reluctance and incapacity to handle dressed beef, and the concerns that they harbored about being undersold by the new product and out-competed, turned most wholesale butchers into active opponents of Swift.

It was thus the incapacity of, and opposition from this Eastern wholesale network that eventually compelled Swift to bypass existing outlets of meat distribution and begin setting up his own independent branch houses. This network of branch distribution, in turn, enabled Swift not only to outcompete and eventually subdue opposition from local Eastern wholesale butchers. As the competitive superiority of Swift's system became apparent, other beef processors took notice. As a result, the branch house business model of Swift began to grow and diffuse to other firms.

[9]Fitchburg, Massachusetts provides a revealing example. Unable to convince the leading meat wholesaler of Lowe and Sons to distribute his beef, Swift set up one of his first branch warehouses in Fitchburg and used this branch to undercut Lowe and supply the town with dressed beef. When Lowe finally capitulated, Swift hired him to manage the Fitchburg branch (Swift, 1927: 70-71).

Figure IV-1

SCHEMATIC OUTLINE OF BEEF CHANNELS



Network Expansion and Diffusion

By 1880, Swift was operating twelve branches in New England. Two years later, Swift opened its first independent branch house in New York City, an event announced in an approving editorial of the period in *Harper's Weekly*. Editors at *Harper's* noted how other cities had benefited from the dressed beef trade, and went on to describe the good fortunes of New York in gaining access to the lower prices of the dressed beef operators. The article concluded by marveling at how a side of beef leaving Swift's plant in Chicago was hung on a railway hook, transferred to a refrigerated rail car, and pushed into the freezer of the branch house when it arrived in New York, "without being removed from the hook on which it was hung when killed" (*Harpers Weekly*, October 21, 1882: 663).

During the 1880s, as Swift's system of long distance dressed beef shipments emerged as an increasingly compelling business model, two competitive outcomes worked in tandem to change the structure of the industry. One outcome focused on the growth of Swift in relation to other meat packing firms. As a result of its branch house system, Swift broke into the top ranks of the industry. By 1884 after only six years in operation as a slaughterer, Swift had become the second largest meat packing firm in the U.S. Only Armour was larger. Secondly, and perhaps more significantly, with the ascent of Swift among the ranks of meatpacking firms, other packers began to imitate key elements of Swift's production and distribution network. The most decisive element in this process of imitation was Swift's branch house system. P.D. Armour himself, in testimony before the Senate Committee of 1890, conceded that his firm, along with others in the trade, had essentially learned the large-scale dressed beef business from Swift (U.S Senate, 1890: 432). In effect, Swift's branch house innovation was undergoing a process of diffusion to competitors.[10] At the same time, this innovation was defining a new set of standards for entry and competition within the meat packing industry. Nevertheless, despite this diffusion process, Swift retained certain advantages as the "first mover" of this process. Armour, the most powerful rival of Swift, did not open its first branch house until 1884. By that time, Swift was operating 43 branches in a continuing effort to build a national distribution system (Yeager, 1987: 63).

[10]The firm of Botsford is instructive on this point about the diffusion of innovation. Henry Botsford, it is reported, sent a circular to the directors of his company in the early 1880s imploring them to consider establishing a branch house distribution system much like that of Swift, warning them of the consequences if they failed to heed his words. The directors, however, decided against it. Botsfords's prediction came true. Although one of the larger firms in 1878-1880, Botsford, as well as others, disappeared from the top ranks of Chicago meat packers by 1884 (Table IV-6). On the story of Botsford see Clemen, 1923: 409.

Table IV-4

Chicago Meatpacking Firms Ranked by Size

1878		**1884**	
Rank	Firm	Rank	Firm
1	Chicago Packing	1	Armour
2	Armour	**2**	**G.F. Swift**
3	Fowler Bros.	3	G.H. Hammond
4	S.A. Ricker	4	Anglo-American
5	G.H. Hammond	5	Libby, McNeil & Libby
6	Tobey & Booth	6	Fairbank Canning
7	Davies, Atkinson & Co.	7	Chicago Packing
8	Allerton	8	B.F. Murphy Packing
9	Botsford & Co.	9	Hately Bros.
10	Chapin & Cudahy	10	Tobey & Booth

Note: Rankings based on number of animals slaughtered and revenue generated from slaughtered animals.
Source: Chicago Board of Trade, *Annual Report* (1879, 1885); Yeager, 1981: 64.

Table IV-5

Branch House Expansion of Swift and Major Firms

Cumulative # of Branch Houses

Year	**Swift**	Armour	Morris	S & S	Cudahy	All firms
1878	**2**	--	--	--	--	2
1880	**12**	--	--	--	--	12
1884	**43**	2	--	--	--	45
1888	**67***	10	9	2	1	89
1895	**138**	125	61	31	28	383
1899	**189**	152	87	42	47	517

*Estimate (precise figure for Swift missing that year)
Source: G.F. Swift & Company, Branch House Dividends 1895, Swift & Company Records, Box 4, Chicago Historical Society; Yeager, 1981: 63; Bureau of Corporations, 1905: 32.

Map IV-2

Dressed Beef Network of G.F. Swift (1880)

Perhaps the most decisive measure of change in the industry stemming from this process of innovation and diffusion is the relative shift that occurred in shipments of live cattle and dressed beef during the crucial transition years of 1878-1887. During this period, dressed beef by 1887 had assumed a dominant role in the beef trade, completely overwhelming shipments of live cattle (Table IV-7). With the exception of New York City, which maintained a thriving kosher industry, demand for beef in the East was being supplied not by live cattle, but instead by beef slaughtered in Chicago. The impact of the new dressed beef product, and business model of Swift for distributing this product through branch houses, was transforming how beef was being produced and sold. In an environment where the cattle and beef business was expanding and where beef consumption was on the rise, it was beef slaughtered in Chicago and shipped long distance that was beginning to dominate the character of the trade.

Table IV-6

Number of Cattle Shipped Live and as Dressed Beef *

Year	Number Received	Number Shipped Live	Number Shipped Dressed	% Shipped Dressed
1878	1,083,068	669,490	413,578	38 %
1879	1,215,732	692,061	523,671	43 %
1880	1,382,477	833,835	548,642	40 %
1881	1,547,498	880,853	666,645	43 %
1882	1,607,495	820,586	786,909	49 %
1883	1,909,167	841,136	1,068,031	56 %
1884	1,870,050	661,127	1,208,923	64 %
1885	1,964,018	619,818	1,354,200	69 %
1886	2,015,190	570,705	1,444,485	72%
1887	2,447,867	605,812	1,832,055	75 %

* Shipped from Chicago
Source: U.S Senate, 1890: 3.

