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General Electric's 20th Century CEOs (Abridged)

General Electric's first CEO, Charles Coffin, was at the helm when Wall Street analysts decided in the mid-1890s to include GE as one of the 12 companies to constitute the first Dow Jones Industrial Average.¹ Over a century later, the Dow continues to be a barometer of the strength of the U.S. economy, but GE is the only original member remaining.² (See **Exhibit 1**—Dow Stocks.) Even though every decade of the twentieth century presented its own unique zeitgeist and combinations of social, political, technological, and macroeconomic change, GE's eight CEOs, from Coffin (1892–1912) to Jack Welch (1981–2000), were seemingly able to master the context of their times.³

Although many associate GE with Thomas Alva Edison, he actually had little to do with GE's long history of leadership and managerial success. While GE relied greatly on Edison's inventions, and some of the same Wall Street financial backers that Edison cultivated over the years, other individuals worked on research and managed the day-to-day business concerns after GE was founded.

In 1878, Edison created the light bulb, then followed that invention with another first: a coal-powered electrical generator which he used to illuminate a New York City block in 1882. That event sparked a series of new local electric utility companies that Edison formed with financial backing from Wall Street financier J. P. Morgan. In the late 1880s, these utilities were consolidated into Edison General Electric. Morgan and the other venture capitalists who backed Edison, including Jay Gould, the Vanderbilts, and Henry Villard, profited handsomely, as did Edison and Edison General Electric.⁴

A couple of years later, on April 15, 1892, Edison General Electric became the minor partner in a new corporation formed by its merger with the Thomson Houston Electric Company of Lynn, Massachusetts. Coffin, the president of Thomson Houston, ran GE from the start. This was a choice made by Morgan after a December 1891 meeting with Coffin; at the meeting, Coffin compared Thomson Houston's financial results with Edison's, showing that Coffin's company was better managed from a bottom-line perspective. Morgan agreed. With five million less in capitalization and 2,000 fewer employees, Thomson Houston's annual profits exceeded Edison's, \$2,700,000 to \$2,098,000, and generated a dividend return per share two times larger. (See Exhibit 2—Charles Coffin's One-Page Financial Summary Prepared for J. P. Morgan, December 1891.)

Playing second fiddle in this merger was a setback for Edison. A fierce competitor, Edison had trouble dealing with a merger between his firm, a champion of the Direct Current he discovered, and

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Thomson Houston, which specialized in Alternating Current.⁵ In 1891, Edison made one last try to discredit AC by advising the New York State Department of Correction that a criminal could be executed with 1,000 volts of AC. But Edison was wrong, and his reputation was tarnished, because the first criminal put on the electric chair was horribly burned for minutes and did not die.⁶ Soon after, Edison shifted his attention to other inventions, and did not return to GE for years—in fact, not until 1922, when he was honored at GE's Research Lab in Schenectady, New York, for a celebration of the invention of the light bulb. Coffin, then, was the first in a line of eight executives who built GE into a multinational corporation. Indeed, when T. C. Martin and S. L. Coles wrote *The Story of Electricity*, in 1919, they noted that Coffin, not Edison, was most important to advancing Edison's inventions.⁷

General Electric CEOs to 1950

Charles A. Coffin, President, 1892-1913

Given his conservative nature and kindly manner, some contemporaries worried that Coffin's business acumen might go unnoticed, or worse, be entirely forgotten.⁸ Those fears did not come to pass. In a July, 2003, edition of *Fortune*, Coffin was ranked the greatest CEO of all time.⁹ It was an opinion held by one of his successors at GE, Charles E. Wilson, who in 1946 authored *Charles A. Coffin, Pioneer Genius of the General Electric Company*.¹⁰ It was an opinion also held by many in the investment banking community at the turn of the century, who marveled at the way Coffin organized the company to send GE's stock price soaring and provide dependable, double-digit dividend yields.¹¹ (See **Exhibit 3**—Selected GE Financial Data, 20th Century.) Finally, it was an opinion held by the academic community, who traced how Coffin steered GE through a downturn in the business cycle in 1907 with sound financial policies.¹²

Coffin was born in Fairfield, Maine on December 30, 1844, to parents of British heritage and Quaker faith. In 1862, Coffin graduated from Maine's Bloomfield Academy, and got his start as a business executive that same year with Coffin & Clough, his uncle's shoe company in Lynn. Coffin immediately immersed himself in the shoe business, one of many in a city where shoemaking was a booming industry. To gain a competitive edge and a larger market share, Coffin designed shoe styles and traveled frequently to the Midwest to secure customers and sales territories for his new designs and the existing lines of Coffin & Clough shoes. Coffin also strategically placed a Coffin & Clough factory next to Lynn's train depot so it would be the first shoe company to grab the attention of potential shoe buyers traveling to the city by rail. R. G. Dun & Co.'s reporters were impressed by the company's efforts at generating sizeable annual sales and profits, but missed the role played by the younger Coffin. December 5, 1870—C. A. Coffin, nephew of C. F., is now with him. He adds nothing. Three years later, the company operated profitably with just one name above the door—Charles A. Coffin & Co.

After building Charles A. Coffin & Co. into a dominant firm in the shoe industry, Coffin decided in 1883 to create a corporate giant in the emerging electricity industry. According to GE company lore, "[Coffin] saw in the electrical manufacturing industry a greater opportunity to lighten man's burden and improve his standards of living—the tremendous potentials for serving the public through electricity." Wilson added that the challenge animated Coffin, "eager to launch out on new ventures, and ready to have a try at anything that looked promising." In the spring of 1883, Coffin formed a syndicate to purchase the American Electrical Company of New Britain, Connecticut; he then renamed the firm "Thomson Houston," giving prestige to Elihu Thomson and Edwin Houston,

the two Philadelphia science teachers and inventors who founded American Electrical. Coffin immediately reorganized Thomson Houston into functional groups, with departments for marketing, manufacturing, and innovation, as well as supporting departments for accounting and purchasing. The Marketing department directed the company's sales offices, with branches as far south and west as Atlanta, Chicago, and St. Louis. 18

Coffin soon perfected a business model that became the basis for electrical expansion in America. As Wilson wrote:

The company did not sell direct to the public, but to local electric lighting companies, and their welfare meant the success or failure of Thomson Houston. The companies were small and had many problems; they needed badly a financial shot in the arm because the investment needed to begin them had often been prohibitive . . . and so . . . Coffin offered to sell equipment for part payment in cash and the balance in securities of the local company. ¹⁹

As the local utility added new customers, it needed additional generators to create more power.²⁰ Thomson Houston benefited financially by receiving an order from the utility to build a new generator. As a shareholder in the local utility, Thomson Houston also received a windfall on the value of its local utility stock as the utility gained additional customers, revenues, and profits.

By 1890, Coffin had helped build Thomson Houston into one of the top three electrical manufacturing companies in America alongside Edison General Electric and Westinghouse. The following year, Coffin suggested to representatives at Edison General Electric that it consider a merger. Morgan, the most renowned Wall Street banker in the Gilded Age, had a significant financial stake in Edison Electric, and invited Coffin to New York City to present his case for the merger. Morgan had to be impressed as he read the one-page financial statement that Coffin brought to their meeting, because it showed how much more profitable Thomson Houston was than Edison General Electric. Although the pace of business in New York City in 1891 might seem vastly superior to Lynn, a longtime colleague of Coffin's, John Broderick, describes Coffin as having a "cosmopolitan" outlook.²¹ Perhaps Morgan saw this same quality when he picked Coffin to run GE, passing over two other capable executives.

Once the merger was complete, Coffin created a new organizational structure for GE. (See Exhibit 4—General Electric Organizational Charts—1892, 1950, 1973, 1981.) Six GE departments reported directly to Coffin—Manufacturing and Electrical; Sales; Accounting; Treasury; Legal; and Secretarial. At the time of the merger, GE owned three manufacturing plants—one in Lynn, another in Harrison, New Jersey, and a third in Schenectady, New York, the location of GE's corporate headquarters. Lynn was where GE made arc lights and smaller mass-produced goods; lamps were produced in Harrison; while generators, motors, and turbines were built in Schenectady. As GE explained in one of its managerial training books: "For the company's relatively small number of product lines, this centralized function type of organization was effective and economical." According to business historian Alfred Chandler, "the resulting centralized, functionally departmentalized structure became the basic organizational form used by modern American industrial enterprises." 23

To build the new company on a solid foundation, Coffin courted the best minds to GE and gave employees the freedom to flourish, including Will Coolidge of MIT and the iconoclastic German-born scientist Charles Steinmetz, the foremost proponent for a new GE Research Lab.²⁴ In 1904, four years after Coffin granted Steinmetz's request for a research lab, Willis Whitney, the first director of the lab, created the General Electric Metallized (GEM) Lamp that used 25% less energy than Edison's original carbon lamps, and was one of GE's first popular consumer products. A year later, Coolidge was

welcomed at the GE Research Lab from MIT, and, in 1906, he discovered a breakthrough technology—tungsten filament for light bulbs—that made electric street lights resistant to blackouts caused by vibrations from clanging railcars and automobile traffic. Improved versions of tungsten light bulbs are still the most popular incandescent light bulbs, as are the tungsten x-ray tubes that Coolidge and Langmuir devised in 1913.

Growth and productivity at GE, particularly in the research lab, were the result of another Coffin management innovation—advisory committees. Advisory committees at GE, in effect, served as a board of directors for each of GE's major functional units. Advisory committees provided a forum for sharing ideas on planning and policy, a place where disagreements could be resolved within a business unit. Advisory committees also avoided the pitfall of one person having too many responsibilities and, due to time constraints or lack of clear vision, letting one responsibility lapse to the detriment of the unit or GE as a whole.

The effectiveness of advisory committees was high due to Coffin's communication skills. Coffin called everyone at GE "one of my associates," and "graciously sought and welcomed suggestions" before reaching a decision. En time, GE was "managed by a set of skilled men, each specializing on one department, balancing and offsetting each other, so that no one interest was allowed to control beyond the point where it ceased to operate for the good of the entire corporation." 26

Wall Street analysts were impressed by Coffin's ability to provide shareholders with secure returns on their investments in GE stock. After reviewing GE's annual report for the year 1901, an analyst for *The Wall Street Journal* praised GE's management for, among other things, a 10% dividend return to shareholders.²⁷ Coffin followed a conservative financial approach. He never forgot the troubles of 1893, GE's first full year in business, when the nation was mired in an economic depression, and Coffin had to secure loans from Morgan to have enough funds to pay his employees. Coffin made sure that GE never reneged on its duties to stockholders either: all investors were confident that dividends promised by GE would be received in full and in a timely way.²⁸

While GE president, Coffin was a driving force in bringing electricity to municipalities across America, an effort that the National Academy of Engineering ranked as the most significant engineering feat of the twentieth century.²⁹ When there was a national cry for President Theodore Roosevelt to become a "Trust Buster" in the mid- to late-1900s, General Electric was identified as a natural monopoly, yet it escaped the fate of Standard Oil, which spent six years litigating a federal action before it was determined to be a monopoly and broken up in 1912. When Edison Electric and Thomson Houston combined in 1892, it was a merger to pool resources, a better alternative than wrangling in the courts with expensive lawsuits to decide which company, Edison or Thomson Houston, should be awarded exclusive U.S. patents and be the first to market. Given the financial barrier to new electric companies that might want to start a utility concern, GE could have been viewed in a negative light, as an electrical oligopoly, if not a monopoly.

In 1905, Coffin opted to avoid the possibility of a monopoly impacting GE's bottom line when he incorporated the Electric Bond and Share Company (EBASCO). EBASCO was a holding unit separate from GE that performed the same functions that Thomson Houston and GE did previously—providing local electric companies with start-up capital, then serving in an advisory capacity as the cities and towns got their power systems up and running.³⁰ According to Broderick, "Coffin had no sympathy with any of the restrictive features of monopoly. . . . [H]is aim, on the contrary, was to foster initiative and stimulate growth."³¹ As a result, Roosevelt and the federal government allowed GE to continue, believing, as Broderick did, that Coffin and GE could be trusted for its integrity—what Broderick calls Coffin's policy of "promoting growth through helpfulness."³²

Coffin also had a keen sense of how to maximize consumer demand in the marketplace. In 1910, when municipal electric power plants were in place in many major U.S. cities, GE launched a landmark advertising campaign for Mazda-brand tungsten light bulbs (co-opting the regal-sounding "Mazda," the Persian God of the Sun) in mass circulating weekly magazines such as *The Saturday Evening Post*. (See Exhibit 5—GE Advertisements, Decades of the 20th Century.)

Despite all the talk about Coffin's conservatism, he did take calculated risks by expanding GE's presence in foreign commerce. Under Coffin, GE established two joint ventures with Japan's Shibaura Electric, later known as Toshiba. In 1904, GE invested a 25% share in Shibaura Electric's new start-up, Tokyo Electric; then, in 1910, GE teamed up with Shibaura Electric to form Shibaura Engineering, a company established to produce heavy electrical equipment.³³ In 1912, Coffin and GE partnered with Germany's Mercedes Benz to build truck engines.³⁴ GE was involved with another significant achievement in global technology in the 1910s – the opening of the Panama Canal in 1915. In 1912, GE was awarded a \$150,000 contract from the U.S. government to build the motor for the canal locks.³⁵ Three years later, the canal opened to allow vessels to travel between the Atlantic and Pacific Oceans for the first time.

Edwin Rice Jr., President, 1913–1922

In Broderick's 1929 account of his 40-year association with GE, Broderick identifies Rice as one of GE's founding fathers, listing Rice alongside Coffin and Thomson. Broderick's assessment does not seem unrealistic. Rice, a star high school science student of Thomson's, developed into an impressive technical expert at GE, with over 100 patents to his name when he was elevated to GE president in 1913.³⁶ Yet, when GE assembled its corporate history for its centennial celebration in 1978, the period from 1913 to 1922 was not called the Rice era. Nor was it part of the Coffin era. Instead, both men were overshadowed; it was called the Steinmetz era.³⁷ However, some credit for the Steinmetz era at GE should be given to Rice, the person most responsible for giving Steinmetz and many other gifted scientific minds and GE staff the opportunity to expand GE's product lines.

Like Steinmetz, Rice was first and foremost a scientist. Rice, born in LaCrosse, Wisconsin in 1862, moved with his family to Philadelphia, Pennsylvania, and attended Boys Central High School, where Thomson taught physics and chemistry, and Rice emerged as his stellar student. In 1880, just two years after Rice graduated from Central High, he relocated from Philadelphia to New Britain to become Thomson's assistant at the American Electric Company. Two years later, the New Britain factory was relocated to Lynn as part of the merger that created Thomson Houston, and Rice became the factory's superintendent; then, its technical director. With the formation of GE in 1892, Rice was named chief corporate engineer, then, vice president in charge of Research, Manufacturing and Engineering, and a member of the board of directors in 1903.

