GD CONTROL DATA

A
Concise History
of Control Data
Corporation
1957-1986

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June 1987

Contents

Chapter 1

Laying The Foundations

Control Data Corporation first opened for business in 1957 with a handful of
employees in rented warehouse space in St. Paul, Minnesota. It had taken twelve
years of preparation to arrive at these modest beginnings. William C. Norris,
then forty-six years old, had played a pivotal role at each stage leading up to
this event.

Born in 1911 on a Nebraska farm, Norris showed an early bent toward the
directions he would later take. As a boy, he built his own radio receiving and
sending equipment and became an avid ham radio operator, acquiring in the
process an abiding interest in the newly emerging field of electronics. His
favorite high school course was physics, and he went on to study electrical
engineering at the University of Nebraska. He was graduated in 1932 at the
depth of the Great Depression; jobs were scarce and he spent the next two years
running the family farm for his recently widowed mother. In 1934 he was hired as
a sales engineer by Westinghouse Electric Company.

The War Years

Following the bombing of Pearl Harbor in 1941, Norris joined the U.S. Naval
Reserve. For reasons of which he was never quite sure, he was assigned to the
Navy unit engaged in supersecret intelligence work: code-breaking, pinpointing
enemy ship locations by intercepting high-frequency radio transmissions, and
other activities requiring the processing of vast streams of data. Even the most
sophisticated high speed mechanical calculating devices then available were
woefully inadequate for the task, and Norris was named to a group charged with
designing new electronic technologies that could be applied to intelligence
problems.

He was deeply impressed by the men with whom he worked: in his words,
"an almost unbelievable assemblage of talent" that included mathematicians,
engineers, and physicists from many leading universities and corporations,
some of whom already had international reputations. He learned to recognize
and appreciate superior technical gifts, and he learned that creative people
function best when they have ample resources to draw upon–lessons that would
serve him well when he came to build his own organizations.

The urgent needs of all-out war had given powerful impetus to the swift
evolution of new devices that were the forerunners of the digital computer. As
the end of the war approached, it became obvious to those in a position to know
that the emergence of the computer would revolutionize computational
technology and, by extension, cryptology. The Navy was deeply concerned about
the impending dissolution of its prized intelligence unit; with demobilization,
the men could no longer be kept in uniform, and few showed interest in the civil
service appointments they were offered. Thus, when Norris and some of his key
associates proposed that they form a private company and continue working for
the Navy on a contract basis, Defense Secretary James V. Forrestal approved the
plan as the only practical way to keep the team together.

Engineering Research Associates

Engineering Research Associates was formed in September of 1946. To raise the
necessary capital, a group of outside investors headed by John E. Parker was
brought in. Parker was an Annapolis graduate and successful investment banker
with connections in both political and military circles. Ownership was divided
equally between the insiders and the outsiders, with 100,000 shares sold to each
group at ten cents a share to generate a total initial capital of $20,000. In addition,
Parker underwrote a $200,000 line of credit, and ERA opened for business in a

former glider plant in St. Paul, Minnesota.

Parker was named president with responsibility for financial matters and overall management. Norris, one of three vice presidents, originally headed marketing, but was soon placed in charge of all operations other than finance. He recruited a qualifed technical staff to supplement the founding core group, and ERA fast became known as a disciplined, cost- and schedule-conscious supplier of high speed digital data-handling equipment and large-scale memories. Its principal customer was the Naval Computing Machine Laboratory, and though this meant that the company was hobbled by tight security, it also gave it the considerable advantage of working for a client with adequate financial resources and ready access to much of the advanced computer work going on elsewhere in government and private laboratories.

During its first year, ERA had revenues of $1.5 million and a profit of $34,000. It was still severely undercapitalized, but the Navy paid its bills promptly and the company continued to grow. By 1951 the work force had expanded to around 1,500 employees, many of whom were professionals and skilled technicians. ERA was now working for other federal agencies, including the Air Force and the Civil Aeronautics Administration, and its equipment had found its way into the BOMARC missile program, predecessor of the SAGE continental defense system, and other advanced military applications.

Remington-Rand

As word of ERA's technical accomplishments spread beyond the confines of military security, elements of the infant private computer industry began to take notice. Among them was James Rand of Remington-Rand. He was one of the first businessmen to sense the commercial possibilities of digital computers, and soon after World War II ended he had established the Norwalk, Connecticut Laboratory. In 1950 he had acquired the Eckert-Mauchly Computer Corporation, a small company that had originally developed equipment to calculate artillery trajectories. In the fall of 1951, Rand approached Parker with the intent of acquiring ERA.