Table IV-7

Shipments* of Live Cattle and Dressed Beef to Major Markets from Chicago (1880-1885)

Destination	Product	1880	1881	1882	1883	1884	1885
Boston	Live Cattle	819	962	563	757	548	399
	Dressed Beef	10	144	187	291	296	377
New England	Live Cattle	451	120	11	10	11	26
	Dressed Beef	208	292	386	529	530	603
New York City	Live Cattle	2222	2653	2573	2388	1917	1822
	Dressed Beef	1	--	38	231	327	452
New York State	Live Cattle	396	229	218	145	170	73
	Dressed Beef	--	--	9	166	246	255

* Hundreds of Tons
Source: Yeager, 1981: 69.

Equally profound was the way these transformations reshaped the craft of butchering, and the lives of individuals dependent on this trade. Gradually, during the course of the 1880s, as Swift's business system spread and other packers established their own branch house networks, local slaughtering of cattle by wholesale butchers became an historical relic. In testimony before the Senate Committee of 1890 on the meat packing industry, Mr. Levi Samuels, a wholesale butcher from New York, provided a graphic description of this historical evolution (U.S. Senate, 1890: 118-119).

Q. [Senator Vest] What has been the effect of the dressed beef business upon the local butchers?
A. [Samuels] In every section of the country, in nearly every small town, it has had the effect of completely stopping the slaughter of cattle by butchers....
Q. How do they [local butchers] operate now?
A. Now the butchers, as a class, purchase Western dressed beef.
Q. Suppose they do not choose to purchase the dressed beef, what is the result then?
A. There is nothing else for them to purchase.
Q. When you speak of Western people of course you do not mean all of us, but you refer to the Chicago people?
A. I mean to say the dressed beef men. They sold their beef at a very much lower rate than the butcher could buy the cattle and produce the beef....
Q. In other words, they crushed out the business of the local butchers and then put their own dressed beef on the market?
A. They crushed it out with their dressed beef.
Q. Do you know of any specific instances where that has been done?
A. Where it has not been done is the exception.

In only a decade, the innovation of dressed beef had made local butchers such as Levi Samuels historical casualties. Many lost their livelihood as butchers. "Very few hold on [to the trade]" explained Mr. L. Leonard to the Senate Committee (U.S. Senate, 1890: 97). Although some former butchers were drawn into the new slaughtering plants as part of a highly skilled "butcher aristocracy," their presence was dwarfed by the number of semi-skilled and unskilled workers in the cattle killing gangs (Commons, 1904: 3). From this process of stratification on the one hand and deskilling on the other, emerged a new type of "butcher workman," transformed into an industrial laborer (Brody, 1964; Horowitz, 1997). Where at one time a skilled butcher killed and dressed an entire animal, a newly created division of labor in the slaughtering plants turned a cow or steer into a detailed "map" apportioning to each worker a tiny portion of the total cutting operation (Commons, 1904: 4; Brody, 1964: 4). "Skill has become specialized to fit the anatomy," observed economist John Commons in 1904 (Commons, 1904: 4). There were for example 78 different occupations in the beef killing gangs at the Chicago plants by 1904 (Bureau of Corporations, 1905: 17-18). During this period of working class formation in meatpacking, the number of wage earners in slaughtering plants increased from roughly 8000 in 1870 to 70,000 by the turn of the century (Horowitz, 1997: 17). In effect, butchering became associated with a new identity as part of a growing industrial working class.

As Swift and the other large packing firms responsible for these changes became increasingly dominant, the meat packing industry itself assumed a different role in the industrial structure of the U.S. economy. Little more than a decent sized industry in 1870, meat packing grew to a position of premier rank alongside other industries in the U.S. in 1900. Only the iron and steel industry was larger.

Table IV-8

Rank of Manufacturing Industries by $ Value of Output

1870			1900		
Rank	Industry	Output ($ millions)	Rank	Industry	Output ($ millions)
1	Flour Milling	$ 445.0	1	Iron & Steel	$803.9
2	Textiles	$ 380.9	**2**	**Meatpacking**	**790.3**
3	Lumber	252.3		Pork	321.3
4	Iron & Steel	199.5		Beef	230.0
5	Clothing	116.5		Misc.	239.0
6	Leather Goods	157.2	3	Machine Shop Products	644.9
7	Machinery	138.5	4	Textiles	640.4
8	Sugar Refining	119.6	5	Clothing	622.9
9	Tobacco Products	71.8	6	Lumber	566.6
10	Furniture	69.1	7	Flour Milling	560.7
11	**Meat Packing**	**62.1**	8	Industrial Machinery	385.0
	Pork	56.4	9	Boots & Shoes	359.9
	Beef	1.9	10	Publishing	347.1
	Misc.	3.8	11	Tobacco Products	264.0

Source: Ninth Census Volume III, The Statistics of the Wealth and Industry of the United States (Washington: Government Printing Office, 1872), Table VIII(c), p. 458; Abstract of the Twelfth Census, Table 154 (pp. 302-321); Shaw, Table I 1, p. 52.

Swift and the firms involved in this transformation operated national organizations. These organizations redefined patterns of development in the economy of the late nineteenth century, creating created a new geography of profit making. At the core of this geography was a very different fusion of spread and concentration.

The Geography of Operational and Organizational Innovation

With its network approaching seventy branch houses by the late 1880s, Swift was forced to seek additional slaughtering capacity in order to keep these marketing outlets supplied. After initially leasing slaughtering facilities, and then purchasing its own plant at the Chicago Stockyards in 1880, Swift opened its first expansion site for slaughtering at the Kansas City Stockyards in 1888 (Unfer, 1951: 57-59). Other disassembly sites soon followed. Swift opened plants in Omaha (1890), East St. Louis (1892), St. Joseph (1896), St. Paul (1898), and Ft. Worth (1902) as the number of its branch houses climbed above one

hundred by the mid-1890s and close to two hundred by the turn of the century (Bureau of Corporations, 1905: 32).[11]

A mutually reinforcing relationship between branch house proliferation and slaughtering capacity drove this growth. Nevertheless, in accounting for the catalyst in this expansion process, production and distribution were not equal. The mass production economies in slaughtering, made famous in *The Jungle* of Upton Sinclair (1906), derived fundamentally from the innovation in distribution pioneered by Swift. This marketing revolution, that created a more direct route from producer to customer, made slaughtering a relatively small part of the beef business in comparison to distribution (Walker, 1905: 493). "Essentially the packer is not engaged in production, but in distribution," read a contemporary account of the meat packing business.