According to Broderick, Rice was similar in some respects to Coffin and Thomson—mild-mannered, more comfortable behind the scenes than on center stage.³⁸ Broderick further describes Rice as "less suave" than Coffin, and with a "grave air about him."³⁹ Rice's technical legacy was overshadowed by Steinmetz, and Rice's legacy as a GE president was overshadowed by Coffin, particularly for those who believed Coffin was still largely responsible for running GE as the chairman of the board while Rice was president.⁴⁰ Yet, Rice had years of experience working in and running factories, experience that helped GE grow and prosper before and after Rice became president. Broderick also credits Rice for insisting on the "integrity of the costs," meaning the requirement that a careful accounting be made of the value of all inputs into a product or service so that it be priced correctly.⁴¹

While Rice might have seemed "less suave" than the "cosmopolitan" Coffin, Rice was not so parochial to allow minor disagreements about style and taste impede GE's growth. Rice's expansiveness is seen in the hiring of Steinmetz, the German scientist whose mathematical theories made electrical generation possible on a large scale. By 1892, Rice was well acquainted with Steinmetz after reading his scientific and theoretical papers, and GE's chief engineer invited Steinmetz to visit Schenectady to encourage him to work for GE. As Rice later admitted, he had some initial misgivings when he first met Steinmetz face-to-face, startled by his three-foot height, shoulder-length hair, and well-chomped cigar. Yet Rice said his "disappointment was but momentary, and completely disappeared the moment [Steinmetz] began to talk. . . . [H]is clear conceptions and marvelous grasp of engineering problems convinced [me] that we had indeed made a great find."⁴²

At GE, Steinmetz created a mathematical formula to get a precise connection between the number of revolutions in a generator and the cycles per second of electricity it should produce. It was also Steinmetz who recommended to Rice that a GE research lab be built in Schenectady, so that staff could devote their energies to inventing new GE lamps and experiment with different vapors, filaments, and electrodes.⁴³ This set the stage for Coolidge's discovery of the usefulness of tungsten filaments in 1906, and Langmuir's discovery in 1913 of the efficiency that could be gained from nitrogen gas inside light bulbs.⁴⁴

The day-to-day conditions faced by GE's own factory workers were very familiar to Rice when he became GE's president. Rice directed the Lynn factory for Thomson Houston before the GE merger, and as GE's vice president of Manufacturing and Engineering from 1898 to 1913, Rice became intimately involved in the way GE's factories in Harrison and Schenectady operated. Rice assumed the presidency of GE at a point in American history when unions and the political labor movements were growing in strength and number. What compounded this concern for Rice upon becoming GE's president was the decline in sales of GE light bulbs. The new tungsten coiled bulbs with nitrogen gas were not ready to be manufactured. Due to slowing demand for existing GE light bulbs, in November 1913 Rice announced GE layoffs, but described them as "temporary," expecting consumer interest in GE's new light bulb product to accelerate demand and in turn, create opportunities for increased employment levels. Rice soon proved to be a man of his word, rehiring the laid-off workers, restoring GE's workforce to 52,000 nationwide, and averting any long-term ill will between GE factory workers and management. He is a constant of the consta

Rice's basic fairness was revealed in other ways to GE workers. Shop workers were entitled to vacations with full pay. Breaks for lunch were provided and the company furnished a well-stocked cafeteria. Employee benefits included health, life, and accident insurance at a cost of nine cents a week.⁴⁷ In 1915, Rice and GE implemented the company's first pension program, whereby 100% of the contribution to the pension fund was made by the company.⁴⁸ GE also protected workers by paying for medical exams for employees. Workplace safety bulletins were readily available as was training on how to avoid industrial accidents.

During his tenure as GE's president, Rice modified the GE organizational structure to accommodate the company's growth in specific areas. For example, during the 1910s, Rice and GE increased their consumer product offerings: in addition to fans, irons and toasters, GE figured out how to build larger consumer appliances, and in 1918 Rice created the Edison Electrical Appliance Division. Then, in 1919, GE entered the communications business by joining the Radio Corporation of America. Before and during World War I, GE worked with AT&T, Westinghouse, and the U.S. government on experiments in radio technology, and these efforts yielded peacetime applications, such as the high-powered radio signal that GE established at the station WGY in Schenectady in 1922.

Without its own patents, however, GE's significant investment into making radios and radio programs for the general public did not yield much profit.⁴⁹

In spite of his experience with radio, Rice was not always profit-driven when it came to the promotion of GE products, including x-ray tubes. Expensive to make, and with a limited market, x-ray tubes discovered at GE in 1913 by Coolidge did not seem at first to be a business that GE should expand. However, Rice recognized that x-rays could be important to medical discovery, specifically for early detection of cancer, and asked the company's board to move forward. For the next two years, a physician hired by GE went on the road to talk with American doctors and radiologists about the value of x-ray tubes, and this, in turn, slowly increased demand for GE x-ray machines and expanded GE's reach into the healthcare field. By 1917, GE had a \$100,000 x-ray business. In his classic *Scale and Scope*, Chandler praises Rice's role in bringing x-ray machines to market and accelerating the diversification of GE's products and service offerings. ". . . [T]he number of GE product lines . . . rose from 10 in 1900, to 30 in 1910, to 85 in 1920, to 193 in 1930 and 281 in 1940."⁵⁰

Gerard Swope, President, 1922-1939, September 1942-September 1944

Throughout his life, Gerard Swope understood the paradigm-changing power of electricity and of GE. In 1893, while studying engineering at MIT, Swope was so excited by the electrical feats of Edison and GE that he quit school and traveled halfway across the country to Chicago to work at the GE exhibit at the Columbian World's Fair. As GE's president, Swope brought a similar excitement to Americans, filling their homes with revolutionary electrical gadgets and appliances. This was not unexpected – *Forbes* magazine introduced Swope in 1923 with great fanfare as the ideal business leader for twentieth-century corporate America, and that opinion only gained in strength over time. Swope capped his career at GE with a grand final flourish – the GE exhibit at the 1939 World's Fair included a live broadcast on a GE television set. Swope's mastery as a business executive convinced Henry Ford to call Swope "The World's Greatest Salesman."

Swope grew up in St. Louis, Missouri, where he was born on December 1, 1872, to a German immigrant, Isaac Swope, a watchmaker by trade, and his wife, Ida Cohen. As a teenager, Swope was enthralled by newly discovered electricity, and set up an electrical lab in his parent's basement. Eager to construct his own generator, Swope designed a prototype; when he was ready to make the iron castings he needed, his father introduced him to an adult friend, Mr. Guernsey, who later was president of the St. Louis Light Company. "After Mr. Guernsey had examined and approved the models, I took them to a foundry and had them cast. Then I put them together and the motor did work! Mr. Guernsey was so pleased that, to encourage me he gave me a share of stock in a business. . . . "⁵² Years later, Swope said his generator project as a teenager taught him much about the importance of giving encouragement. ⁵³

After his stint at the GE exhibit at the Chicago World's Fair, Swope returned to MIT to get his bachelor's degree in electrical engineering, then moved to Chicago, Illinois, to work at Western Electric's motor department, rising from factory helper to engineer to commercial sales manager. In those early years Swope had limited financial means, and lived for a time at Hull House, the settlement that the pioneering social worker, Jane Addams, established on the South Side of Chicago in 1883. At Hull House, Swope met his wife, Mary Dayton Hill, who ran a weaver's cooperative there. After they married and moved to St. Louis in 1901, Mary continued doing social work for many years. Hull House also influenced Gerard's view of the social and economic welfare responsibilities of American business. This included not only establishing a secure welfare net for GE employees, but also offering plans and proposals to the government, such as his much-discussed Swope Plan of

September 1931, published in *Time* magazine, which called for federal worker's compensation programs, unemployment insurance, and pensions for the aged, which later became known as Social Security.⁵⁵

Soon after Swope became GE's president, he was pegged in the business press as a new kind of business executive, a leader who had the right blend of technical and managerial skills. ⁵⁶ Even though Swope had less than a year at the helm of GE, there was already a track record of success at GE that justified the high praise. In July 1922, Swope authorized a scientific marketing study in support of a professional advertising campaign to take advantage of GE's strengths in consumer electronics and its research lab. The marketing research asked what GE products were most desirable to American homemakers, and the answers included Thor washing machines, Premier vacuum cleaners, and Hotpoint kitchen ovens and stoves. Recognizing these brand names were not yet all associated with GE, Swope met with his top marketing and sales executives in late 1922 to impress upon them the need to consolidate these separate units under the GE brand. ⁵⁷ By early 1923, GE had its marketing plan ready for launch based on the concepts of opportunity cost and improved quality of life. The main thrust was that "any woman who does anything a little electric motor can do is working for three cents an hour." ⁵⁸ (See Exhibit 5.)

Swope collaborated with GE's chairman of the board, Owen Young, in building the prestige of the GE logo by developing a philosophy of good corporate citizenship behind that logo. Swope was named GE's president at the same time that Young, GE's patent attorney, was elevated to GE's chairman. Unlike the rumored mentor-protégé relationship between Coffin and Rice, the Swope-Young relationship was established on an equal footing that never wavered. One of Swope and Young's most important tasks was to dissolve EBASCO. In the 1920s, electric utilities were more profitable than ever—as Joseph Schumpeter notes in *Business Cycles*, U.S. power production increased from 38.9 billion kilowatt hours in 1919 to over 97 billion in 1929.⁵⁹ Although EBASCO was financially profitable, Swope and Young believed that "it was bad business and hardly ethical to own our own customers and be in two businesses at the same time."⁶⁰ To the shock of Wall Street analysts, Young announced in December 1924 that GE had disposed of all of its shares in EBASCO.⁶¹ Besides being morally consistent, the decision to dissolve EBASCO later helped GE avoid the major push in the 1930s by the federal government to tightly regulate the American electrical industry's rates and business structures.⁶² However, federal attorneys eventually pressed GE into giving up its stake in RCA, which, by the 1930s, was a media empire that included RKO.

Like Young, Swope was an able communicator, capable of articulating organizational philosophy and putting it into effective action at GE. His visits and meetings at the GE factories were a morale boost and a welcome change from the leadership styles of Coffin and Rice.⁶³ "...[F]ew knew Coffin or Rice by sight. They thought it remarkable that Swope came among them at all. . . . When they gathered their foremen together for talks on work, pay, and promotions, they approved audibly. They were heard referring to him as 'Gerry,' a familiarity never intimated by higher officials."⁶⁴ The impact on plant productivity was significant. At Nela Park, dubbed "the University of Light," GE staff produced many innovations in lighting products in the 1920s and 1930s, expanding from GEM Lamps to bulbs with frosted glass, fluorescent lights, projector lamps, and heating lamps.⁶⁵

Swope's leadership in setting GE's corporate ethos was also evident in his business mantra, Analyze, Organize, Deputize and Supervise. (See **Exhibit 6**–GE Slogans and Executive Mantras.) "Analyze" comprised the activities that GE staff admired in Swope—getting to know the workers, what they do and why—the essential knowledge of the company and its processes required to lead well. The second term, "Organize," described efforts by business executives to make sure their organization's people and other resources were capable of effective production. And despite Swope's

hands-on management style, he was clearly not philosophically opposed to "Deputizing" and decentralization: "I believe very heartily in definite responsibility for every man in an organization, especially executives—definite responsibility that the man may know that for which he is held accountable. With that responsibility should go an authority to exercise it." Willis Whitney, the original director of GE's research lab, is on the record as saying that Swope gave him his full confidence and support to run the research lab himself. The final term, "Supervise," was something that Swope did extraordinarily well. "The greatest thing he ever did was teach industry how to treat people," Whitney would say about Swope as a supervisor. 67

When Swope helped to found NEMA, the National Electrical Manufacturers Association, in the fall of 1926, he championed it as an opportunity to standardize equipment, share ideas, and make products better and more affordable to the public.⁶⁸ Yet Swope took this philosophy a step further, becoming a public advocate for government policies. Whereas Coffin was content to fly under the government radar, Swope recognized that the role of the chief corporate executive in America in the Great Depression required more. Swope offered his plan for economic recovery in September 1931, and both Swope and Young toured the country to articulate how GE retirement programs could be adopted by other NEMA members as well as the federal government. Swope joined the National Recovery Administration and was an important consultant to Franklin D. Roosevelt on New Deal recovery programs. GE's commitment to the nation continued after Swope and Young retired; the two men returned to run the company from September 1942 to September 1944 while Charles Wilson worked in government to properly equip America's armed forces in World War II.

Under Swope's direction, GE continued to produce positive financial benefits to shareholders. Between 1923 and 1939, GE's annual dividends never fell below 8%. Moreover, Swope offered investors 4-for-1 stock splits twice in a span of less than five years, the first in 1926, the second in 1930. (See Exhibit 3.)

Swope devoted significant time as GE's president selling GE as a premier American brand. Despite an economic downturn during the Great Depression, Swope reinvigorated the Coffin tradition of lending financial support to a GE customer. Under Coffin, GE financed local utility companies, so that these companies could afford GE generators and equipment. Swope updated the process in 1931 by creating GE Capital, a department designed to allow people the opportunity to buy expensive appliances on credit. But Swope's salesmanship was far more exciting than Coffin's ever was. It was displayed at the 1939 World's Fair in New York City, where Swope made sure that the GE exhibit was at least as dynamic as the one that drew him to Chicago in 1893. The final part of the exhibit was a television set with a live broadcast feed from a nearby stage. Visitors flocked to the stage, while others viewed them on a television set, GE's latest electronic convenience for the American home, which Swope priced to sell at \$200 each.

Charles E. Wilson, President, 1940 to September 1942; September 1944 to 1950

In the fall of 1942, President Franklin D. Roosevelt handpicked Wilson to help lead the nation's effort to mobilize and sustain American industry in support of the allies during World War II. This was a momentous decision for Wilson and GE. FDR tasked Wilson to improve the efficiency of production in the aircraft industry and, Wilson's managerial skills won him much acclaim, as did another government assignment in 1950 as the director of President Harry S. Truman's Office of Defense Mobilization, a key post in the early Cold War era. According to Chandler, when Wilson became GE's president in 1940, Wilson recognized that the company could no longer be run by one man (as Swope had done so well during his tenure) because GE was growing so rapidly, and into so many diverse areas, that its corporate structure could no longer be tightly centralized from the GE

president's office down the chain of command.⁶⁹ Decentralization was a process that Wilson tried to establish while GE president, but he also encouraged it to be taken up by his successor, Ralph Cordiner, who became GE's president in 1950.

Wilson's ascent to the presidency of GE and to two prestigious government posts is even more remarkable considering his early background. Wilson was born on November 18, 1886, on Leroy Street in the Lower West Side of New York City, a hardscrabble area known as "Hell's Kitchen." After the death of his father at age three, Wilson was raised by a single parent, Hannah Wilson, a nurse with a strong Baptist faith. Another important early influence in Wilson's life was Bill Reute, superintendent of the Sprague Electric Factory where Wilson worked full time after dropping out of seventh grade in 1899. Reute was a positive influence on Wilson at work and after hours, taking Wilson bowling, teaching him how to tie a necktie, and impressing upon him the importance of cleanliness. With encouragement from his mother and Reute, Wilson went back to school, which helped Wilson get a promotion from office boy to assistant shipping clerk, the position he held when Sprague Electric was bought out by GE in 1903.