Uncomfortably aware of ERA's always tenuous financial position, Parker was receptive to Rand's overtures and, after hard bargaining, sold the company for approximately eighty-five times what the original founders had paid to start it only five years before. Norris, who was then vice president and general manager, was opposed to the sale, as were his fellow insiders. But there was little they could do about it since Parker had financial control, and they reluctantly went along.

With the acquisition of ERA, Remington-Rand had assembled the strongest array of technical computer talent in the world. IBM, Burroughs, National Cash Register, and others all had nascent capabilities, but none had the technical resources to match what James Rand had put together. Unfortunately, Rand's managerial capacities were not equal to his strategic foresight. The three computer units—the Norwalk Laboratory, ERA, and Eckert-Mauchly—reported to different corporate departments and operated as fiercely independent entities.

Left largely to their own devices, the individual operating units accomplished important breakthroughs. The Eckert-Mauchly group produced the Univac system that successfully predicted the outcome of the 1952 presidential election; Univacs I and II, which were installed in the U.S. Census Bureau, greatly speeded the tabulation of the 1950 census of population and the 1954 census of business. The ERA group made the fastest and most reliable hardware in the industry and pioneered the introduction of transistors to replace

the bulky, failure-prone vacuum tubes that had been basic to computer electronics. Despite these and other technical achievements, both Eckert-Mauchly and ERA suffered from lack of overall direction and coordination from their Remington-Rand parent.

ERA's efforts were further hampered by the fact that much of its work was so secret that its nature could not be disclosed even to corporate headquarters. When at one point ERA obtained the Navy's permission to bring out a civilian version of a high-speed computer originally developed for the military, corporate officers were amazed to learn some of the things that had been going on and how far the state of the art had progressed. This particular piece of equipment formed the basis for ERA's first major venture into the nonmilitary market; the hardware that stemmed from it was able to process great masses of data at a speed, cost, and level of reliability unprecedented in the civilian market.

Sperry-Rand

In 1955, Remington-Rand and Sperry Corporation merged to form Sperry-Rand. The new company consolidated the several disparate computer units under the by then well-known Univac name and made Norris vice president and general manager in charge of all computer operations. Sperry-Rand thus had a unified computer business entity incorporating research, engineering, manufacturing, and marketing under strong centralized leadership. The future looked promising.

Norris urged Sperry-Rand to use the substantial resources it had assembled to become the world leader in computers. Under the elder Thomas Watson, IBM had been mesmerized by the success of its punched-card tabulating machines and slow to grasp the significance of the new electronic technology. The younger Thomas Watson, who had succeeded his father in 1946, was determined to take his company into the computer age, but the way was still clear as late as the mid-1950s for Univac to become what IBM in fact became. Sperry-Rand let its chance slip by, hesitant to make the investments and take the risks Norris knew were necessary. Meanwhile, IBM forged ahead, and by the late 1950s it had become the dominant factor in the new industry, a position from which it has never been dislodged.

"We sat there," Norris recalls, "with a tremendous technological and sales lead and watched IBM pass us as if we were standing still." Finally, the frustration proved too much. By the summer of 1957 Norris "had a belly full" and walked out. He was followed by a dozen key associates with whom he formed Control Data Corporation.

Chapter 2

Building The Company

The new corporation was financed initially by the sale of 600,000 shares of common stock at $1 a share. It ushered in the dollar stock era in the United States and was the first computer company to be publicly financed. There were some 300 stockholders, of whom Norris with 75,000 shares held the largest block. The remaining shares were purchased by members of the founding group, by their friends, and by scattered investors intrigued by the glamour of the emerging computer industry.

Norris and those who followed him from Sperry-Rand set up shop in rented quarters in an old warehouse of the Minneapolis Star and Tribune Company. In the ensuing months, they were joined by other disaffected Univac engineers and technicians. Floor space was divided by temporary chipboard partitions, which five years later were still standing and still unpainted. In this unpretentious setting, Norris and his colleagues set out to design and build the most powerful computers the world had ever known.

By this time, IBM dominated the industry, and other major companies were struggling to find a place for themselves. IBM's greatest strength lay in business data processing, which was then thought to represent 80 percent of the total market. Its rivals directed their efforts toward the same market segments, but this proved to be a costly strategy that resulted in head-to-head confrontations with the giant. Many of IBM's most financially sound competitors—notably General Electric, RCA, and Bendix—eventually withdrew in defeat.