> The plant operations may therefore be looked on simply as processes preparatory to the distribution of meat and by-products in a more economical way than that afforded by the earlier method of sending the live animals to the consuming centers (quoted in Aduddell and Cain, 1973: 97).

As Swift's branch house and slaughtering network expanded during the 1880s and 1890s, the capital value of the Company escalated dramatically. Incorporated in 1885 with a capital value of $300,000, Swift expanded decisively during the next two decades. By 1904 the Company had grown over one hundredfold amassing a capital value of $35 million and generating revenues of $200 million. At that time, it was one of the fifteen largest industrial corporations in the U.S. Perhaps more significantly, in that year Swift emerged as the largest meat packing concern in the United States, surpassing Armour in terms of revenues, slaughtering and distribution capacity, and market capitalization. Indeed, by 1904, when the first great wave of merger mania in the U.S. had come to a close, G.F. Swift & Company was the largest meat packing firm in the world.

[11]Swift also owned an additional sixty branch houses in foreign countries, mostly England and Germany where it distributed dressed beef shipped on special refrigerated cargo ships (Bureau of Corporations, 1905: 32).

Table IV-9

Capital Value / Sales of G.F. Swift & Company
($ millions)

	1885	1886	1890	1899	1902	1904
CV	$.3	$3.0	$7.5	$20.0	$25.0	$35.0
Sales	$1.7	$17.1	$44.8	$103.6	$152.2	$200.0

Note: Except for 1904, sales figures are estimates based upon backward projections from $200 million sales figure supplied by Swift for 1904, and relationship between capital value and sales.
Source: Bureau of Corporations, 1905: 286; Federal Trade Commission, 1919: Pt. 4, pp. 25-27.

Table IV-10

Rank of Individual Firms Comprising The Beef Trust
1903

Rank	Firm	Cattle Slaughtered	Hogs Slaughtered	Market Capitalization
1	**G.F. Swift**	**1,578,215**	**4,079,756**	**$35,000,000**
2	Armour	1,255,366	3,451,892	27,500,000
3	National Packing	848,884	3,101,425	15,000,000
4	Morris/Fairbank	761,179	1,247,393	6,000,000
5	Cudahy Packing	469,228	1,347,675	7,500,000
6	Schwarzchild & Sulzberger (S & S)	559,200	623,598	4,373,400

Source: Bureau of Corporations, 1905: xix-xx.

Expansion and Control

This expansion in the Swift production and distribution organization, however, did not occur in arbitrary locations. The pattern of Swift's expansion in slaughtering facilities paralleled the opening of new stockyard companies west of the Mississippi. In this process, Swift, as well as other large packers, were both followers and shapers of a new slaughtering geography.

To some extent, these western stockyards where Swift migrated, began to compete with Chicago as cattle markets, although Chicago maintained an overwhelming dominance as a cattle center well past

the turn of the century. Nevertheless, Swift, and the packers comprising the Dressed Beef Trust, expanded into these growing cattle markets to gain control over access to sources of cattle supply for their growing national production and distribution networks. At their disposal in accomplishing this aim was their power as dominant firms.

In their role as large cattle purchasers, Swift and the Beef Trust came to control the practice of cattle buying and selling at the stockyards. By purchasing in volume, Swift and the other large packers essentially subverted the independent role of the cattle commission business which had formerly acted as consignees for grazers and feeders, and facilitated the transfer of cattle from producers to buyers at the stockyard sites. With opportunities to dispose of large consignments with Swift and the Beef Trust, these commission merchants effectively became the unofficial purchasing agents at the stockyards for Swift and the largest firms. Two once-prominent groups of actors in the beef trade were at a particular disadvantage in this system. Cattle raisers suffered in this system from low prices Swift was able to command, while smaller independent cattle buyers and shippers were largely excluded from access to the best cattle supplies. In this regard, the remarks of Brewster Cameron, a cattle grazer and shipper, at the Senate Committee of 1890 are particularly instructive. When asked by Senator Vest, the Committee Chair, how the cattle business is conducted in Chicago, Cameron replied that: "The cattle are disposed of chiefly to what is known as the Dressed Beef Trust" (U.S. Senate, 1890: 81). "The butchers of the country, the feeders, and all other buyers," Cameron continued, "do not have a free opportunity to buy in competition with the Big Four." Samuel Cady, a cattle commission merchant at the Chicago Stockyards echoed this theme when asked if there had been any change in the business of buying and selling cattle the last few years. "We do not have near as many buyers as we used to," explained Cady (U.S. Senate, 1890: 212). The reason? "I should express it something like the old expression that 'the big fish are eating up the little ones.'"

In addition to these informal mechanisms of control based on size, Swift and the other large firms benefited from more overt sources of power in the form of ownership interests in the stockyard companies themselves. Packers secured such ownership stakes in the stockyards in two related ways. The primary

mechanism was for stockyard companies to offer stockholding as incentives to the packing firms to set up a plant at a particular stockyard site. Omaha, St. Louis, St. Paul, and Ft. Worth extended such inducements to Swift. Similarly, Kansas City asked Swift to make an investment in the Kansas City Stockyard Company in exchange for subsidies such as free land for the Swift slaughtering facility. In both cases, ownership in the stockyard companies either through subsidy or investment, provided Swift and the large firms with opportunities to gain greater control of the cattle markets at stockyard locations. While the ownership stakes themselves were relatively small (Bureau of Corporations, 1905: 288), they nevertheless provided Swift with access to the governance authority at the stockyards that established systems of rulemaking for buying and selling livestock (Aduddell and Cain, 1973: 106-107). In this way, Swift and the large packing firms transformed the stockyards from competitive cattle markets, into highly controlled supply points for their national production and distribution systems.

Map IV-3

Expansion of G.F. Swift Production Facilities

By expanding into these new stockyard locations, Swift influenced the development of a new geographical trend in slaughtering activity while changing the relationships by which cattle supplies were transferred from producers to the new slaughtering establishments.