Swope impressed Wilson with his fairness in employee evaluations. Right after Swope became president, he visited Reute and Wilson at their Maspeth, Long Island plant. At the time of Swope's visit, Wilson was in his mid-30's but already had 15 years of experience as an assistant superintendent at GE's Long Island Plant. Swope was instantly impressed with Wilson, and, as a firm believer in meritocracy, Swope decided to make Wilson a plant superintendent, first in Kensington, Pennsylvania, then, at Maspeth. Within five years, Swope promoted Wilson to be the managing engineer of GE's new Bridgeport, Connecticut plant, where the company made the majority of its consumer products.⁷⁰

Wilson's directness and candor were traits that Swope admired. Before getting the top post at the Bridgeport plant, Wilson spoke out against the problems in the GE corporate culture at a late 1920s GE executive retreat. During the retreat, which included members of GE's "Elfun" or Electrical Fund, Wilson urged GE executives to adopt a vertical management structure to avoid the cumbersome qualities of the horizontal structure GE maintained.⁷¹ The hallmark of the new plan was placing new vice presidents in charge of a business unit, and giving the vice presidents, rather than advisory committees, the authority to direct basic policy.

Swope asked Wilson to organize the new GE Appliance and Merchandise Division along the decentralized model. Swope provided clear guidelines—strive for perfection, have clear sets of figures on what is taking place, and further emphasize GE quality by testing a product prototype before it was approved to go to market. Wilson's success at GE-Bridgeport led to his promotion to the GE board of directors in 1938, and, when Swope stepped down as president the following year, Wilson was designated as his successor. That choice met with unanimous approval.

When Wilson became GE president, he endeavored to strengthen GE's core competencies in research, manufacturing, sales, and distribution. Wilson quickly consolidated GE's top executive power into the president's office. Whereas Swope and Young had been viewed as the two representatives of GE, equal partners with complementary duties and responsibilities, Wilson was the head of the company and its sole spokesperson on the executive level—a dual role that became increasingly clear after Wilson completed his wartime service in the U.S. government.

Before becoming president, Wilson helped position GE to be ready for World War II production demands by recommending the formation of "Post-War Advisory Committees" whose members included a vice president from each major division of the company.⁷² At that time, GE was already building engines for the U.S. armed services, like the Van Dyke tanker, contracted in 1936.⁷³

However, after the bombing at Pearl Harbor on December 7, 1941, GE and America's economy was mobilized for war.⁷⁴ From late 1941 to July 1942, GE created a \$22 million plant for the U.S. Merchant Marine capable of building 100 turbines and 50 gears per year. By that point, GE had already secured orders for generators from the U.S. Navy and Merchant Marine totaling 19 million horsepower, a 34% increase in the national production level from the previous year.⁷⁵

In September 1942, Wilson agreed to become a vice chairman of the War Production Board (WPB), with the stipulation that Swope and Young return as GE's president and chairman of the Board. FDR and his new commanding officer at WPB, Donald Nelson, convinced Wilson to work for the government at a salary of \$1 a year. "It took me 40 years to become president of GE and forty seconds to leave it. . . . I keep reminding myself that there's a war on. Hell's broke loose and I've got to do something about it." Wilson put several hundred analysts to work on studying inefficiencies in Army and Navy projects, and he immediately found reasons why projects were delayed or late. Part of the problem was procurement—inexpensive mass-produced items were not specified in the contracts to be built by a certain time.

Wilson quickly solved the problem using some of what worked for him at GE, including advisory committees. In addition, production and scheduling experts from component-based industries were brought together to divide up orders, collaborate on eliminating backlogs, and share best practices. This was the type of sensible solution that Americans associated with Wilson, nicknamed "Mr. Make It." Wilson also had to confront bureaucratic infighting at WPB, which he tried to alleviate with biweekly meetings with the service chiefs that the WPB was supplying.⁷⁷ Wilson soon relied on his legendary brawn to take over the aircraft procurement process from the Army, churning out nearly 100,000 airplanes in 1944 alone.⁷⁸

When Wilson took GE's reigns back from Swope, Wilson knew the difficult job ahead: realigning the company's staff and plants on a postwar production plan. "We've got to build practically from the ground up. . . . Some of the biggest plants (refrigerators, electric ranges, radios, toasters), have been taken out of existence as plants. Machine layouts have been completely removed. Conveyors have been dismantled. All of these have to be put back together again. It's one hell of a job." In November 1944, Wilson established a "Blueprint for Action," whereby GE would sell postwar products at prewar prices, and maintain the pay levels for GE employees at the highest level reached during wartime. (See Exhibit 6.) Wilson and GE were ready to respond to the postwar-era demand for convenient GE household products especially after Wilson transformed the organizational structure at GE to include three new sets of committees—Director's Committees, General Committees, and Administrative Committees. Wilson spent the final two weeks of each month in meetings with these committees, and a sampling of the discussions at those meetings was supplied to readers of a 1947 article in Fortune:

Shall a new plant be established in a certain district of Ohio? Will enough female workers be available there? How about the potential gas supply in another situation? Schenectady still has a snag in wartime dislocations—what to do about it? What is the production target for television sets? What's the labor outlook? Is one officer's demand for an electronics appropriation reasonable or not? What final decision is to be made between proposed product A and proposed product A-prime?⁸²

Wilson also made a determined effort to keep GE employees aware of what the company was doing and why, carrying on the tradition that Swope had started.⁸³ Nevertheless, Wilson had to contend with GE's first major strike in decades, and a loss in a federal antitrust suit concerning GE's

Electric Lighting Division, whereby GE was ordered to divest itself of half of its lighting plants and make public all of its lighting-related patents.

Wilson continued to discuss the issues of the day as a spokesperson for GE and statesmen for the manufacturing industry. In a December 1948 speech titled "Program for Preparedness," Wilson urged Americans and American business not to be caught off-guard when the next war arrives. How years later, President Truman created the Office of Defense Mobilization to address international communist expansion, and Wilson put his speech into action as ODM's director. Wilson's power was immense. Since he reported directly to Truman, Wilson was nicknamed "Truman's Number 2 Man," "The New Vice President," and "The Boss of War Production."

General Electric CEOs, 1951-2000

Ralph Jarron Cordiner, President, December 1950–1963, CEO 1958–1963

When Cordiner became GE's president, he was determined to make GE's organizational structure and philosophy responsive to the current demands of the American and world marketplaces, while remaining consistent with GE's longstanding corporate values. Cordiner was dedicated to a decentralized managerial structure that would depend on educated and skilled middle management. To make this happen, Cordiner committed significant time and corporate resources to managerial training. By the mid-1950s, GE had established a corporate training facility in Croton-on-Hudson, New York, where GE managers from across the country and around the world learned about decentralization at GE through instruction from four massive "GE Blue Books." Cordiner also was a featured business lecturer for the McKinsey Foundation, which published three of Cordiner's lectures in a 1956 volume titled *New Frontiers for Professional Managers*, giving managers at other companies insights into GE's corporate culture. Health Meanwhile, purchases of GE consumer products boomed along with the rising American middle class demographic, as GE had become a venerable brand name, and its diverse corporate portfolio was enhanced in advertising and by General Electric Theater, a popular national television program hosted by future U.S. President Ronald Reagan.

Cordiner was born on March 20, 1900, on a wheat farm in Walla Walla, Washington, operated by his parents George M. Cordiner and Mary Jarron. Cordiner attended local public schools, then served a year in the U.S. Navy before returning home to attend Whitman College. In 1922, Cordiner earned a bachelor's degree in economics with honors, then secured a managerial job with Pacific Power and Light, where he had worked part time during his college years as an appliance salesman. Within a year, Cordiner was hired by the General Electric affiliate in Portland, Oregon, and began his rise through the corporate ranks: from Northwest regional manager in 1927, to Heating Appliance Division Manager at GE's Bridgeport plant in 1932, a role that brought Cordiner in direct contact with Wilson, then the plant's Appliance and Merchandise department manager. This was a momentous career move. Wilson and Cordiner became close colleagues, as Wilson actively helped develop this young protégé. When Wilson was elevated to corporate vice president in 1938, Cordiner stepped into Wilson's role as manager of the Appliance and Merchandise department.

Cordiner did not stay with GE much longer, deciding in 1939 to become President of Schick Dry Shaver Inc., the company founded by the inventor of the electric razor, former U.S. Colonel Jacob Schick. Cordiner's business savvy was needed to keep the company solvent, and Cordiner quickly set Schick on a solid financial footing, meriting praise from *Time* for putting Schick "back on its feet

again."87 Indeed, in less than three years, Cordiner made an indelible mark on Schick's employee morale and profitability.

It was at this point that Wilson invited Cordiner to work for him in a government post at the WPB. Wilson needed another GE man to help him organize and streamline WPB bureaucracy. This was a task that Cordiner was well prepared to do, and would later be Cordiner's Job Number 1 when he took over as GE's president in December 1950. In his memoir, *Straight From the Gut*, Jack Welch recalls how Cordiner emphasized the benefits of organizational reform in the professional managerial development programs that GE ran for young executives at Crotonville. "Thousands of GE managers were taught to take control of their own operations with profit-and-loss responsibility. For many years, the center's instructors taught a useful menu of training courses based on the 'Blue Books,' nearly 3,500 pages of management dos and don'ts. Thousands of general managers were raised on this gospel." 88

Cordiner gave a prominent place in GE's Blue Books to the presentation he heard by Wilson at a 1920s GE executive retreat on the defects in the functional organizational structure. Wilson conceded that GE under Swope's direction did quite well despite its horizontal structure. "He [Swope] always gave you a free hand once the decision had been made," Wilson said. "In fact he insisted that his subordinates do the job themselves." However, Wilson and Cordiner wanted to go much further, with vice presidents replacing advisory committees as the main decision-makers at GE, so that within a functional area, executives in the branch offices would follow general directives from vice presidents in the home office or main department, yet retain the ability to make ad hoc decisions at the local level. Advisory committees were not completely abandoned. Wilson and Cordiner assigned them a different set of responsibilities—"to study, to guide, to educate," but not to decide. "

These understandings about optimizing an organization's effectiveness were applied to the GE reorganization that Cordiner initiated upon becoming president. In December 1950, GE, for the first time since the company was founded, had a detailed organizational chart. (See **Exhibit 4**.) It was a process informed by GE's initial decentralization plan. Decentralization was not a strategy to group geographic areas or similar product lines in a company, but a strategy of empowering managers closest to the effort requiring a decision.

In the 1940s, Cordiner and GE had isolated six types of functional management responsibilities in a modern multinational corporation—(1) research and engineering, (2) manufacturing, (3) marketing, (4) financial, (5) employee and public relations, and (6) legal and corporate. It was Cordiner's plan to integrate all six of these managerial functions into each business component, whether it was a group, department, division, or subdivision, etc. These departments had subunits for some or all of the six functional responsibilities. Over the next two years, Cordiner refined and streamlined GE's organizational structure into five groups managing 20 decentralized operating divisions that contained another 70 departments. As time went on, if a department or division grew large, Cordiner split it into smaller parts, a process that created a total of 106 separate departments, and many more managers, by 1960.

To help GE managers apply their new decision-making powers appropriately, GE continued to provide top-notch management training. The richly detailed GE Blue Books given to each manager at a training session in Crotonville were compiled in-house by Harold Smiddy and GE's Management Consultative Services Division, one of 11 service divisions providing companywide support to GE operations in Cordiner's reorganization scheme. A new strategy that GE developed to deal with the decentralized structure was to apply management theorist Peter Drucker's Management By Objectives (MBO) approach to GE, so that responsibilities and lines of communication between

individual contributors and managers were clear. 95 (See **Exhibit 7** – Roles of Individual Contributors and Managers, GE Blue Books.)

Cordiner was both business practitioner and philosopher, making his lectures for the McKinsey Foundation and the resulting 1956 book, *New Frontiers for Professional Managers*, required reading for all employees. Cordiner explained how other CEOs could apply MBO and decentralize their organizations as GE did, then track managerial performance with assessment tools like those developed by Borch while leading the Measurements Project in GE's Accounting Services Division in the early 1950s.

Cordiner and GE took other steps to create a corporation that was ideally suited to the 1950s, an era Cordiner called "mass capitalism." The company innovated new products at an astounding rate and improved existing ones constantly. By the mid-1950s, GE had 42 full-scale research labs, and in the 10 years after World War II, invested \$175 million in research and development. Based on sales, GE's major businesses were in home technologies and electronic gadgets. Amid this expansionary phase, Cordiner also downsized and eliminated waste. Cordiner cut duplicative jobs, attacked nepotism, and fired managers who did not perform well, especially regarding profitability. The profitability goals were set high —7% return on sales or 20% return on investment every quarter. He hierarchical structure was familiar to GE employees who were war veterans, often working in management after getting an education through the GI Bill.

However, the transition to the new system was not seamless. Yet the initial impact of the reorganization seemed only to improve GE's financial picture. Despite the corporate restructuring, GE's annual sales rocketed from \$2 billion in 1952 to \$3 billion in 1953, then to \$4 billion by 1956. 100

Cordiner was confident in his vision of how GE and corporate America could harness the technological changes of the age. He told a Congressional Committee in 1955 that automation, nuclear energy, and computers were the three most important technological trends of the age—automation was a multiplier of tools, nuclear energy was a multiplier of power, and computers were a multiplier of minds. 101 GE positioned itself to take advantage of all three emerging technologies. Earlier in the twentieth century, GE sold to plants a generator or turbine to replace their horsepower. In the 1950s, those turbines and generators could be programmed by computer to go on or off, and could be monitored with electronic gauges and automated monitors also tied into a computer center. To foster this growth area for GE, Cordiner created GE's Industrial Electronics Division in 1956, which was a launching pad for GE forays into information systems, data processing, and computer software. Indeed, after building successful data-processing centers under military contracts, GE created its first major commercial data center, ERMA, the Electronic Recording Method of Accounting, for Bank of America in 1956. 102 By that point, GE also had a significant role in the nuclear power sector and was a visible force in the first decade of the television age.