The Big Computer Strategy
Control Data was a very small fish in a sea of very big predators, but that did not worry Norris because he had picked a different place to swim. With financial resources of less than two-thirds of a million dollars, he and his associates chose to stake out their position in an area where their special technical and professional expertise would give them a decisive advantage: large-scale computers for engineering and scientific applications. IBM and others were also interested in exploring this area, but none as yet had the technological skills to match those of the group Norris had assembled.

Fully transistorized, Control Data's computers incorporated the most advanced elements of electronic technology. Initially, they were sold with little accompanying software to customers who could write their own programs and did not need the kind of hand-holding that novice users required. Clients like the Atomic Energy Commission and the Department of Defense were soon joined by some of the nation's largest universities, including Illinois, Wisconsin, and Michigan State, who appreciated the new equipment's unique problem-solving capabilities.

Even though Control Data had the field virtually to itself, at least at the outset, its strategy of concentrating on giant computers was heavy with risk. Simply learning how to build such computers was a chancy undertaking because state-of-the-art technology—by definition new and untried—carries with it not only the hope of success but the threat of failure. The potential market for the type of computer Control Data produced was limited to federal government laboratories, a handful of universities, and a relatively small number of corporations engaged in military and atomic energy research. The company's precarious financial position meant that a minor error in judgment or a stroke of bad luck could have been fatal. Its sole reliance for revenue on a narrow product line posed another hazard. IBM, National Cash Register, Burroughs, Honeywell, RCA, General Electric, and Bendix all had substantial earnings from other well-established products and services; if the going in the new field proved too rough,

they could always fall back on other resources. Control Data had to make it with its big computers or not make it at all.

The strategy came perilously close to failing. In the beginning, all the new company had was brains. Among other things, it was sorely lacking in manufacturing facilities, and it especially needed metalworking and related machinery. Realizing that Control Data would have to expand quickly if it was going to survive, Norris embarked on an aggressive acquisition program.

Growth by Acquisition

In 1958, Control Data acquired Cedar Engineering, Inc., a Minneapolis instrument manufacturer, to provide badly needed production facilities. The acquisition soaked up a sizeable part of the company's meager working capital, but the financial bind was relieved when Allstate Insurance Company purchased a $350,000 issue of six percent preferred stock.

Subsequent acquisitions were made primarily for the purpose of obtaining needed technologies. Control Corporation (acquired in 1960) brought with it desirable know-how in gas, oil, and water distribution control systems; Holley (1961) added capabilities in the design and manufacture of printers; Meiscon (1963) afforded competence in engineering design; and the computer division of Bendix (also 1963) resulted in an influx of skilled personnel. These and other moves greatly broadened and strengthened Control Data's technical competence.

Acquisitions were friendly and accomplished by exchange of stock. After emerging from its early difficult years, Control Data became one of Wall Street's favorite glamour issues. In the "go-go period" of the 1960s, investors were entranced with almost anything electronic, and Control Data's stock was bid up to heights that gave the company considerable leverage in exchange-of-stock transactions and allowed it to make a number of desirable acquisitions on highly favorable terms. The most striking of these was the acquisition of Commercial Credit Company in 1968.

Since the day of its founding, Control Data had been plagued by a chronic shortage of cash, and its rapid growth had placed a severe strain on its limited resources. In addition, many computer systems were leased rather than sold outright, and the debt that was incurred to finance the lease build-up had an unfavorable impact on the company's balance sheet. During the latter part of the 1960s, Control Data's chief financial officer prepared a ten-year projection of the financing that would be needed to cover equipment on lease; the figure came to an astounding $1 billion, an amount obviously unattainable by conventional means. A possible answer lay in acquisition of a finance company.

Commercial Credit Company

It happened that Commercial Credit Company of Baltimore was at that time actively looking for a buyer. A diversified financial services company with $3.4 billion in assets, it was the object of a hostile takeover effort and wanted to find an acquirer in whom its management could have confidence. Cognizant of Control Data's leasing problems, Commercial Credit made overtures to which Control Data responded with alacrity. A deal satisfactory to both parties was swiftly worked out, and in August of 1968 Commercial Credit became a wholly-owned subsidiary of Control Data Corporation.

The merger proved beneficial to all concerned. Commercial Credit retained its corporate autonomy and its own board of directors, which was necessary for legal reasons and to preserve its credibility in the financial community. Control Data found a solution to its leasing dilemma; at last it had sufficient means to

finance this crucial part of its business. This was not the only advantage Control Data realized from the acquisition. From 1968 through 1985, Commercial Credit added $733.7 million to Control Data's earnings and paid its parent $448.3 million in dividends. During three periods of financial stringency—1969-70, 1974-75, and 1984-85—Commercial Credit's earning power helped its parent to survive sharp downturns in the computer industry.