By the turn of the century, as a result of these expansion decisions by Swift and others, slaughtering had completed an ongoing migration to Illinois and states nearby in a pattern of regional concentration. In addition, slaughtering itself became highly localized. Chicago was the most dominant center followed by Kansas City, Omaha, and St. Joseph, cities where Swift expanded its operations.

These concentrations of slaughtering represented the formation of what Alfred Marshall (1890) described as industrial districts. In these places, Swift and other firms profited not only from internal economies of scale based on high-volume slaughtering. Swift benefited from what Marshall termed, external scale economies deriving from place-based proximity to sources of supply, concentrations of labor and skill, and access to technical knowledge specific to the trade. Industrial districts of slaughtering and dispersed nodes of distribution thus co-existed in this new pattern of profitmaking.

Anatomy of the New Geography

This new pattern of concentration for the slaughtering component of the meat packing business replaced an older, far less concentrated location pattern for slaughtering. Although this older pattern included tendencies of both geographical concentration and decentralized spread, it was the latter that prevailed in the balance between the two. This older pattern of weak concentration and strong decentralization was based upon two earlier attributes of the meat packing business.

One attribute, marked by the overwhelming primacy of pork in the meat packing business, did, in fact, create places of concentration where pork was slaughtered (Walsh, 1978; 1982). Yet, despite the concentration of slaughtering in places such as Cincinnati -- dubbed “Porkopolis” in 1850 -- pork slaughtering and packing also occurred in numerous river towns especially in the Ohio River Valley and central Illinois, as well as numerous towns in the East. In effect, while there was concentration in pork slaughtering, a highly decentralized structure of pork packing towns, along with the slaughtering and

curing of pork on numerous farms, acted as an offset to this tendency.

The second characteristic that had strengthened the tendencies of geographical spread prior to the advent of dressed beef, stemmed from the slaughtering of cattle in virtually all locales in the country. Because cattle slaughter and beef consumption had to occur in close proximity, the slaughtering of cattle was highly localized and geographically dispersed. This second attribute acted to decentralize slaughtering even more profoundly than pork packing and slaughtering, spreading it more uniformly throughout the country.

Together these two elements created a geography of slaughtering marked more by decentralization than concentration. In effect, while there *was* concentration in slaughtering during the early period of meat packing, the widespread slaughtering of animals throughout numerous towns and farms acted as powerful countervailing force. Consequently, the pattern of concentration and spread for slaughtering that prevailed prior to the ascendancy of dressed beef, was different than the geography of concentration and spread exhibited by the industry beginning in the 1880s when dressed beef emerged as a dominant new product and business model.

From 1860-1900, as slaughtering migrated into the nation's midsection, the map of slaughtering activity changed dramatically (Map IV-4). This transformation is marked by the shift of slaughtering from its former base in Cincinnati and other river towns that had produced pork, and from numerous local farms and local abattoirs that had slaughtered cattle for beef consumption. This industrial structure had made New York with the largest population, the largest slaughtering state. At the same time, the largest five slaughtering states accounted for 33% of total slaughtering activity. By 1900, slaughtering industrial districts in Chicago, Kansas City, Omaha, and St. Joseph replaced this older, dispersed geography. One state, Illinois, and one city, Chicago were overwhelmingly dominant, while the top five states in 1900 were doing close to three quarters of all the slaughtering in the country (Table IV-11).

What had occurred during this period to change the geography of meat packing activity so profoundly was the ascendancy of *distribution* as the source of territorial spread in the industry and the decisive element of the meat packing business. Deriving from the rail and telegraph revolution and the

innovation of Swift, branch house distribution networks, and the logistics of sending dressed beef to branch houses located long distances from the places of slaughter, are what elongated and spread the activity of meat packing. As Swift expanded its network of branch houses during the 1880s and 1890s, and as it established additional slaughtering facilities outside Chicago to supply these branches, the Company began to shape the foundations for a new geography of profit making in meat packing. Alongside the concentrated pattern of slaughter in industrial districts, the elongated activity of distribution through branch houses created the linkages for a new geography of concentration and spread. At the foundation of this concentrated and elongated geography, however, were innovations in business organization, and operational routines deriving from a very different relationship – a more direct relationship -- between Swift as a manufacturer, and its customers.

Map IV-4

Top 5 Slaughtering States 1860 / 1900

Table IV-11

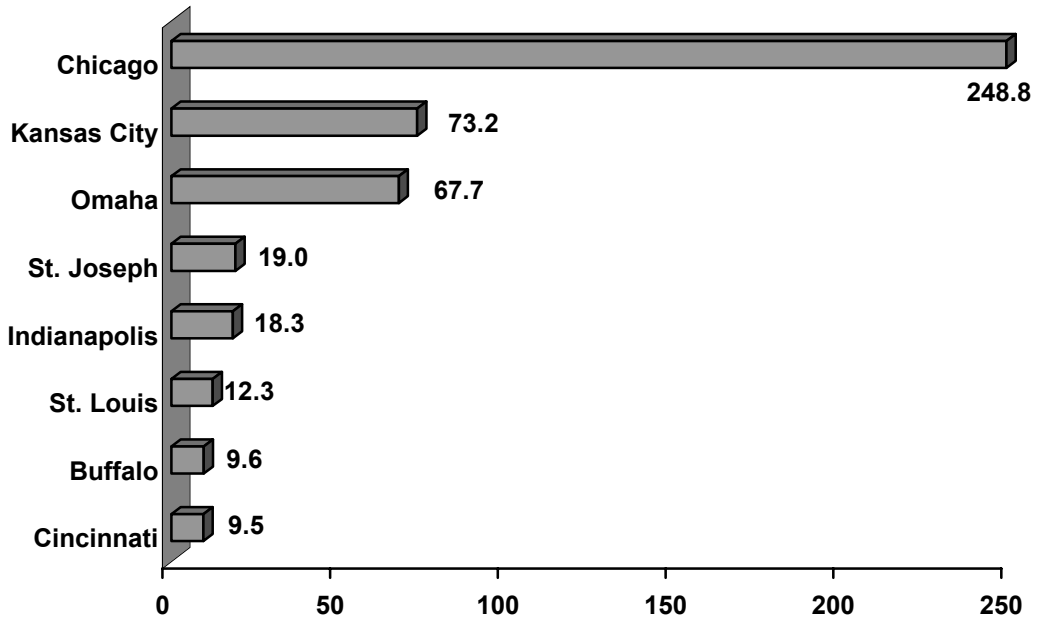
Largest Slaughtering States
By $ Value (millions) of Animals Slaughtered
and % of Total Slaughtering