Cordiner's final years at GE were difficult ones. The company was rocked by a price-fixing scandal in 1959, a scandal that called into question the validity of Cordiner's leadership and the decentralized organizational structure model. The Tennessee Valley Authority reported 24 instances between 1956 and May 1958 where the prices on contracts were identical for all bidders, suggesting collusion. By January 1959, Cordiner identified the names and activities of the GE executives involved, and condemned them for showing "flagrant disregard" for GE policy and possibly U.S. antitrust laws. Not only did these executives talk with competitors about the prices they would be charging the government in their bid packages, they also denied doing so to Cordiner. Cordiner fired, demoted, or reassigned these executives, but he had to endure two more years of investigations by the U.S. Justice Department and other interested parties. During that time, Cordiner implemented

new corporate auditing techniques designed to enforce GE's policy and catch wrongdoing, elevating Borch, with his strong background in auditing and managerial science, to become GE's executive president. GE legal staff added detailed training modules on corporate ethics and antitrust laws to training programs at GE. ¹⁰⁴ In 1961, when Cordiner spoke at Congressional hearings that were held on the electricity industry's collusion, he was still angry at the GE executives involved, charged with 17 indictments by the Justice Department. But Cordiner did not agree with Tennessee Senator Estes Kefauver that it was a corporate disgrace, given that there were another 27 companies involved along with GE. ¹⁰⁵ By that point however, William Ginn, one of the GE executives indicted in the price fixing, was in a federal jail, and GE's shareholders had voted in April 1961 to investigate whether Cordiner and GE's top executives should have been reasonably aware of the price fixing.

In December 1963, when Borch was selected from a pool of 15 candidates to succeed Cordiner as CEO, GE's corporate culture and image had certainly changed through the decentralization process. While decentralization may have succeeded in some respects, it had generated negative publicity because of the internal dislocations and the price-fixing scandal. Cordiner, always somewhat detached and diffident, was viewed by some GE staff as a "hatchet man," as Robert Slater, author of several books on GE's history, explains: "Managers who 'made the numbers' kept their jobs; those who did not were sent into the wilderness. A premium was placed on short-term profits. Long range planning was sacrificed." However, the majority view was that Borch was taking over a strong company from a strong leader. In a 1963 *Dun's Report*, General Electric and Cordiner received high praise—GE was one of the 10 best-run companies in America. This was not the view of a single Dun reporter—it was the consensus opinion of 300 corporate presidents and chairmen. 107

Frederick "Fred" Borch, CEO, 1963-1972

As GE's CEO, Borch understood that the organization had to be structured to best address the short-term and long-term needs of its staff, its customers, and trends in American society and the world economy. That skill was essential for GE's CEO in the 1960s, given that the company had 250,000 employees and close to 200 operating divisions. What made Borch even more valuable to GE was that his experience with the company was dedicated to micro-level activities, like auditing and planning. The improvements that Borch made in accounting and financial reporting allowed Cordiner's decentralization program to be more effective and more enforceable in the 1960s. Borch also took steps to optimize GE's advisory committees by setting up two special boards devoted exclusively to planning - the Corporate Operations Board and the Corporate Policy Board. When Borch focused on the overall structure of GE, he made several hard decisions about the businesses that GE should retain or sell off. Those decisions were connected with his managerial innovation, Strategic Business Units, or SBUs, a way to organize GE's substructure around core functions. Borch had to figure out whether product lines like computers, critical to an increasingly automated American workplace and society, should continue at GE. Borch's mastery of business conditions and macro-environmental factors gave him the insight needed to make the tough decisions in response to the challenges of his time.

Borch was born on April 28, 1910, in Brooklyn, New York, where his father worked as an electrical engineer with Consolidated Edison of New York. The Borches later settled in the Cleveland area, where Borch attended local public schools before enrolling at Case Western Reserve in 1927. While in college, Borch picked up a part-time job as a timekeeper on an electrical transmission line. Borch graduated Phi Beta Kappa in June 1931 with a bachelor's degree in economics, and was determined to get a job at GE's Nela Park plant, even though hiring was on hold due to the effects of the Great

Depression. "I just camped at the door of Dan Dailey, the department's auditor. . . . I got the job in October 1931 and I have been with the company ever since." 108

From the start of his GE career, Borch gained the skills and knowledge needed to be in a position to run the company. In his first assignment as a company auditor, Borch learned about GE's diverse products and functions. By making site visits, meeting with plant officials, and reviewing reports and financial statements, Borch soon knew what GE did well and not so well. In 1940, after Borch was promoted to general manager of the Customer Service Unit at Nela Park, he listened to the people who bought GE products and services, and heard their praise and their complaints. Borch already knew what was efficient and effective in GE's plants, but he was now aware of what customers liked best and least about GE.

Borch brought these understandings to his next post, heading up GE's National Lamp Division. In the late 1940s, Wilson and Cordiner decided that Borch and the National Lamp Division would carry out the decentralization philosophy that GE wanted to implement on a companywide basis. Borch was the final decision-maker on almost all questions, a shift away from GE's reliance on Advisory Committees, whose role Cordiner wanted to transform: "General Electric structure has no place for committees as decision-making bodies," Cordiner said. "It is my feeling that a committee moves at the speed of its least informed member, and too often is used as a way of sharing responsibility." 109

Borch's success as Division chief convinced Cordiner to invite Borch to the company's corporate offices in New York, where Borch rose from a member of the Accounting Services Division, to vice president of Marketing and eventually CEQ. Borch was instrumental to the Cordiner reorganization at GE in the early 1950s. ¹¹⁰ As GE vice president, Borch articulated the company's "total marketing concept" to reinforce the idea that GE is customer driven. Never losing sight of the customer when he became CEQ, Borch told a *New York Times* reporter that one of GE's greatest challenges was servicing customers. ¹¹¹ What continued to delight the majority of GE customers were the improvements in products and services made via GE's research lab and its fast-multiplying business units. The company was in a fertile creative period, where Borch let a thousand flowers bloom. ¹¹² Others noted the decisive shift in company culture to reconnect GE with its tradition of innovation. ¹¹³

Early in his tenure, Borch skillfully handled difficult internal challenges presented by GE's staff. The company and its employees were still under the public's microscope regarding the price-fixing scandal, but GE quickly dispatched the suit when Borch and GE's chairman, Gerald Phillippe, settled 90% of the antitrust claims with the stroke of a pen and a check for \$160 million. In October 1964, Borch and GE broke a six-month long strike by electrical union workers in Schenectady, agreeing to pay the workers a salary rather than on a piece-rate basis.

Meanwhile, Borch and GE chose 1964 as the year to make GE the premier player in the world's data processing and small computer industries. One customer for GE computers was the U.S. government: NASA, the National Aeronautics and Space Administration, was the target consumer for GE's new variable incremental computer system. To increase GE's market share in data processing and small computers, Borch forged new partnerships with two major European computer companies—Compagnie des Machines Bull in France and Olivetti in Italy, with whom GE agreed to create a \$43 million facility. In Japan, GE reinvigorated its connections with Toshiba, which GE had partnered with in the 1900s under Coffin; at that time GE pooled patents and resources with Shibaura and Tokyo Electric to build generators and power plants. In 1964, GE and Toshiba pooled resources to manufacture computers. Certain that computers were part of a new technological wave, Borch quickly established 13 new plants and research facilities devoted to small computers, and planned to allocate another \$400 million for a new small-computer product line in 1969.

To become a major player in the computer industry, GE faced what became insurmountable organizational limitations. When Cordiner became CEO in 1950, GE had 25 major business units, and began parsing off business units at an exponential rate. By following Cordiner's practice of maintaining units only "as big as a man could wrap his hands around," by 1969 GE had 305 business units with 400,000 employees, and the stresses and strains on the organization were becoming apparent. GE hoped to outperform the national GNP, as Borch proclaimed from time to time; but although GE sales continued to rise in the 1960s, profits did not. In the second and third quarters of 1967, GE reported earnings drops of 11% and then 18%. In late 1968, Borch conducted a comprehensive in-house study to determine the future prospects of GE's nuclear power, jet engine, and computer businesses. The study, conducted by The New Ventures Task Force, headed by Reginald Jones, Borch's successor as CEO, concluded that GE should discontinue its computer business because GE could never be better than second in this industry to IBM. In May 1970, GE sold its computer business to Honeywell in a multimillion-dollar deal that Jones finalized.

The New Ventures Task Force was not Borch's only attempt to reconfigure GE's organizational scope and structure. In 1968, Borch created a four-person executive committee to expand top-level organizational capacity. Another Borch effort to reconfigure GE eventually led to organizational improvements and the creation of a useful portfolio management tool, the McKinsey-GE Matrix. Borch hired McKinsey in 1968 to assess every one of GE's businesses and their organizational supports, with an eye toward optimizing company resources. Given the diversity of GE's product lines, the consultants took years. Using a three-by-three grid, McKinsey ranked each business on a scale of low, medium, and high, in terms of the attractiveness of the industry and the strength as a GE SBU. The criteria for the ranking of industry attractiveness included market share, market growth rate, cyclicality, barriers to entry, inflation, social issues, environmental issues, regulation, legal issues, and the like. The critical factors for internal strength included many of the functions that Cordiner isolated in his 1950 reorganization, such as sales, marketing, financial resources, research and development, and manufacturing.

The GE-McKinsey Matrix would be a shift away from Borch's and GE's policy of letting a thousand flowers bloom. For students of GE's corporate history, the period from the late 1950s to the late 1960s was given a less than flattering moniker, "the era of profitless prosperity," because GE's soaring sales numbers yielded miniscule profit margins and investment returns. In the months after GE's sale of its computer business to Honeywell, Borch acknowledged in an interview with *Forbes* that GE could not expand in all areas at any time, because there were limits to growth. "I was hit with three massive new investment areas all at once, computers, nuclear power and jet aircraft engines. You've got to put yourself in my position and ask, 'What were the other problems taking up top management's time?" 118

By the late 1960s, GE had close to 300 businesses, yet 80% of overall earnings came from just three of them—industrial equipment, power systems, and consumer gadgets and appliances. ¹¹⁹ Critics wondered if GE's long-range planners should have raised caution flags when the company tried to go into three new capital-intensive businesses all at once—computers, nuclear power and jet engines. Yet by early 1971, GE shares rose to its highest price ever, due to the company's strengths in power systems, computer appliances, and industrial equipment. Later that year, company shareholders benefited from a 2-to-1 stock split, only the fourth such split in company history.

Given GE's size and economic clout, GE had a definite impact on the American political scene in the late 1960s and early 1970s. Alarmed by the U.S. trade deficit hitting the \$7 billion mark, Borch asserted publicly that the U.S. federal government should "forgive our own social costs on U.S. exports by (tax) rebates and collect them back by taxing imports (as the Japanese and Europeans

do)."120 Borch later chaired what became known as the Business Roundtable to present a united set of pro-business policy prescriptions.

Reginald "Reg" Jones, CEO, December 1972-December 1980

Oil price shocks, recession, post-Vietnam malaise — these were three of the negative external forces that "Reg" Jones and GE had to confront in the 1970s. Yet Jones, an expert strategist, skillfully steered GE through a difficult time in American business history, when large industrial concerns struggled to restructure and refocus themselves for long-term survival. When Jones took the helm at GE in June 1972, he continued the effort of his predecessor to study each business unit at GE to determine those that should be kept and those that should be spun off. Jones brought an added perspective to this process; he evaluated GE's mix of products and services in terms of the macroeconomic forces of the time, especially rising oil costs. Jones determined that GE needed to acquire two businesses to help make GE, in his words, "recession-resistant." One purchase bid became the largest acquisition to that point in U.S. corporate history—a \$2.2 billion purchase of Utah International, a mining and engineering firm. Jones also spoke frequently about government policy, authoring articles and giving interviews in business publications. He also met privately with government leaders, including President Jimmy Carter, who, it was rumored in the popular press, encouraged Jones to join his administration.

Jones, born in 1917 in Stoke-on-Trent England, had moved to America at age eight with his parents and settled in Trenton, New Jersey. Jones's father and mother both worked at the American Rubber Factory, where his father was an electrician, his mother, an assembly line worker. A bright student, Jones aspired to be a teacher, and chose the University of Pennsylvania because it offered a nationally accepted teaching certification upon graduation. Midway through his undergraduate years, Jones switched majors and enrolled at the Wharton School.

Like Borch, Jones gained his first detailed understanding of GE's business functions as a company auditor after he graduated from GE's three-year executive training program in 1942. Unlike Borch, who was transferred from auditing to GE's customer service and marketing divisions, Jones proceeded on to a job in finance rather than sales. In 1950, Jones was named assistant to the comptroller in the Apparatus Division at GE's Schenectady Works. After spending six years on GE's finances, Jones shifted into operations when he was elevated to the general manager position for the Air Conditioning Division in New Jersey. He served there for two years and directed a remarkable financial turnaround, leading to his promotion to general manager of GE's Supply Division.¹²¹

Even though his undergraduate classes at Wharton inspired his life-long love of business finance, Jones was reluctant to move from his executive role heading GE Construction Industries in 1968. He initially refused when Borch offered Jones the position of vice president of finance, because he had grown to love the operations side of the business. However, Jones did immediately accept another assignment from Borch—leading the internal review by the New Ventures Task Force to determine the viability of the three businesses that GE launched in the 1960s—computers, nuclear power plants, and jet engines. Jones and the Task Force were unafraid to tell Borch what he likely did not want to hear: GE should spin off the computer division. Yet, Jones, as GE's chief negotiator on the Honeywell sale, allowed Borch to recover most of the \$400 million GE had invested. From this followed more responsibility—Borch asked Jones to be his chief assistant on the effort with McKinsey to realign GE's organizational strategy and structure.

On June 23, 1972, Jones became the seventh chief executive of GE, when the country's and the world's economic situation was uncertain. America was a year into President Richard Nixon's New

Economic Plan, targeted at addressing underperforming industrial company stock, unemployment, and inflationary pressures that had mounted in the late 1960s. There was still some hope that the plan would ultimately succeed without major dislocations and changes in U.S. industry. Yet Jones and GE were already well-positioned to make the right strategic decisions for GE's long-term survival. Relying on McKinsey's analysis of SBUs, Jones and GE decided to drop GE's integrated circuits unit.

Tough decisions like this were made easier due to the analytical approach Jones applied to GE. He spent his first six months studying the company intently through site visits and conversations with staff, a practice that dated back to Swope. Jones was convinced that personal contact was essential in making all decisions about whether to retain staff. "If you've seen people in good times and under stress, you're more capable of judging their capabilities than if you simply read a dossier." Creating a GE manager that could make these tough decisions now and in the future was essential to Jones. "I am concerned not with developing enough managers per se as I am with developing business managers who have the sensitivity and concern for external factors to permit them to operate successfully in what I see in the years ahead as a much more hostile environment. . . . "124"

The double-whammy of oil price shocks and recession took a heavy toll on U.S. industry by the mid-1970s, notably the automobile industry, churning out more and more full-size cars that were being eclipsed in popularity by lower-cost, high mileage imports. GE, as a supplier of headlights and other automotive parts to American automakers, felt some of these negative reverberations. GE also was directly impacted by the decision of the OPEC cartel in late 1973 to raise the price of a barrel of oil from \$3 to \$12, since oil was needed to power GE factories and make GE products. What was needed, according to Jones, was a pro-business regulatory climate and a capital infusion. Jones recommended in a fall 1975 article in the *Harvard Business Review* that the capitalization come from his proposed 12% investment tax credit for all industry and a reduction in the corporate tax rate by a few points from 48%.¹²⁵

Besides making these policy recommendations, Jones and GE took two giant steps toward insulating the company from economic recessions with the acquisition proposals for Utah International and Cox Cable. In each case, Jones clearly sought to acquire businesses that would help diversify GE's portfolio, which was traditionally weighted more toward products than services.

The proposed GE-Cox Cable merger was another attempt at entering a profitable industry that GE was unable to develop internally fast enough or large enough to become a market leader. GE had past experience with the media business—RCA, for example—and still had a stake in a dozen small radio and TV stations and a dozen cable TV outlets. Yet the company in the late 1970s would essentially have to start from a small scale, and after watching how three new ventures in the 1960s cannibalized profits from annual sales, Jones was not going to take a risk and build GE's media empire internally. Expansion would come via acquisition.

America's conclusion of the Vietnam conflict in 1975 did not usher in an era of prosperity as happened after World War II. Rather, conservation, not consumption, became a primary concern. A disillusioned, defeatist attitude after so many lives and resources were lost in Vietnam fueled what President Carter called in July 1979 a crisis of confidence, a malaise that had overtaken the traditional national can-do spirit. During these difficult days, Jones made frequent visits to Washington, D.C., to see Carter, and was invited to join his Cabinet to deal with the mounting national recession as the Director of the Office of Management and Budget or as the chairman of the Federal Reserve Board. According to Stuart Eizenstadt, one of Carter's aides, Jones brought the same attention to detail and command of the facts that he did when making any business transaction for GE. "I think he is one of

the wisest, most intelligent, most informed people on public policy I have ever met. He's always armed with the data, and he's extremely articulate in making his presentation."¹²⁸

Amid a national feeling of malaise, Jones and GE stood tall. Surveys taken of U.S. business leaders in 1979 and 1980 by the *US News & World Report* identified Jones as the most influential person in business. ¹²⁹ GE's prosperity was a reason why: under Jones's tenure, GE more than doubled its sales from \$11.6 billion to \$25.0 billion and earnings from \$585 million to \$1.5 billion. ¹³⁰

By the end of the 1970s, GE and Jones had taken several steps toward choosing the next CEO of GE. His first step came in June 1973, a year into his tenure as CEO, when he restructured the executive offices and major divisions at GE. 131 (See Exhibit 4.) One of the most significant developments that came out of this reshuffling was that Jack Welch was promoted from the general manager of the Chemical & Metallurgical Division to a Group Executive slot, making him, at age 37, the youngest in that position ever in GE history. Welch's style was seen by some as the exact opposite of Jones' cool, calm and collected demeanor. However, Jones accepted Welch's approach – by March 1975, Jones was actively planning on whom would be his successor, and soon it was clear that Welch was the right person to lead GE for the rest of the twentieth century. 134

John J. "Jack" Welch Jr., CEO, 1981-2001

Welch was born in Peabody, Massachusetts, in 1936, the only child of Irish immigrants Grace Welch and John J. Welch Sr., a conductor on the Boston & Maine Railroad. The Welches were a family of modest means. Jack recalled how his mother would get up at 6 a.m. and sift through the ashes in the furnace to find some half-burnt coal she could reuse. A devout Catholic, Grace Welch took young Jack with her to mass every morning and also encouraged Jack academically, hoping that he might someday become a physician or a priest. It was Grace Welch who helped Jack deal well with any teasing about his high-pitched voice and stammer by reminding him that he spoke that way because he was bright and his mind moved too fast for his mouth. Welch was accepted at the University of Massachusetts-Amherst, where tuition was \$50 a semester, and later he qualified for graduate fellowships and attended the University of Illinois for a Master's and then a PhD in chemical engineering.

Welch secured an interview with Daniel Fox, inventor of Lexan, at GE's Plastics Division in Pittsfield, Massachusetts in 1960. Fox hired Welch right away, and Welch started his GE career on October 17, 1960, when he and his staff of one set out to make GE's invention, polyphenylene oxide, or PPO, into a marketable product. Within a year, however, Welch submitted his resignation, upset by his small annual raise, which he didn't consider enough to support his family. However, the work atmosphere at GE Plastics remained as appealing as it was during his interview with Fox, and Welch changed his mind and stayed with the company until he retired in 2001.

Welch received a series of promotions and assignments that demonstrated by the early 1970s that he was on a fast track to the top of the GE organization. For example, in 1973, at age 37, Welch ran GE's Components and Materials Group, responsible not only for GE Plastics but also GE Medical Systems. As former GE President Rice did when he championed x-ray machines, Welch believed strongly in Computer-Assisted Tomography Scanners, CAT Scanners, that would greatly help medical personnel detect and diagnose internal injuries. Though CAT Scanners were expensive at \$1 million apiece, GE received a flood of orders for this major advance in medical technology. 137

In 1977, Welch was put in charge of one of six new sectors that Jones created — Consumer Products and Services. For many, it was a sign that Welch was in line to succeed Jones, since Wilson, Cordiner

and Borch all ran some form of GE's Consumer Products group just before becoming GE's chief executive. Jones was pleased by the results from a bold position that Welch took for GE earlier in the 1970s when he transformed GE Credit Corporation into a lending vehicle for heavy construction equipment. By the late 1970s, GE Credit Corporation became a major growth unit for GE, as Welch and Larry Bossidy, head of GE Capital, made high-risk, high-interest loans that most debtors paid off. Welch's policies at GE Capital had an immediate positive impact on GE's overall bottom line: 24% annual average growth. Welch also proved that he could be cautious. Late in the negotiations for the GE takeover of Cox Cable, Welch saw that the Cox lawyers had retained a great deal of control for themselves in the fine print of the agreement. Welch recommended walking away, and, after some reservations, Jones and the board agreed with the soundness of that recommendation, even though Cox was still coveted by GE.

Given that GE Capital secured loans for several commercial airliners, some early critics of Welch thought that he and his Consumer Products Division might take a nosedive. Instead, Welch soared to the top of the list of the candidates to replace Jones. Where Welch would emerge the winner in the end, for Jones and the GE board of directors, was with his memorandum justifying his fitness for the CEO job and vision for the company over the next 20 years. Welch said that the deal he did not make with Cox Cable was as instructive as the thousands of deals that went through under his watch. "It reinforces my view that what we have to sell to the equity investor is consistent, above average earnings growth throughout the economic cycle. The discipline to balance both short and long term is the absolute of such a strategy." 140

When Welch became CEO in 1981, hitting the target of above-average annual earnings growth was a real challenge. (See **Exhibit 3**.) The national economy was in a recession and oil was more than \$50 a barrel. For GE to continue the positive earnings momentum that Jones had created during his term, Welch pared down an important cost in every GE product or service—GE's staff. (See **Exhibit 4** for GE's 1981 Organizational Chart.) The restructuring and resulting layoffs at GE were decisions that Welch later explained with some remorse: "The world changed, and we had to deal with it. . . .oil was going to go to \$100 a barrel, if you could get it. Inflation was 20%." 141

In December 1981, Welch held a press conference with Wall Street analysts to begin an explanation of what became known as the strategy of "number one or number two, else fix, sell or close." (See Exhibit 6.) Welch explained how GE would decide which businesses and staff GE should keep, which should be spun off or outsourced, and which should be acquired. Companies first or second in market share of their industry would be kept, so long as these businesses had sizable earnings growth potential in the double digits. To further help GE become lean and agile, Welch devised his "three circles" test for GE business units. (See Exhibit 8—Jack Welch's Three Circles Vision for GE.) Staff contracted from 410,000 to 220,000 in a couple of years, as some critics called Welch "Neutron Jack" for leaving all of GE's buildings intact while killing off all the people, as a neutron bomb was designed to do. Welch was unsentimental about his decision-making—in 1984, he divested GE of its Housewares Division, a part of GE since the 1900s when light bulbs were first sold to American homeowners, as well as Utah International, the major acquisition of his predecessor's tenure. Welch's policies generated bitterness among those who believed in the social contract of the post-World War II era guaranteeing lifetime employment. Welch acknowledged that the social contract had to be updated for GE to survive the 1980s and beyond. (143)

After a period of national malaise, Welch had confidence and a vision for GE. This was crucial, as GE at the end of Welch's third year as CEO had a miniscule growth spurt in labor productivity of 1.9%. This was a time when Welch was reviewing the 40 businesses in his three circles to identify the ones that had shown growth potential in 1983 and 1984. Just 16 of the 40 turned out to be winners,

which translated into more plant closings, more layoffs, and more concerns about the value of corporate downsizing.

In 1985, Welch attempted to change the mood of ambivalence in the downsized GE corporation by illuminating the Statue of Liberty, as part of a centennial celebration on Staten Island. He also introduced a new ad campaign that seemed as authentically American as the Statue of Liberty - "GE: We Bring Good Things to Life."145 Then, Welch engineered a special mega merger, signing off on GE's \$6.3 billion purchase of RCA, a former GE possession that now included a very lucrative TV business, NBC. However, RCA was not just a media company; it was a conglomerate. Like GE, RCA had a significant contracting business with the U.S. military, providing electronic equipment to several Naval weapons programs. RCA also had a sizable consumer electronics business and a set of businesses that could help GE transform from its traditional strength in manufacturing to services. That transformation had already been initiated with gusto by Welch, who in 1982 had opened the GE 24-hour customer-service answer center. However, where GE expanded the most in terms of its service offerings was adding new businesses to GE Capital. After GE bought Employers Reinsurance Inc. for \$1.1 billion from Texaco in 1984, GE Capital, now called GE Financial, acquired 80% of the Kidder, Peabody investment house in 1985, followed by the acquisition of Montgomery Ward Credit Corporation in 1988. (See Exhibit 9-GE's Major Divisions Presented as a Percentage of Total Revenues, 1981-2000.)

After initiating these dramatic changes to GE's mix of products and services, Welch turned his attention to making GE's organizational culture and operations more effective. Welch started laying the groundwork for this process in his first few years as CEO with significant capital investment. Welch put \$130 million each in R&D and modernizing GE's Schenectady Works, \$250 million in GE Lighting, and another \$1 billion in the Major Appliances unit. Besides infusing GE's infrastructure with money, Welch infused his staff with the sense of the greatness of their potential. "Work-Out" was the new mantra for GE--ridding the company of wasteful bureaucracy, memoranda, and approvals as Cordiner's decentralization plan had intended to accomplish in 1950. (See Exhibit 6.) Work-Out was more than a decentralized structure; Welch said it was part of a boundaryless organization where ideas for improvement could come from anyone at any time. Over the next four years, 200,000 GE employees came to Crotonville to learn the basics of Work-Out. The sessions lasted three days and involved a detailed, no-nonsense look by everyone in a unit at how they could better do their jobs and how GE could better serve its customers. It also succeeded in empowering workers and removing lingering cynicism about the downsizing of the early 1980s. 146

To reinforce the concept that new ideas for improvement were welcome in the Work-Out process at GE, the company created a library of best practices followed by other organizations. One of those best practices became a GE policy in the 1990s that had many imitators—Six Sigma. Originally devised at Motorola, it was a quality assurance/quality control management tool that met the needs of a global economy. Like GE, other industrial companies competing in the late 1980s and 1990s chose to make quality a primary objective, adopting Six Sigma or other disciplined quality management tools, like Total Quality Management. But Six Sigma became engrained into the DNA of GE because of the enthusiasm that Welch had for the idea, and it became a part of all of GE's businesses that were launched under Welch, from the CAT Scan technology he championed in 1981, to the CNBC cable network he launched in the late 1990s. Like Total Quality Management tools, Like Total Quality Management.

The boundaryless, quality-focused GE organization was well-equipped to make its mark in the increasingly globalized economy of the 1990s. In the 1980s, anticipating NAFTA (the North American Free Trade Agreement), Welch invested heavily in international partnerships. But the globalization

trend was not merely a way to cut costs by hiring cheaper labor; Welch recognized that it was a way to optimize GE as a truly international corporation. 149

While employee layoffs at GE in the early 1980s were justified as a means for making the company lean and agile, a similar policy of eliminating the bottom 10 performers in the late 1990s was presented as a way of improving the corporate gene pool and strengthening the company's commitment to Six Sigma. After weathering a couple of years of slow growth in the early 1980s, GE produced a 20% return on investment for the next 18 years and announced five separate stock splits during this span, including a 3-for-1 split in May 2000, Welch's final year as GE CEO.

In December 2000, a columnist in *The New Yorker* making a prediction about the future of GE and Jeffrey Immelt, Welch's successor as CEO, wrote admiringly of GE's successful run of top executives:

Jeffrey Immelt faces one of the toughest challenges in business history. As the new CEO of General Electric, Immelt must follow in the footsteps of a man who was perhaps the most respected top executive of his time—a man who reinvented GE and fashioned a new management structure that became the model for firms around the world. He developed a host of new products, invested heavily in groundbreaking research, and sent the company's revenues and profits soaring. This act, you don't want to follow.

I refer, of course, to Ralph Cordiner, the GE head in the postwar years. No, make that Charles Coffin, the company's co-founder. I could have in mind Gerard Swope, who steered GE through the Jazz Age and the Great Depression. Or I could be talking about Jack Welch. . . . ¹⁵⁰

Exhibit 1 Dow Stocks

Origin	aal 12 Industrials Chosen by Charles Dow in 1896	Dow S	Stocks at the End of the 20th Century
1	American Cotton Oil	1	3M Corporation
2	American Sugar	2	Alcoa
3	American Tobacco	3	Altria (Philip Morris)
4	Chicago Gas	4	American Express
5	Distilling and Cattle Feeding	5	AT&T
6	General Electric	6	Boeing
7	Laclede Gas	7	Caterpillar
8	National Lead	8	CitiGroup
9	North American Company	9	Coca-Cola
10	Tennessee Coal, Iron & Railroad Co.	10	Eastman Kodak
11	U.S. Leather	11	E.I. Du Pont de Nemours
12	U.S. Rubber	12	Exxon Mobil
		13	General Electric
		14	General Motors
		15	Hewlett-Packard
		16	Home Depot
		17	Honeywell
		18	Intel
		19	IBM
		20	International Paper
		21	J.P. Morgan Chase
		22	Johnson & Johnson
		23	McDonalds
		24	Merck
		25	Microsoft
		26	Proctor & Gamble
		27	SBC Communications
		28	United Technologies
		29	Wal-Mart
		30	Walt Disney

Source: Dow Jones Indexes website, available at http://djindexes.com/mdsidx/dowloads/DJIA_Hist_comp.pdf, accessed December 2005.

Exhibit 2 Charles Coffin's One-Page Financial Summary Prepared for J.P. Morgan, December 1891

Selected Annual Financial Figures for Edison General Electric and Thomson Houston

\$15,000,000 10,940,000 \$2,098,000 6,000	\$10,400,000 10,304,500 \$2,700,000
\$2,098,000	
. , ,	\$2,700,000
6,000	
0,000	4,000
400,000	340,000
3,000–4,000	3,000–4,000
375	870
2,300	Very few
180	204
2,230	2,760
	375 2,300 180

Source: Robert Silverberg, Light for the World: Edison and the Power Industry (New York: D. Van Nostrand, 1967), p. 257.