1860			**1900**		
Rank / State	$ Value	% of Total Slaughtering	Rank / State	$ Value	% of Total Slaughtering
1 New York	$15.8	**7.4%**	1 Illinois	$279.8	**40.1%**
2 Illinois	$15.0	**7.0%**	2 Kansas	$ 76.8	**11.0%**
3 Ohio	$14.7	**6.9%**	3 Nebraska	$ 71.0	**10.1%**
4 Pennsylvania	$13.4	**6.3%**	4 Indiana	$ 42.9	**6.2%**
5 Tennessee	$12.4	**5.8%**	5 Missouri	$ 42.2	**6.0%**
Top 5		**33.4%**	**Top 5**		**73.4%**

Source: Eighth Census, Agriculture of the United States in 1860, pp. 186-187.
Twelfth Census, Manufactures, Part I, p. ccvii.

Chart IV-1

Slaughtering and Meatpacking for 8 Cities (1900)
By $ Value of Output (millions)



Source: 12th Census Manufactures, Part 1, page ccvii

Map IV-5

Dressed Beef Network of G.F. Swift (1903)

The Direct System of Operations

The network of branch houses and slaughtering facilities built by Swift represented a *direct* system of producing and marketing (Rhoades, 1929: 262). Fresh beef produced in high volume was sold directly by Swift to retail butchers without the involvement of wholesale intermediaries who had formerly assumed an integral role in the process. This phenomenon of disintermediation gave the direct system of Swift its innovative character. In bridging the territorial separation of slaughtering facilities and branch distribution outlets, the system of direct marketing eliminated an historically-entrenched group of wholesalers in the cattle and beef business (Porter and Livesay, 1971: 168-173). Swift had essentially learned how to bypass these actors, and capture that portion of the value that had formerly accrued to them in their role of facilitating the transfer of beef from cattle producers to consumers.

In addition to disintermediation, Swift's system of direct marketing had four other key operational attributes. Firstly, Swift's system was a *pull* system of procurement, production, and selling. In contrast to supply-driven systems in which goods are produced and then "pushed" into various market channels for final sale, Swift's system relied on actual demand in the form of orders from retail butchers to ignite the circuit of procurement, production, and sale. These orders for certain cuts, grades, and quantities from retail butchers served as the basis for "pulling" cattle supplies through procurement, disassembly, and sale at branch houses. In this sense, Swift's pull system operated as an early type of just-in-time system. Secondly, Swift's system operated on the basis of high volume throughput and was dependent upon such volumes for profitability. In this sense, it sought economies from the compression of time in the circuit of procurement, production and final sale, compression measured perhaps most dramatically by the ninety seconds it took to fell, slaughter, decapitate, and run to bleed a head of cattle (U.S. Department of Agriculture, 1889: 365). Thirdly, because actual orders served as the catalyst for drawing raw materials, semi-finished sides, and finished cuts through the network, the pull system incorporated elements of *customization*. While it is important not to exaggerate this element, it is also critical to recognize how the different grades and cuts of beef ordered by retail butchers became part of a high volume procurement and production system driven by the specific needs of retail customers. "In the

marketing of beef there is the widest difference with regard to the character of the pieces sold" noted the Bureau of Corporations. "A large proportion of the carcasses are sold as sides, but many retail dealers desire special parts…cut in a variety of ways" (Bureau of Corporations, 1905: 21). Almost paradoxically, the highly standardized nature of the product -- its capacity to be broken down into standard grades, cuts, and sizes -- created parameters for both high volumes and customization. Finally, this custom-direct, pull system relied upon an intricate process of *supply and demand balancing* in order to function. Demand and supply flows of product between the different branch houses, stockyard sites, and disassembly factories had to be constantly modulated and adjusted as conditions changed.

Much of what drove these three operational, process-oriented attributes was the time sensitive nature of Swift's product. Dressed beef was a perishable commodity. With a limited shelf life, dressed beef posed its most formidable set of production and distribution challenges with respect to time. Owing to the geographical separation of slaughter and sale, however, the issue of time was inseparable from the issue of distance. Compressing time and bridging distance were therefore the two most significant operational obstacles facing Swift. Circumscribed by this interrelated issue of time and distance, the direct pull system of Swift was dependent upon instantaneous communications for balancing supply and demand in close to real time, and rapid transportation for moving product over distance through the network. Telegraphic information and rail transportation provided the critical linkages in this highly innovative, direct pull system. The network of Swift was actually an intricate web of telegraphic information flows and rail-based product flows linking procurement at stockyards, disassembly at slaughtering facilities, and order intake along with final sales at branch houses.

In order to coordinate the production and distribution of its perishable product, Swift had to develop a central storehouse of information for balancing supply and demand flows of product between branch houses, stockyard supply sites, and disassembly factories in close to real time. Orders from customers had to be coordinated with the securing of cattle supplies, the slaughtering of cattle at disassembly sites, and shipments of dressed beef to branch houses for final sale. This process of supply

and demand balancing in highly compressed time frames emerged as one of the most critical core competencies of the Company.

The telegraph provided the communications and information infrastructure for Swift in establishing this core capability. In describing the critical operational elements common to Swift and the largest packing firms, the Bureau of Corporations made specific reference to the challenge of supplying a customized and perishable product in high volume, and balancing inventories of this product through telegraphic communication. "Differences in quality of animals and of their products are so great" explained the Bureau, "that the closest supervision of the central office is necessary" in order to ensure the balancing of appropriate inventory in the network. "The central office is in constant telegraphic correspondence with the distributing houses," the Bureau wrote in its Report, "with a view to adjusting the supply of meat and the prices as nearly as possible to the demand" (Bureau of Corporations, 1905: 21).

Operationally, the circuit of procurement, production and sale in Swift's direct pull system began with the order intake process and concluded with final sale at branch houses. These branch houses telegraphed orders for quantities on a daily basis to the Company's central office in Chicago. Depending upon the location of the branch, these orders were then conveyed by the central office to Swift's seven slaughtering locations. Each branch house was normally assigned to a particular slaughtering plant upon which to draw product based on proximity to stockyard and slaughtering sites. Generally, the communication from branch houses was routed through the central office in Chicago (Chandler, 1988: 53). At times, however, branches communicated their needs directly to the slaughtering plant to which they were assigned. In addition to refrigerated storage space for receiving dressed sides, each branch house included a sales office, and a sales staff that procured orders from, and sold the dressed beef to retail butchers, grocers, and other retail food outlets (Chandler, 1977: 300). This sales staff contacted local butchers, conferred with them regarding their needs, and telegraphed orders to headquarters or assigned slaughtering plants either at the end or very beginning of the day.