Exhibit 3 Selected GE Financial Data, 20th Century

1900-1950

First/Last Year of	Coffin			Rice			Swope			Wilson		
Tenure	1892	1912	+/-	1913	1922	+/-	1923	1939	+/-	1940	1950	+/-
Revenues	\$13.8	\$89.2	\$75.4	\$106.5	\$200.2	\$93.7	\$271.3	\$304.7	\$33.4	\$411.9	\$1,960.4	\$1,548.5
Profits	2.9	12.6	9.2	14.1	26.2	12.1	33.5	41.2	7.7	56.2	173.4	117.2
Total Assets	50.9	131.9	81.0	144.1	355.4	211.3	373.6	392.2	18.6	435.6	1,277.4	841.8
Fixed Assets	.3	26.1	25.8	30.5	65.0	34.5	59.6	37.1	(22.5)	41.5	276.5	235.0
Stock Price ^a												
Low	100.00	155.00		129.75	136.00		167.00	31.00		26.13	41.13	
High	115.72	188.50		187.00	190.00		202.25	44.63		41.00	50.50	
Adjusted Drice												
Adjusted Price Low	N/A	.034		.028	.030	`	.036	.108		.090	.143	
High	N/A	.034		.028	.030		.030	.155		.142	.143	
riigii	IN/A	.041		.041	.041	4	.044	.100		.142	.175	
Employment	10,000	N/A		65,000	N/A	=	N/A	71,485		85,746	183,800	98,054

1951-2000

First/Last												
Year of		Cordiner			Borch			Jones			Welch	
Tenure	1951	1962	+/-	1963	1972	+/-	1973	1980	+/-	1981	2000	+/-
Revenues	2,319.3	4,792.7	2,473.4	4,918.7	10,239.5	5,320.8	11,575.3	24,959	13,383.7	27,240	129,853	102,613
Profits	138.1	265.8	127.7	270.6	530.0	259.4	585.1	1,514	928.9	1,652	12,735	11,083
Total Assets	1,459.8	2.847.0	1,387.2	3,015.1	7,401.8	4,386.7	8,324.2	18,511	10,186.8	20,942	437,006	416,064
Fixed Assets	318.7	712.9	394.2	694.8	2,136.6	1,441.8	2,360.5	5,780	3,419.5	6,844	40,015	33,171
Stock Price Low High	49.50 63.88	54.25 78.50	=	71.75 87.50	58.25 73.00	 	55.00 75.88	44.00 63.00	 	51.13 69.88	41.65 60.50	
Adjusted Price												
Low High	.172 .222	.565 .818) :	.747 .912	1.214 1.521	 	1.146 1.581	.917 1.313	 	1.065 1.456	31.354 ^b 53.167	
Employment	210,200	258,174	47,974	262,882	369,000	106,118	388,000	402,000	14,000	404,000	313,000	(91,000)

Sources: Compiled from: 1892 Revenues and Profits, General Electric, *Professional Management in General Electric, Book One: General Electric's Growth* (New York: General Electric Company, 1953), pp. 10–11 and 13. 1892 Total and Fixed Assets are from GE's 1892 Annual Report, p. 10. 1892 Stock Prices are from *The Wall Street Journal*, for all other years, GE Investor Relations. All other data are from GE Annual Reports, except Employment for 1892, 1940, 1950 and 1951, from GE's 1953 Blue Book, p. 6.

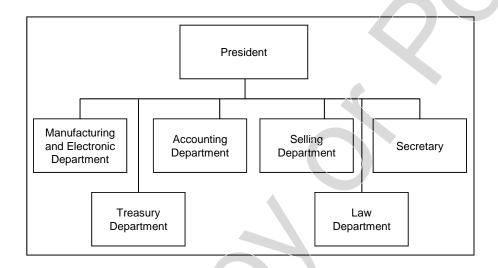
Notes: Revenues, Profits, Total Assets, and Fixed Assets are expressed in millions of dollars; all Stock Prices are in dollars.

^aGE authorized nine stock splits: 1926 (4 for 1), 1930 (4 for 1), 1954 (3 for 1), 1971 (2 for 1), 1983 (2 for 1), 1987 (2 for 1), 1994 (2 for 1), 1997 (2 for 1), and 2000 (3 for 1). The Adjusted Prices were calculated backwards from the final stock split in 2000.

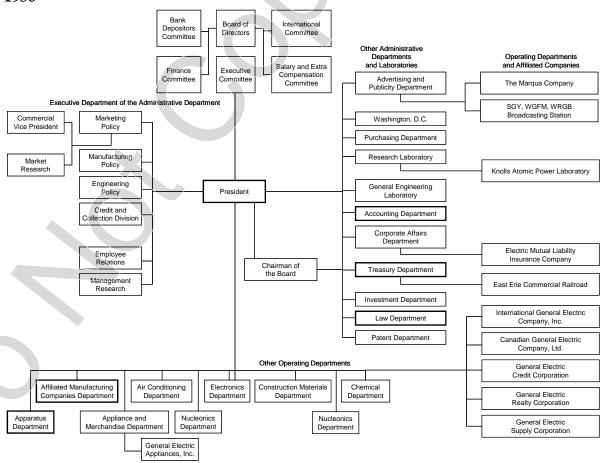
^bAdjusted Stock Price for 1999.

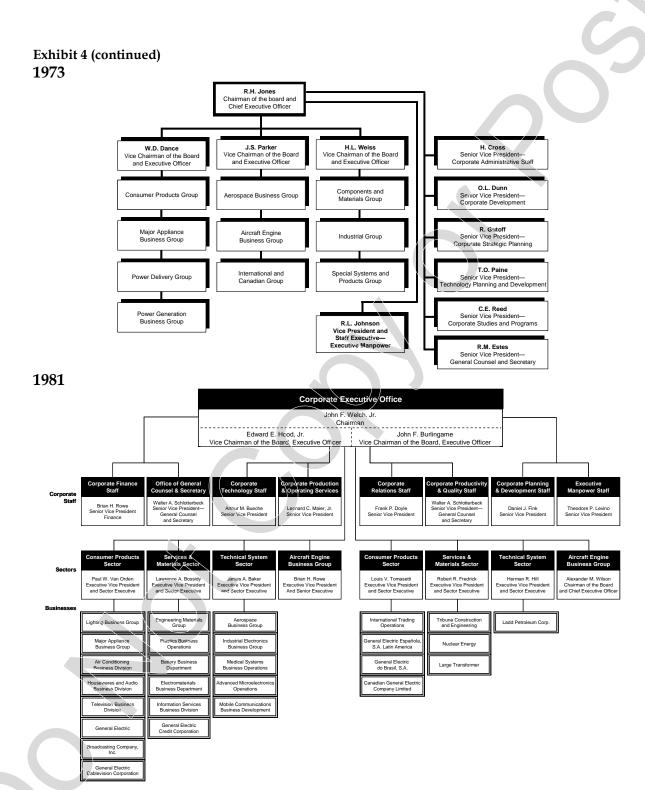
Exhibit 4 General Electric Organizational Charts – 1892, 1950, 1973, 1981

1892



1950

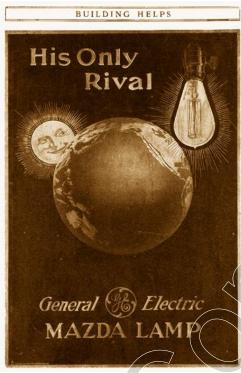




ces: (1) Ronald Greenwood, Managerial Decentralization (Lexington, MA: D.C. Heath & Co. 1974), p. 14; (2) Greenwood, p. 23, and Professional Management in General Electric: Book One: General Electric's Growth, opposite p. 48; (3) "GE's Jones Restructures His Top Team," Business Week, June 30, 1973, p. 39; (4) Noel M. Tichy and Stratford Sherman, Control Your Destiny or Someone Else Will (New York: Harper Business, 2005), p. 573.

Exhibit 5 GE Advertisements, Decades of the 20th Century

1900-1920s





1930s-1950s

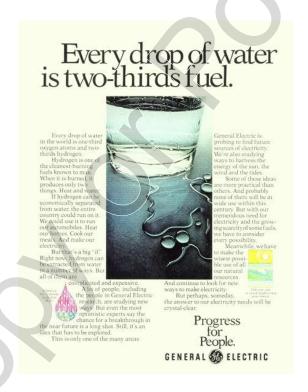




Exhibit 5 (continued)

1960s-1970s





1980s-1990s





Sources: GE corporate web site, available at http://www.ge.com/innovation/FLASH/timeline.html, accessed December 2005, except for "Any Woman ad," taken from Roland Marchand, *Creating the Corporate Soul* (Berkeley, CA: The University of California Press, 1998), p. 159.

Exhibit 6 General Electric Advertising Slogans, GE CEO Mantras

1920s	Slogans:	GE is a welcome friend in your home. Any woman who does anything which a little electric motor can do is working at three cents an hour.
1930s	Slogan:	More goods for more people at less cost
	Mantra:	Analyze, Organize, Deputize, Supervise
1940s	Slogan: Mantra:	You can put your confidence in General Electric. Make blueprints for action
1950s	Slogan:	Progress is our most important product.
	Mantras:	No sale, no job. Go for it. Decentralize
1960s	Mantra:	Strategic Planning
1970s	Slogan:	Progress for People
	Mantra:	Recession-resistant, not recession-proof
1980s	Slogan:	GE: We bring good things to life.
	Mantra:	GE must rank "Number One or Number Two" in divisions inside the three circles of manufacturing, technology and services, else fix, sell, or close.
1990s	Mantras:	Six Sigma. The 4Es (Energy, Enthusiasm, Edge, Execution)

Source: Compiled from various sources by casewriter.

Exhibit 7 Roles of Individual Contributors and Managers, GE Blue Books

SOME DISTINGUISHING CHARACTERISTICS

The Work of a Functional Individual Contributor

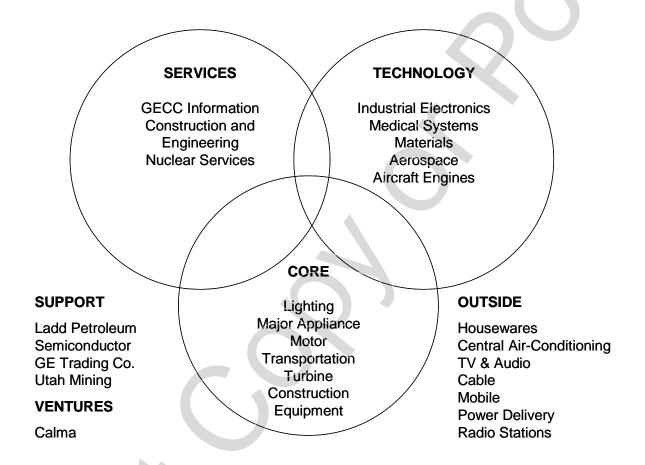
The Work of a Professional Manager

- Responsible for achieving the objectives of the specific position.
- Proposes changes in the over-all objectives and broad function of the specific position and participates in their determination; recommends objectives for other positions, for the component and for the business.
- Includes responsibility, as assigned, to recommend and suggest to Manager on decisions involving other positions, for example: organizing, staffing, appraising.
- 4. *Proposes* policies and procedures for the component and the business and *participates* in their formulation.
- Interprets policies of own component and the business as these affect the responsibilities of the specific position, and of other positions as required.
- 6. Responsible for deciding on specific objectives, plans and schedules of the position to meet agreed upon over-all objectives and broad function of the position; recommends objectives, plans and schedules for the component and for the business; can have responsibility for deciding on dispatching the work of other positions, when this responsibility has been designed into the specific position.
- 7. When designed into the specific position, has responsibility for guiding and counseling; and for inspecting, measuring and evaluating the work results of others; has responsibility to recommend on appraisals of others to the Manager to whom they report on request of Manager.
- Develops and recommends standards for measuring work of the specific position; has responsibility for recommending standards for measuring work of other positions, as requested by the Manager; measures results of the work of the specific position.
- Responsible for decisions designed as necessary to achieve the objectives of the specific position, and for its contribution to the component, and the business.
- 10. Responsible for appraising own strengths and weaknesses; for evaluating and deciding on own self-development plans after receiving appropriate suggestions from the Manager of the component; responsible for teaching, advising, and counseling in his functional specialty as requested by others or as designed into the specific position.
- Responsible for direct communication with sources and recipients of necessary information, keeping Manager of component and others informed where their responsibilities are significantly affected.

- Responsible for the achievement of all objectives of the component; responsible for his personal Professional Managerial contribution to the achievement of component objectives.
- Responsible for deciding on the over-ail objectives and broad function of all positions in the component, except the Managerial position; proposes over-all objectives and broad function for Managerial position and for component and participates in their determination; recommends objectives for next larger component and for the business.
- Responsible for the organization of positions in the component; for example, designing and grouping positions, staffing, appraising, removing for cause (within authority).
- 4. Responsible for deciding on policies and procedures for the component within policies and procedures of the mext larger component and the business; proposes policies and procedures for next larger component and for the business and participates in their formulation.
- Interprets, to those in the component, policies of larger component and the business as these affect the work of the component.
- Responsible for deciding on objectives, plans and schedules for the component within agreed upon over-all objectives and broad function of the component; recommends objectives, plans and schedules for next larger component and for the business.
- Responsible for deciding on appraisals of all those reporting to him in the component; can have responsibility to recommend on appraisals of others to the Manager to whom they report.
- 8. Responsible for deciding on standards for measuring work of all positions in the component; develops and recommends standards for measuring work of the Managerial position; can have responsibility for recommending standards for measuring work of other positions in the business; measures results of the work of the component and of the Managerial position.
- Responsible for integrating or resolving conflicts in work occurring between positions in the component; and of personal conflicts, as required by the work.
- 10. Responsible for creating climate for the self-development of all in the component; for getting those in the component voluntarily to appraise their own strengths and weaknesses; responsible for suggesting plans for their own self-development; responsible for appraising his own strengths and weaknesses; for evaluating and deciding on own self-development plans after receiving appropriate suggestions from the Manager of the next larger component; responsible for teaching the work of managing to Managers in his component, and to other individuals in the component to the extent required by their work.
- Responsible for direct communication with sources and recipients of necessary information, keeping Manager of next larger component and others informed where their responsibilities are significantly affected.

Source: General Electric, Professional Management in General Electric, Book Four: The Work of a Functional Individual Contributor (New York: General Electric Company, 1959), p. 31.

Exhibit 8 Jack Welch's Three Circles Vision for GE



Source: "GE's Two-Decade Transformation: Jack Welch's Leadership," HBS No. 399-150. (Figure retyped by casewriter.)

Exhibit 9 GE's Major Divisions Presented as a Percentage of Total Revenues, 1981–2000

GE Division	1981	1985	1990	1995	2000
Aerospace			9.6)
Aircraft Engines	10.6	16.1	12.9	8.7	8.3
Appliances	11.2	12.4	9.8	8.5	4.5
Broadcasting			5.5	5.6	5.2
Consumer Products	15.1	12.2			
ndustrial Products & Systems	19.3	15.6	12.1	14.6	9.1
Natural Resources	6.2				
Plastics/Materials	7.4	8.4	8.9	9.5	6.0
Power Systems	21.6	19.0	9.9	9.4	11.4
Technical Products and Services	10.8	17.8	8.2	6.3	6.1
GE Capital	.9	1.7	25.2	37.8	51.0
Eliminations	(3.0)	(3.1)	(2.1)		(1.7)

Source: General Electric Annual Reports for 1981 (p. 52), 1985 (p. 34), 1990 (p. 33), 1995 (p. 60), and 2000 (p. 44).

Endnotes

- ¹ Technically speaking, Ralph Cordiner was the first GE CEO, creating the position in 1958. Before that organizational change, the two highest-ranking officers were the president of the corporation and the chairman of the board.
- ² Lester Thurow's testimonial for the 1994 book on Jack Welch and the GE way, Control Your Destiny or Someone Else Will, addresses this very point. "The January 1, 1900, Wall Street Journal reported that the top 12 companies of the time were: American Cotton Oil Company; American Steel Company; American Sugar Refining; Continental Tobacco Company; Federal Steel; General Electric; National Lead; Pacific Mail; People's Gas; Tennessee Coal and Iron; U.S. Leather; and U.S. Rubber. Only General Electric remains. Why? Control Your Destiny or Someone Else Will explains." Noel M. Tichy and Stratford Sherman, Control Your Destiny or Someone Else Will (New York: Harper Business, 1994).
- ³ Seven of the eight GE CEOs are ranked amongst the top 1,000 CEOs and founders of American businesses in the 20th century based upon research conducted by Anthony J. Mayo and Nitin Nohria and described in their 2005 book *In Their Time*. Edwin Rice, Coffin's immediate successor, is the lone GE CEO not included in the top 1,000. However, this case identifies how all eight GE CEOs managed or led their company in response to six contextual factors: government intervention; global affairs; demography; social mores; technology; and labor. For a more detailed discussion of these six contextual factors, see Anthony J. Mayo and Nitin Nohria, *In Their Time* (Boston: Harvard Business School Press, 2005).
- ⁴ Blaine McCormick, At Work With Thomas Edison: 10 Business Lessons from America's Greatest Inventor (Canada: Entrepreneur Press, 2001), pp. 137–160.
- ⁵ The general difference between Alternating Current (AC) and Direct Current (DC) is that AC is transmitted intermittently in cycles, while DC is a continuous emission from the power station. In practical terms, this means that the strength of the DC charge weakens over a long distance—that is, the charge would start to lose voltage the farther it was away from the power station. This problem did not exist with AC—AC did not lose power between the power station and the destination.

In the early 1890s, these distinctions were significant to city planners deciding on the way to electrify American cities. If a city relied upon DC electrical systems, that city had to have more power stations more closely bunched together to do the job, whereas with AC, fewer power stations were needed since the AC voltage could travel long distances without losing strength.

Discoveries later in the 1890s by Nicola Tesla and Charles Steinmetz led to the creation of a transformer, which could use both AC and DC. For example, AC could carry the voltage almost to the destination; then, in the transformer, it could be converted into DC, which would assure a continuous power surge rather than a cyclical one.

For more information, see the U.S. government's Energy Information Agency web site at www.eia.doe.gov/basics/electricity_basics.html, accessed December 2005.

- ⁶ This is the version of the story provided in greater detail in the PBS documentary, "Edison's Miracle of Light," *American Experience*, John Walter, director, 1995.
- ⁷ T. Commerford Martin and Stephen Leidy Coles, *The Story of Electricity, Volume 1* (New York: M. M. Marcy, 1919), p. 82.
- ⁸ See, for example, "Abilities Out of Date," *The Wall Street Journal*, July 12, 1913, p. 1, and "C. A. Coffin Dies, Electrical Pioneer," *The New York Times*, July 15, 1926, p. 23.
- ⁹ Jim Collins, "The 10 Greatest CEOs of All Time: Learn from Them," *Fortune*, July 21, 2003, p. 68. "Charles Coffin Built the Stage on which They All Played."
- ¹⁰ Charles E. Wilson, *Charles A. Coffin (1844–1926), Pioneer Genius of General Electric Company* (New York: the Newcomen Society of England American Branch, 1946). See also the General Electric biography of Charles A.

Coffin, available at www.ge.com/en/company/company info/executivebios.html (accessed August 2005), part of an extensive online corporate history and archives.

- ¹¹ The Wall Street Journal's first GE stock quote reports a 2% quarterly dividend on shares valued at \$108.5 to \$109. ("Comment on the Market," The Wall Street Journal, July 18, 1892, p. 2.) This 8% annual dividend return seemed a sure bet in an uncertain stock market, as we see in "Studies in Value: General Electric," The Wall Street Journal, July 20, 1900, p. 2: "To pay 8 per cent dividends on General Electric stock requires in round figures \$1,900,000 per annum after allowing for preferred stock and debentures. The company earned last year from current operations not less than 24 per cent on its common stock. Even in 1896, a very poor year, it earned 8 per cent easily on the common stock." In 1903, a year with an economic downturn, GE provided 22%, and in 1912, Coffin's last full year as CEO, GE traded at \$185 and provided a 30% dividend return. "General Electric," The Wall Street Journal, April 17, 1903, p. 5, and "General Electric," The Wall Street Journal, November 13, 1912, p. 1.
- ¹² Niles Carpenter Jr., "The Westinghouse Electric and Manufacturing Company, The General Electric Company, and the Panic of 1907, Part I," *The Journal of Political Economy*, March 1916, pp. 230–246, and "Part II," April 1916, pp. 382–399.
- ¹³ W. Bernard Carlson, *Innovation as a Social Process: Elihu Thomson and the Rise of General Electric* (New York: Cambridge University Press, 1991), pp. 208–209.
 - ¹⁴ R. G. Dun Reports, Volume 24, M. P. Clough, p. 165.
- ¹⁵ Wilson, *Charles A. Coffin*, p. 5. The Dun reporters eventually realized that C. A. Coffin was adding something to the business: "November 1, 1882—One of the leading houses here, doing a very successful business and steadily accumulating, are very easy in money matters . . . are men of excellent ability, have given no notes for merchandise for seven years and their credit unquestioned, are worth 200 to 225 thousand dollars." *R.G. Dun Reports*, Vol. 26, C. A. Coffin & Co., p. 358.
- ¹⁶ General Electric, Professional Management in General Electric, Book One: General Electric's Growth (New York: General Electric Company, 1953), p. 57.
 - ¹⁷ Wilson, Charles A. Coffin, pp. 12–13.
 - ¹⁸ Carlson, p. 220.
 - ¹⁹ Wilson, Charles A. Coffin, pp. 15–16.
- ²⁰ In this early era of electrical expansion, risks of electrocution, fire, and explosion were real, especially given that not all that needed to be known had been discovered about the AC that Thomson Houston specialized in, or the DC that was the focus of Edison Electric.
 - ²¹ John T. Broderick, Forty Years with General Electric (Albany, NY: Fort Orange Press, 1929), p. 32.
 - ²² Professional Management in General Electric, Book One, p. 5.
 - ²³ Alfred D. Chandler, Jr., The Visible Hand (Cambridge, MA: Harvard University Press, 2002), p. 417.
- ²⁴ For a detailed history of GE's Research Lab in Schenectady, see George Wise, *Willis R. Whitney, General Electric and the Origins of U.S. Industrial Research* (New York: Columbia University Press, 1985).
- ²⁵ General Electric biography of Charles A. Coffin, available at www.ge.com/en/company/companyinfo/executivebios.html, accessed August 2005. See also Broderick, Forty Years with General Electric.
 - ²⁶ Carpenter Jr., "Part II," p. 396.
 - ²⁷ "General Electric," The Wall Street Journal, April 26, 1902, p. 1.
 - ²⁸ "The World of Finance," Harper's Weekly, October 14, 1899, p. 1055b.

- ²⁹ Electrification ranks ahead of the automobile and the airplane. See the National Academy of Engineering's web site at www.greatachievements.org, accessed December 2005.
- ³⁰ Broderick, pp. 44–45. "That corporation, now a gigantic holding unit, separate from the General Electric Company, besides insuring an adequate supply of capital for the local securities by making their securities marketable, became their guide, philosopher and friend. Some of them it helped to organize, and during the initial stages of operation, to manage. Into others that languished, it instilled new life by pointing out opportunities alike for increased efficiency and for profitable expansion. It recommended advantageous mergers, and employed its facilities to bring them about. Its activities in a word, followed a comprehensive scheme of helpfulness."
 - ³¹ Broderick, p. 48.
 - ³² Broderick, p. 51.
 - ³³ Alfred D. Chandler, Jr., Inventing the Electronic Century (New York: The Free Press, 2001), p. 202.
- ³⁴ "General Electric: General Vehicle Co. Secures Exclusive Manufacturing Rights for Mercedes Commercial Cars in U.S.," *The Wall Street Journal*, July 29, 1912, p. 2.
 - ³⁵ "Panama Canal Motor Contract Awarded," The Wall Street Journal, April 2, 1912, p. 7.
- ³⁶ "New Head of General Electric Long Identified with the Company," *The Wall Street Journal*, June 21, 1913, p. 8.
- ³⁷ General Electric, A Century of Progress: The General Electric Story, 1878–1978, A Photohistory in Four Volumes (Schenectady, NY: Hall of History, 1981). Volume 2 is titled "The Steinmetz Era, 1892–1923." Volume 1 is "The Edison Era, 1876–1892," Volume 3, "On the Shoulders of Giants, 1924–1946," and Volume 4, "Pathways of Progress, 1947–1978." In 1922, the year Rice retired, no articles by or about him are noted in the Reader's Guide to Periodical Literature. However, there are nine entries for Steinmetz.
- ³⁸ Broderick, p. 26. "All three men, though intensely earnest, were in fact singularly unassuming. They lacked both the virtues and the defects of the typical go-getter of today, with his faith pinned to the paraphernalia of high-pressure salesmanship."
 - ³⁹ Broderick, p. 62.
- ⁴⁰ See, for example, David Loth's biography of Rice's successor at GE, Gerard Swope. "In 1913, Coffin had exchanged the presidency of his company for the chairmanship. He had placed one of the industry's pioneer engineers, Edwin W. Rice, Jr., in his old office, but Coffin remained the executive head; he alone signed reports to stockholders just as he had when he was president. Rice, who was a scholarly type and looked it, with a round face, round spectacles and a tiny imperial ornamenting his round chin, devoted himself almost exclusively to problems of research and engineering, in which he displayed great imagination and took much responsibility. But he was barely consulted on such matters as the new subsidiary for foreign business." David Loth, *Swope of GE: The Story of Gerard Swope and General Electric in American Business* (New York: Simon and Schuster, 1958), pp. 94–95. This opinion is somewhat echoed in Rice's official GE biography: "In 1913, he succeeded Charles A. Coffin as president of GE. Coffin, however, recognized Rice's limitations as a businessman, and continued to hold the Company reigns as both an electrical pioneer and an industrial statesman." Indeed, GE's annual reports from 1913 to 1922 are introduced with a letter from Charles A. Coffin, president of GE's board of directors, rather than a letter co-signed by the CEO, Rice, and the chairman of the board. Indeed, Rice had more of a voice in GE's annual reports before becoming CEO, when his Third Vice President's report was included each year. (*General Electric Annual Reports* for the years 1901 to 1922.)
 - ⁴¹ Broderick, pp. 75–78.
 - ⁴² Broderick, pp. 184–185.
 - ⁴³ September 21, 1900, letter to Rice, quoted in Wise, p. 76.

- 44 Carpenter, "Part II," p. 396. This is part of Langmuir's legacy as a scientist recognized in 1932 when he was awarded a Nobel Prize.
 - ⁴⁵ "General Electric Reducing Forces," The Wall Street Journal, November 24, 1913, p. 4.
- ⁴⁶ GE, however, did not completely avoid worker strikes. In 1917, GE Lynn staff staged a strike to get an increase in pay commensurate with the increase in work and production that was demanded of GE to supply soldiers and the U.S. military effort in World War I. When the federal government bumped up basic pay by 20 cents in 1918, the strikers went back to work.
- ⁴⁷ These benefits are described in further detail in Ripley, with an introduction by E. W. Rice, Jr., *Life in a Large Manufacturing Plant* (Schenectady, NY: General Electric Company, 1919).
- ⁴⁸ General Electric, *Professional Management in General Electric, Book One, General Electric's Growth*, pp. 14–15. Thirty years later, GE employees were required to make a contribution of one-third, with GE funding the other two-thirds.
- ⁴⁹ GE's breakthrough in radio technology came soon after Ernst Alexanderson, hired to work at the GE Research Lab in 1902, developed a high frequency alternating generator for long-distance radio transmission. That this development did not have immediate application did not deter GE, as Thomas Peters and Robert Waterman explain in their analysis of "bootlegging at GE" in their book *In Search of Excellence: Lessons from America's Best Run Companies* (New York: Warner Books, 1982), pp. 144-145. "At GE, one term for experimenting is bootlegging. . . . There the tradition of squirreling away a little bit of money, a little bit of manpower, and working outside the mainstream of the organization is time-honored."
 - ⁵⁰ Alfred D. Chandler, Jr., Scale and Scope (Cambridge: Harvard University Press, 1990), p. 221.
- ⁵¹ B. C. Forbes, "New Type Executive, Wizard of Plants and Markets," *Forbes*, February 2, 1923. Twenty-five years later, when Forbes put together his collection of "America's Fifty Foremost Business Leaders," he noted that Swope was one of the elder statesmen, and would have been one of the 50, but Swope was no longer running the day-to-day business of a corporation in 1948. B. C. Forbes, editor, *The Life Stories of America's 50 Foremost Business Leaders: How They Rose to the Top* (New York: B. C. Forbes Publishing, 1948), p. ix.
- ⁵² Gerard Swope quoted in an attachment to a July 30, 1948 letter from Joseph E. Kewley, former staff member at GE's Nela Park Plant, to Rudolph Clemen, in the personal papers of Henrietta Hill Swope, 1917–1982, Accession 82-M146, Schlesinger Archives, Radcliffe College, Folder 32.
 - 53 Ibid.
- 54 GE opened an office in St. Louis due mostly to Swope's salesmanship and expanding GE's customer base beyond Chicago and its suburbs.
 - ⁵⁵ The Swope Plan was presented to the American public in the September 28, 1931 edition of *Time*.
- ⁵⁶ Roger W. Babson, "What Makes a Successful Businessman—Analyzing the Reasons for Failures—Labor's Changing Status—Price Ups and Downs—Distributing and Retailing," tenth of a continuing series, *Forbes*, January 20, 1923, pp. 409 and 420.
- ⁵⁷ Roland Marchand, "The Inward Thrust of Institutional Advertising: General Electric and General Motors in the 1920s," *Business and Economic History*, Volume 18, 1989, p. 190.
- ⁵⁸ David E. Nye, Electrifying America: Social Meanings of a New Technology, 1880–1940 (Cambridge, MA: MIT Press, 1985), p. 271.
 - ⁵⁹ Joseph Schumpeter, *Business Cycles* (New York: McGraw Hill, 1964), pp. 306–307.
 - ⁶⁰ Swope quoted in Loth, p. 134.