After receiving orders from its branch houses, Swift's central office telegraphed instructions to its cattle buyers at stockyards as to the needs of the Company in terms of breeds, grades, and quantities on any given day (Bureau of Corporations, 1905: 21). Cattle generally arrived from the ranges by train at night where they would be held in stockyard pens. Procurement took place in the early morning with the aim of transferring cattle by rail spur from pens where they would be purchased, to the killing floors of the plants no later than 11 a.m.[12] From the slaughtering facilities, sides of dressed beef were shipped by rail to designated branch houses where they were transferred to the chilled storage area. There, the dressed sides were matched with orders and further butchered by Swift employees in accordance with the orders received. Retailers would then call at the branch house and pick up their goods.

As cattle moved from stockyards to the (dis)assembly line in the various slaughtering facilities, the final branch house destination of the various sides and parts was already known (Chandler, 1988: 237). Such a system was information-intensive and inconceivable without instantaneous communications provided by the telegraph. By the 1890s, the Company was spending $200,000 per year on telegraphic communications to keep inventories in its network balanced in close to real time between cattle purchases at stockyards, production at slaughtering facilities, and orders from branch houses (Bureau of Corporations, 1905: 207).

Critical relationships of spatial proximity involving branch houses, stockyard sites, and slaughtering facilities were also integral to the direct pull production and distribution network developed by Swift. In the first place, branch houses required convenient railroad facilities for receiving finished goods. Consequently, branch houses were located where switching capability from railroad trunk lines could be expedited (Rhodes, 1929: 270). Far more important, however, was the relationships between stockyard supply locations and slaughtering facilities. With its attributes of just-in-time procurement, driven by demand pull in real time, the dressed beef business avoided the buildup of cattle raw material

[12]Swift and the other large packers did not want their slaughtering gangs to be kept idle by lack of supplies. Workers generally reported at 7 a.m. but would be sent home without pay if cattle did not reach the killing floors by 9:00 or 10:00 a.m. and told to return two or three hours later (Commons, 1904). By 1904 the Amalgamated Meat Cutters and Butcher Workmen, after threatening to strike, successfully negotiated pay for hours spent waiting for cattle to arrive from the yards (Brody, 1964: 13-33).

inventories. Stockyards essentially assumed the responsibility -- and costs -- of holding inventories of supplies for the dressed beef industry. A well-developed system, built over time, ensured that inventories of cattle supplies would be available in these locations to Swift and the dressed firms for disassembly. In this way, inventories of cattle raw materials, which Swift essentially controlled without having to bear the carrying costs, and disassembly of these raw materials occurred in spatially adjacent locations.

This direct pull system, with its attributes of just-in-time procurement, product customization in high volume, and supply and demand balancing, redefined conditions for entry and competition in the business of meat packing. Firms aiming to compete in the industry on a national level, were compelled to imitate these elements. Implementation of these operational innovations, in turn, meant deploying the technologies of the railroad and the telegraph in fundamentally new ways. It also entailed the creation of a far different type of business organization.

The Vertically-Integrated Organization

The scope of the Swift operation in terms of branch houses and slaughtering facilities, coupled with the system of direct distribution to retail butchers, created unprecedented challenges of management and control. Confronting Swift was the complexity -- and risk -- of coordinating the long distance flows of product and information between stockyards, slaughtering units, and branch houses, and between branch houses and final customers. One of the most significant outcomes of this challenge involved a profound transformation in the organizational structure of the firm. The innovation of Swift in slaughtering and selling in disparate locations was as much an organizational phenomenon as it was an operational and process-oriented set of changes.

The solution pioneered by Swift to address this challenge of operational control and management of risk was *vertical integration*. Swift gradually absorbed the range of geographically dispersed activities involved in the slaughter and sale of fresh beef within the boundaries of the Company. The vertically-integrated enterprise developed by Swift, though decentralized geographically, was highly centralized organizationally and operationally. Major departments -- procurement, disassembly, distribution, and

accounting -- functioned on the basis of instructions devised and communicated from headquarters in Chicago (Chandler, 1988: 53). The reason for such central control stemmed from the logistical challenges of managing the various steps in producing and distributing a highly perishable product.

In this process of organizational transformation, Swift assumed control over not only the operations most directly connected to cattle and beef processing. It incorporated a wide variety of ancillary but necessary steps into its own organization. This process of vertical integration represented an entirely new development in the history of American business enterprise (Chandler, 1977).

Map IV-6

Centralization / Decentralization in the Dressed Beef Network of Swift (1903)

Among the most notable of these ancillary operations was the Swift Refrigerator Transportation Company, which built refrigerated rail cars for the firm's dressed beef business (Bureau of Corporations, 1905: 287). Instead of assuming the risk of having to purchase refrigerated freight services from the railroads, Swift instead produced and operated its own refrigerated rail car fleet (Raff and Temin, 1991: 24-25). Similarly, rather than relying on the market to secure ice for cooling the refrigerator cars and branch houses, Swift became an ice manufacturer and distributor. It purchased ice harvesting rights on lakes all over Illinois and Wisconsin, sending ice harvesting gangs as far north as Green Bay during mild winters to ensure adequate supply (Unfer, 1950: 36). It built immense ice storage houses near harvesting facilities, and constructed icing stations along railroad routes to re-supply rail cars. Although ice was not a costly asset, the risk to Swift of being without it, as the largest single ice user in the country, was sufficient enough for the Company to assume control over this seemingly minor detail in the production and distribution of dressed beef (Swift, 1927: 191). Ice, in effect was an asset critically specific to Swift's business. Much like other assets specific to the operation, it became a source of organizational integration within the boundaries of the firm (Raff and Temin, 1991: 24-25).

Table IV-12

Output of Meat Products*
and Manufactured Ice ($ millions)

	1869	1879	1889	1899	1904	% Increase 1869-1904
Meat	75.2	249.9	477.8	634.2	704.4	937 %
Ice	.3	.5	4.8	13.4	24.4	974 %

* Includes fresh and cured beef and pork.
Source: Shaw, 1947: Tables II1 and II2.

As the dressed beef business expanded and assumed a more complex character, the Company became involved in business ventures that did not have a connection to the industry at the outset of Swift's branch house innovation. An example of such a business was the Swift Fertilizer Works,

established to make profits from the inedible byproducts of cattle. This business in the byproducts of meat compelled Swift to develop an industrial research business within the Company in the 1890s as the byproducts portion of the industry expanded to roughly the same size as the beef industry itself (Table IV-9). Animal rendered margarine was one of the breakthrough products resulting from such activities in research and development.[13] At the same time as it was moving into new activities, Swift intensified its dominance over aspects of the distribution process that had initially escaped its control. Swift created "peddler car routes" outside its primary branch house distribution outlets in large cities where, in these less urbanized areas, the Company sold dressed beef butchered into retail cuts directly to the public, bypassing local retail butchers (Bureau of Corporations, 1905: 30-32).

Finally, the relationship of Swift and the stockyards, mediated through stockholdings in the stockyard companies and other subsidies (see above), reveals how Swift was able to extend control over the critical element of cattle procurement without assuming the costs of owning an asset outright. This "functional integration" of the stockyards, and the assumption of control over cattle buying that resulted from such integration, enabled Swift to minimize one the greatest risks to its high volume direct pull system, that is, the ability to secure cattle raw materials. As a result of this relationship, sources of cattle supply at stockyards, while not formally integrated into Swift's operation, became in a practical sense, a part of the Swift enterprise.[14]

---

[13]Beginning in the 1890s, Swift moved toward the establishment of a professionally staffed full time research organization. Its first research lab dates from 1892 and was headed by W.D. Richardson who later became the first editor of the *Journal of Industrial Engineering*.

[14]Although Swift had integrated all of these steps in the fresh beef trade, the boundaries of the firm stopped short of backward integration into the actual raising of the livestock. Few incentives existed for owning the actual supply of cattle. As noted above, the concentrated power of Swift and other large packers enabled them to control terms of trade with the thousands of livestock producers (Walker, 1906: 492; Federal Trade Commission, 1919: 83). Such power ensured that the system of cattle sale established at the stockyards worked to the benefit of Swift. Commission houses had effectively come under complete domination of the large packing firms and took control of cattle shipped to stockyards by grazers and feeders, and then made the stock available to Swift et al. to the exclusion of smaller packers and cattle buyers (Senate Report, 1890: 131). Such a system of sale complemented the "subsidies" given by stockyard companies to packing firms for their investments in the stockyards, and provided Swift with animals at acceptable prices (Arnould, 1971: 22). Consequently Swift and other large packers chose to secure cattle supplies across a "market" rather than absorbing such transactions into their own corporate hierarchies. This market however, resembled a market in name only. Cattle markets at stockyards were characterized more by control mechanisms based on power rather than the so-called invisible hand.

The Company, in effect, sought control of the beef trade primarily through ownership of assets and creation of new businesses in a process of vertical integration. It also sought control over the beef business through mechanisms of market power and domination over terms of trade. Finally Swift used investment and mechanisms of rulemaking and governance when such mechanisms were economically viable and politically desirable as in the case of the stockyards. This control, both formal and informal, extended the geographical reach of Swift into every region of the country.

For Swift, there were several advantages in owning or controlling the adjacent steps in this high-volume production and distribution system (Aduddell and Cain, 1973: 98-99). First was the fact that the creation and capture of surplus value in this network was dependent upon high volumes and internal scale economies. Such internal economies of scale, in turn, were generated from a division of labor difficult to find in any other industry of the period that resulted in a slaughtering capacity of 2000-3000 cattle per day in the most productive plants (Commons, 1904: 3). Owning and controlling virtually the entire channel, from sources of supply, to slaughtering and distribution, possessed obvious advantages of certainty for organizing the steps needed to generate such levels of throughput. In this way, vertical integration and internal economies of scale were mutually reinforcing. Second was the fact that the branch system of marketing eliminated the profit of the traditional wholesalers and consignees in the beef industry. Such value, historically captured by intermediaries, now flowed instead to Swift. Thirdly, distribution and marketing was more efficient. As an integrated firm with its own centrally controlled procurement, production, and distribution network, Swift could match demand and supply of beef over a wider area and regulate product flows in accordance with shifting demand, supply, and price conditions. Derived from the telegraph technology, this power of information reinforced its power of control through ownership of assets. Finally, as the turnover of product accelerated owing to the highly organized branch system, and as demand and supply became more highly balanced, costs per unit of output were further reduced thereby reinforcing the scale economies of high volumes.

In the system pioneered by Swift, innovation was the foundation of a reinforcing set of relationships between economies of scale, the division of labor, and the extent of the market. As it turned

out, however, the extent of the market was not a function of innovation and technology alone. The national markets created by the innovation of dressed beef also had a decidedly political dimension.

The Politics of the National Beef Market

By the mid 1880s vertical integration had become the standard for entry and competition in the meat packing industry. In 1887 five of these firms -- Swift, Armour, Hammond, Cudahy, Morris -- controlled 85% of the dressed beef trade, that is, the shipments of beef slaughtered at the major cattle markets of the Midwest and shipped long distance. Three years later with the addition of Schwarzschild & Sulzberger these firms controlled 90% of all dressed beef shipments. Although by 1903, these companies controlled only about one half of the beef supply in the entire country (owing to the survival of farm-slaughtered beef and the role of local butchers in small towns and agrarian areas), their share in large Eastern cities often exceeded 75% (Bureau of Corporations, 1905: xxi).

The system of centralized slaughter in Chicago and the national branch house distribution networks of the firms in this Beef Trust oligopoly established the operational and organizational standards for firms intent on competing for national markets. Nevertheless, even the smaller butchering firms that sold outside their immediate locality but not on a national scale, and had managed to survive the competitive pressures of the dressed beef oligopoly, began to adopt the organization and methods of the branch house system of production and marketing (Rhoades, 1929: 265). Yet, this transformation of the beef industry, in which the oligopoly of large-scale firms dominated, did not go unchallenged.

In the first place, resistance to the dressed beef trust emerged from the labor force in the large packing plants. In May of 1886, thousands of workers in the Chicago slaughtering plants, despite being unorganized, answered the call issued by the Federation of Organized Trades and Labor Unions for a general strike to secure an eight-hour workday (Brody, 1964: 13). Among packing firms, Gustavus Swift was recognized as a leader in breaking this strike of packinghouse workers (Swift, 1927: 181). When the action of May failed and the packers, at the behest of Swift along with Armour, restored the ten-hour day in the packing plants, two more strikes involving 9000 workers in Chicago, occurred in October of 1886.