- ⁶¹ "General Electric Gives Up Holdings in Public Utilities, Relinquishes Electric Bond and Share, Controlling 100 Power Enterprises, Wall Street Surprised, News Sends Stock Up to New High of 307-3/8, but heavy selling closes it at 297, New Company Announced, To Take Over General Electric Interest and Distribute Its Shares to General Electric Shareholders," *The New York Times*, December 31, 1924, p. 1.
- ⁶² The closest GE would come to that monumental government intervention was in the fall of 1931, when federal investigators found a list of supposed clients of Samuel Insull who, when he was short on cash, allegedly offered low-cost shares in certain public utility offerings to a preferred list of customers rather than through a public offering. The list included the names of Swope and Young. Young was asked to testify before Congress in December 1931, and Swope, Young and GE were eventually exonerated. "Friends of Insull," *Time*, October 3, 1932, "Friends of Insull, Continued," *Time*, October 10, 1932, and "Young on Insull," *Time*, December 26, 1932.
 - ⁶³ Loth, pp. 115-116.
 - ⁶⁴ Ibid.
 - ⁶⁵ Paul Keating, Lamps for a Brighter America (New York: McGraw Hill, 1954), pp. 135–166.
 - ⁶⁶ Professional Management in General Electric, Book One, p. 38.
- ⁶⁷ Loth, p. 153. Whitney helped set the collaborative team approach and excitement about scientific inquiry with his standard greeting to his staff: "Are we having good fun today?"
- ⁶⁸ "New Body Formed by Electrical Men, Three Organizations Merge to Create National Organization of Manufacturers, Gerard Swope at Head, Group of 270 Leading Companies Represents Annual Business of \$1,500,000,000," *The New York Times*, September 27, 1926, p. 35.
- ⁶⁹ Alfred D. Chandler, Jr., Strategy and Structure: Chapters in the History of the Industrial Enterprise (Cambridge, MA: MIT Press, 1990), pp. 363–370. "Shortly after Charles E. Wilson took office as Swope's successor, he began to reshape the company's structure. The war delayed his plans and in 1946, Swope turned over the organization to Ralph Cordiner. Cordiner's first step was to create six autonomous multifunction divisions. (But) war and postwar expansion, by creating new skills and facilities, particularly in the electronics field, doubling the number of plants and tripling the number of employees, brought increasing pressure for still more structural change." Wilson and Cordiner's work on decentralization at GE actually started in the 1920s, especially at a 1929 GE executive retreat at GE's Camp General, where Swope and Wilson affirmed the primary imperative to making decentralization work. See also *Professional Management in General Electric, Book One*, 1953.
 - ⁷⁰ "Mr. Wilson at Work," *Fortune*, May 1947, p. 122.
 - ⁷¹ Loth, p. 176.
- ⁷² For a more detailed look at GE's Post-War Advisory Committees, War Projects Committee, and Special Planning Committee, see R. P. Gustin and S. A. Holmes, "An Approach to Postwar Planning," *Harvard Business Review*, Summer 1942, pp. 459–472. The Committees evaluated potential postwar demand for electrical products, GE's share, and the human and other resources needed to manufacture GE's share.
 - ⁷³ John A. Miller, Men and Volts at War (New York: McGraw Hill, 1947), p. 25.
 - ⁷⁴ See Men and Volts at War for more details on GE's contributions to U.S. armed forces in World War II.
 - ⁷⁵ "No Blackout," *Time*, June 8, 1942.
 - ⁷⁶ "Out of the Top Drawer," *Time*, September 28, 1942.
 - ⁷⁷ "The New Order Starts," *Time*, October 5, 1942.
 - ⁷⁸ "The Man at the Wheel," *Time*, February 19, 1951.
 - ⁷⁹ "Exodus Before X-Day," *Time*, July 3, 1944.

- ⁸⁰ "Keep Prices Down," Time, November 13, 1944.
- ⁸¹ "Mr. Wilson at Work," pp. 166, 168, and 172.
- ⁸² "Mr. Wilson at Work," p. 172.
- 83 "Tell 'Em," *Time*, September 12, 1949.
- ⁸⁴ Charles E. Wilson, "Program for Preparedness: An Address Delivered to the American Ordinance Association at the Waldorf Astoria Hotel, December 6, 1948, p. 8.
- ⁸⁵ Ernest Lindley, "The New Vice President," *Newsweek*, December 25, 1950, p. 20; "Wilson, No. 2 Man," *Newsweek*, December 25, 1950, p. 49; "Two Giant Steps: Wilson and Eisenhower are Given Key Jobs," *Life*, January 1, 1951. See also "A Job for C.E. Wilson," *Business Week*, October 14, 1950, p. 136, and John G. Forrest, "Wilson of GE—Production, Not Blueprints," *The New York Times Magazine*, December 31, 1950.
 - ⁸⁶ Ralph J. Cordiner, New Frontiers for American Managers (New York: McGraw Hill, 1956).
- ⁸⁷ GE Corporate Biography of Ralph Cordiner available at www.ge.com/en/company/companyinfo/executivebios.html, accessed August 2005.
 - ⁸⁸ Jack Welch with John A. Byrne, *Jack: Straight from the Gut* (New York: AOL Time Warner, 2001), p. 170.
 - ⁸⁹ Loth, pp. 124–125.
 - ⁹⁰ Professional Management in General Electric, Book One, pp. 37–38.
 - ⁹¹ Professional Management in General Electric, Book One, foldout chart opposite p. 48.
 - ⁹² Ibid. The General Electric Supply Company Department was not assigned a group.
- ⁹³ Alfred D. Chandler, Jr., "The Functions of the HQ Unit in the Multibusiness Firm," *Strategic Management Journal*, Vol. 12, Winter 1991, p. 43.
- ⁹⁴ Alfred D. Chandler, Jr., "Management Decentralization: A Historical Analysis," *The Business History Review*, Vol. 30, No. 2, June 1956, p. 125.
- ⁹⁵ These characteristics were also spelled out in the GE Blue Books. Exhibit 7 is a delineation of the role of GE's individual contributors and managers found on page 31 of the fourth volume of the GE Blue Books, *Professional Management in General Electric, Book Four: The Work of a Functional Individual Contributor* (New York: General Electric Corporation, 1959).
 - ⁹⁶ Cordiner, New Frontiers for American Managers, p. 1.
 - ⁹⁷ Cordiner, New Frontiers for American Managers, p. 27.
 - 98 Ronald G. Greenwood, Management Decentralization (Lexington, MA: D.C. Heath Books, 1974), pp. 60-61.
 - ⁹⁹ Tichy and Sherman, p. 45.
- ¹⁰⁰ Cordiner lashed out at the impact of retroactive taxes on GE's earnings, which actually were in decline despite the booming sales. In 1951, for example, GE's sales were up by \$36 million but net earnings were just \$15.6 million after the tax impact, so that earnings per share were halved in the third quarter of 1951 from \$1.23 to .54. "Tax Toll," *Time*, October 29, 1951.

Some were not certain that GE management tools and performance metrics were contributing to GE's prosperity. According to Walter Wriston, a GE board member at this time: "It was just unreal. You'd take the size of a guys shirt collar and divide it by the Gregorian calendar and multiply it by the square root of pi, and you'd come up with a number that was totally meaningless." Tichy and Sherman, p. 46.

- ¹⁰¹ General Electric Industrial Electronics Division, *General Electric Press Seminar on Automation*, June 13, 1962, available at Baker Library Historical Collections, Harvard Business School.
 - 102 Ibid
 - ¹⁰³ "Price-fixing at GE?" Time, January 18, 1960.
- ¹⁰⁴ Ralph Cordiner, 1961 speech at the University of Chicago, quoted in "Conspiracy's Wake," *Time*, March 10, 1961.
- ¹⁰⁵ "It was a Lazy, Indolent...," *Time*, June 16, 1961. Leonard Slone, "90% of G.E. Damage Suits Settled for \$160 Million," *The New York Times*, April 30, 1964, p. 47.
- ¹⁰⁶ Robert Slater, *The New GE: How Jack Welch Revived an American Institution* (Homewood, IL: Business One Irwin, 1993), p. 13.
 - ¹⁰⁷ "The Ten Best Managed Companies," Dun's Review, Vol. 81, No. 1, January 1963, p. 86.
- 108 Leonard Slone, "New G.E. Chief Optimistic on Industry Outlook," *The New York Times*, October 12, 1963, p. 47.
 - ¹⁰⁹ Cordiner quoted in Greenwood, p. 49.
 - ¹¹⁰ Greenwood, pp. 60-61.
 - ¹¹¹ Slone, p. 47.
 - ¹¹² Slater, p. 14.
 - ¹¹³ "Making Room for Some Free Spirits," Fortune, August 1972, p. 33.
 - ¹¹⁴ Stacy Jones, "Computers Figure Boldly in '63 Patents," The New York Times, January 6, 1964, p. 70.
 - ¹¹⁵ Chandler, Inventing the Electronic Century, p. 102.
 - ¹¹⁶ "Two Tone," Time, May 5, 1967, and "Special Circumstances," Time, October 27, 1967.
 - ¹¹⁷ "Borch of General Electric: Look At It Through My Eyes," Forbes, May 15, 1971, p. 59.
 - ¹¹⁸ Ibid.
 - ¹¹⁹ Slater, p. 14.
- ¹²⁰ Fred Borch, "Excerpts from 'The Future of International Trade," *Forbes*, December 15, 1972, p. 17. See also "General Electric Chairman Fred Borch Lays It on the Line," *Forbes*, November 15, 1971, pp. 27–28, 111.
 - ¹²¹ Slater, p. 19.
- ¹²² Isadore Barmash, "America's Most Influential Jones," New York Times Magazine, September 16, 1979, p. 120.
- ¹²³ "Jones of General Electric: Big Does Not Necessarily Mean Unresponsive," p. 86. On GE's program for equal opportunity employment in the 1970s, see Theodore V. Purcell, "How GE Measures Managers in Fair Employment," *Harvard Business Review*, November–December 1974, pp. 99–104.
 - ¹²⁴ "GE: Not Recession Proof, But Recession Resistant," Forbes, March 15, 1975, p. 36.
- ¹²⁵ Reginald H. Jones, "Why Businesses Must Seek Tax Reform," *Harvard Business Review*, September–October 1975, pp. 53–54.
 - ¹²⁶ "Batter Up!" Forbes, September 18, 1978, p. 138.

- ¹²⁷ Barmash, p. 120.
- ¹²⁸ Ibid.
- ¹²⁹ Ten years after, the glowing praise for Jones had not dimmed. "The final evolutionary step in the development of corporations as we know them today came about in the United States between the end of World War II and the 1960s, a period of enormous economic expansion. The regimes of Robert McNamara at Ford, Harold Geneen at ITT, and Reginald Jones at General Electric epitomized management of that era. Through elaborate planning exercises, senior managers determined the businesses in which they wanted to be, how much capital they should allocate to each, and what returns they would expect the operating managers of these businesses to deliver to the company. Large staffs of corporate controllers, planners and auditors acted as the executive's eyes and ears, ferreting out data about divisional performance, and intervening to adjust the plans and activities of operating managers." Michael Hammer and James Champy, *Reengineering the Corporation* (New York: HarperBusiness, 1993), p. 15.
- ¹³⁰ GE Corporate Biography of Reginald Jones available at www.ge.com/en/company/companyinfo/executivebios.html, accessed August 2005.
 - ¹³¹ "GE's Jones Restructures His Top Team," Business Week, June 30, 1973, p. 39.
 - ¹³² Ibid.
 - ¹³³ "GE: Not Recession Proof, But Recession Resistant," p. 33.
- ¹³⁴ "Reverberations of Wharton: The Most Admired Businessman in America," available at www.wharton.upenn.edu/alumni/networks/impact/08_most_admired.html, accessed December 2005. "I felt succession planning was extremely important," said Jones. "I started working on succession planning my second or third year as chairman."
- ¹³⁵ Harris Collingwood and Diane L. Coutu, "HBS Interview: Jack on Jack," *Harvard Business Review*, February 2002, p. 94.
 - ¹³⁶ Janet Lowe, Welch: An American Icon (New York: John Wiley & Sons, 2001), p. 29.
 - ¹³⁷ Tichy and Sherman, p. 65.
- ¹³⁸ ". . . GE Capital, once a popcorn stand, has become one of the most valuable parts of GE. When I got my first look at the business as a sector executive in 1978, GE Capital earned \$67 million on \$5 billion in assets. (In 2000, GE Capital made \$5.2 billion, 41 percent of GE's total income, on more than \$370 billion in assets.). . . What I saw in 1978 was immense opportunity—not just the benefit you get on a balance sheet, but the additional leverage you get by putting together two raw materials: money and brains." *Straight from the Gut*, p. 233.
 - ¹³⁹ Tichy and Sherman, p. 68.
 - 140 Straight from the Gut, p. 84.
- ¹⁴¹ Martha Lagace, "Jack Welch to HBS Grads: 'Don't Be a Jerk.'" HBS Working Knowledge, June 11, 2001, available at http://hbswk.hbs.edu/archive/2310.html, accessed September 2007.
 - 142 Tichy and Sherman, pp. 93–107.
 - 143 "Life After GE? And How," BusinessWeek, March 8, 2004, p. 77.
 - ¹⁴⁴ General Electric Annual Report for 1983.
 - ¹⁴⁵ Phil Dusenberry, *Then We Set His Hair on Fire* (New York: Portfolio, 2005).
- ¹⁴⁶ Slater, p. 228. More information about the benefits of Work Out at GE are available in *Straight from the Gut*, pp. 182-189. The next steps after Work Out sessions are detailed in a book coauthored by Larry Bossidy,

who took the concept with him from GE Capital to Honeywell International: Larry Bossidy and Ram Charan, *Execution: The Discipline of Getting Things Done* (New York: Crown Business, 1992), pp. 98–102.

¹⁴⁷ See the description of GE's Six Sigma program on its company web site, available at www.ge.com/sixsigma.html, accessed December 2005.

¹⁴⁸ Lowe, p. 122.

¹⁴⁹ Lowe, p. 139

¹⁵⁰ James Surowiecki, "The Financial Page: Jack Welch, Average Guy," *The New Yorker*, December 18, 2000, p. 45.