Again, Swift was perhaps the most aggressive in hiring strikebreakers to cross picket lines during these actions. A second round of strike activity occurred in the summer of 1894 after packing companies, in the aftermath of the 1893 Depression, reduced workers' wages. Unlike the earlier actions, however, this strike was accompanied by the use of troops from Fort Sheridan near Chicago, authorized by President Grover Cleveland, to keep trainloads of dressed beef moving from the packing plants to branch houses. Owing to this use of force, this action by packing house workers also suffered defeat. Other strikes followed throughout the remainder of the 1890s. Though sporadic and generally unsuccessful, these uprisings exposed the conflict existing in the stockyards between workers and owners of the packing firms that continued throughout this initial cycle of packinghouse unionization (Brody, 1964: 13-33).

While the trade union impulse represented a powerful source of resistance to Swift and the dressed beef firms, a second source of resistance emerged among smaller wholesale butchers. In 1886, wholesale butchers in several states formed a trade association, the National Butchers' Protective Association. Its aim was to protect the livelihood of local butchers from the competitive encroachment of the large dressed beef firms. Taking advantage of still-existing sentiment against non-locally slaughtered beef, this organization campaigned vigorously to defend the markets of local butchers by seeking passage of state laws requiring local inspection of cattle prior to slaughter. So successful were their efforts that they were able to persuade lawmakers in Minnesota, Indiana, Colorado and Massachusetts to enact such state-level, pre-slaughter inspection laws of livestock. Under the provisions of these laws, animals would have to be inspected by state officials twenty-four hours prior to being butchered. Clearly protectionist in aim, the laws of these states were designed to block the interstate operations of Swift and other large packers, and insulate local butchers from the competition of dressed beef slaughtered in Chicago and shipped long distance.

The large dressed beef firms chose to ignore the laws instructing their local agents to invite arrest and conviction (McCurdy, 1978: 632). State authorities accordingly indicted the local sales agents of Swift and others. By 1890 the leading case*, Minnesota v. Barber* was under review by the U.S. Supreme Court. In its judgment, the Court concurred with the argument of Armour, the defendant in this case speaking for the large dressed beef firms, that the pre-inspection law was established as a form of

protection to the detriment of internal free trade. Furthermore, the Court held that such legislation represented a potential breach of the Commerce Clause of the Constitution. In the view of the Court, the Commerce Clause was intended by the Constitutional framers to create a unified national market. Finally, the Court concluded that if government had a responsibility to protect consumers against the dangers of tainted meat, as counsel for Minnesota had contended, another inspection remedy would have to be created other than state-sponsored inspection. The solution was federal inspection that preserved the idea of government regulation of the industry while at the same time maintaining the integrity of interstate trade and the idea of a national market (McCurdy, 1978: 643-648). The outcome was the passage by Congress in 1891 of the Federal Meat Inspection Act. This legislation placed a new regulatory burden upon the industry. At the same time, however, this legislation legitimized the long distance interstate traffic in dressed beef dominated by the large, vertically integrated dressed beef firms. The new legal and regulatory environment enabled Swift and the large packers to secure the national markets they had created from innovation deriving from the rail and telegraph revolution.

Yet, in legalizing the national markets of Swift and others, and upholding the sanctity of interstate commerce, the Supreme Court in the *Barber* Case, and national lawmakers through the Federal Meat Inspection legislation, gave new legitimacy to the importance of large-scale manufacturers (McCurdy, 1978: 648-649). In the process, Swift and the dressed beef firms, as vertically integrated manufacturers, became the source of a new problem for the Government. The issue was antitrust.

Swift and the dressed beef firms faced ongoing confrontation from Government in its role as a regulator of monopolies and trusts following passage of the Sherman Act in 1890. At least some of the political momentum for passage of the Act itself came from the Senate Committee Hearings on the Meat Industry (1890). Its conclusions set the tone for much of the government's antitrust activity involving Swift and the Beef Trust over the course of the next thirty years. According to the Committee, "the principal cause of the depression in the prices paid the cattle raiser, and of the remarkable fact that the cost of beef to the consumer is not decreased in proportion, comes from the artificial and abnormal centralization of markets, and the absolute control by a few operations thereby made possible." Other causes are also contributing factors, noted the Committee, "but so long as the combine at Chicago can

dominate the entire cattle interest of the country there will be the same result" (Senate Committee, 1890: 33).

Throughout the 1890s and the first years of the new century, Swift and its erstwhile competitors entered into a variety of pooling arrangements and price fixing schemes that became well publicized through journalistic exposes undertaken by the *New York Herald* and the *Chicago Tribune* (Gordon, 1984). These accounts compelled a newly formed government agency, the Bureau of Corporations, to pursue an antitrust investigation of the Beef Industry in 1904. Relying upon data supplied by the Beef Trust itself, the Report, issued the following year, concurred with the statements of the packers that no illegal monopolizing of the beef trade existed. This was only one in a long series of government investigations of the beef industry under the auspices of the Sherman Act.

The most famous decision in the government's lengthy battle against the beef industry -- and one that emphasizes why the these firms successfully evaded prosecution when the evidence against them appeared so overwhelming -- involved the firm of G.F. Swift. The case in question was the 1905 decision in *Swift & Co. v. United States* (Gordon, 1984: 244). In this Supreme Court case, the Court affirmed that a party's intent would subsequently be a material consideration in determining whether a combination constituted a restraint of interstate commerce (Gordon, 1984: 245). In practice, this ruling had a profound impact on the enforcement of antitrust legislation. It placed a burden upon the complaining party to prove that firms, in this case, Swift, intended to control terms of trade through illegal combination with other firms. Even under such rigid standards, however, Swift in this case, received a judgment against it. Nevertheless, the injunction issued against it by Justice Oliver Wendell Holmes was a "pyrrhic victory" for government (Yeager, 1983: 184). The decision allowed Swift and the dressed beef industry sufficient room to conduct their operations as vertically integrated and oligopolistic firms Although forced to confront government regulators, Swift had managed to prevail. Innovation pioneered by Swift had converged with politics in redefining the nature of the business enterprise and the territory where the enterprise could make profit.