Peripheral Products

Well before the acquisition of Commercial Credit Company, Control Data had accomplished two significant strategic moves: entry into the peripheral products business and entry into data services. While the company had originally directed its efforts toward a relatively small and specialized segment of the computer mainframe market, it soon became clear that this market alone was not enough to support the technical and manufacturing resources required to serve it. Moreover, the giant computer market is inherently volatile. Control Data was well established in the scientific computer sector, but it needed to build a broader and more stable customer base.

As much as two-thirds of the total cost of a data processing system is represented by peripheral equipment: tape and card readers, magnetic tape transports, random access memories, printers, and the like. The powerful computers Control Data was building required peripherals with extraordinary performance capability and reliability. Since these were not available from other companies, Control Data had no choice but to design and build its own. Unfortunately, high speed peripherals are expensive to develop, and economies of scale are important in their manufacture.

In the face of strong internal opposition, Norris decided on a bold course: To secure the volume needed, Control Data would develop and make peripherals for *other* computer companies as well as for itself. At the time, IBM was the only company that could supply its own peripherals, and there were several other companies in the same position as Control Data. These manufacturers welcomed Control Data as a new source of high-quality, reasonably-priced equipment for their own products. The decision to move into the original equipment manufacturer (OEM) market proved sound, and the business prospered.

Over two-thirds of all computer equipment in place was manufactured by IBM, and the OEM market, while substantial, was limited to the remaining third. The temptation was therefore great to challenge the giant in his own backyard by building peripheral equipment that could be used on IBM mainframes—so-called "plug compatibles." The risk was great, but IBM's pricing policies provided an umbrella under which Control Data could build a profitable business.

Data Services

At about the same time Control Data began moving into peripheral products, Norris was envisioning yet another potential market: data services. There were many companies with the technical sophistication to use powerful computers, but only the largest and most prosperous of them could afford to invest in the type of equipment Control Data offered or keep that equipment busy enough to make it cost effective. Control Data's computers were simply too powerful and too expensive to have wide appeal. Norris decided, in his words, to "sell a little piece of a big computer at a time," and to make the power of his machine "available to the guy who couldn't afford to invest in one."

Initially, the data services offered consisted of nothing more than "raw time." Before long, however, Norris and his associates recognized that a much

broader and more lucrative market could be tapped by furnishing specialized applications programs that would address individual industries and specific user needs. In the years that followed, the company worked in close cooperation with users to develop a sizeable volume of software in such areas as seismic exploration and engineering design, and several key acquisitions were made for the specific purpose of adding to its growing body of applications expertise.

The IBM Suit

Control Data's services business was given a powerful boost in 1973 with the resolution of an antitrust suit the company had filed against IBM five years earlier. In an effort to prevent Control Data from pre-empting the market for large-scale computers, IBM had embarked on a crash program to overtake the upstart newcomer and adopted selling practices that Norris considered unethical, unfair, and illegal. Angered and embittered, he fought back.

The suit was supported by an imposing catalog of damning complaints and demanded triple damages. During the discovery proceedings, Control Data's attorneys examined over twenty million pages of IBM documents, photocopied over one million pages, and added some 500,000 pages (about 150,000 documents) to its own already formidable computerized data base. Only with the aid of powerful computers and sophisticated software especially designed for the purpose was it possible to sort, index, retrieve, and organize this enormous quantity of information. This was the first time high-speed computer technology had been used in a major legal proceeding, and was a significant factor in Control Data's winning an out-of-court settlement five years later.

IBM paid a heavy price to get Control Data off its back. The central feature of the settlement was the transfer of the Service Bureau Corporation, IBM's subsidiary, to Control Data at a nominal price. Considering the value of the Service Bureau and other cash and non-cash elements of the agreement, it was, at over $100 million, the largest private settlement in U.S. antitrust history. Control Data privately valued the settlement at twice that figure.

The acquisition of the Service Bureau Corporation was important to Control Data in three ways. First, it more than doubled Control Data's service business. Second, it greatly broadened its services market; up until then, Control Data's services had been oriented primarily to engineering and scientific applications, and SBC added a strong business data processing capability and an established market. Third, the acquisition brought with it a first-rate management staff; as Norris would comment with satisfaction some years later, "They were really loaded with talent."

The First 25 Years

Control Data celebrated its twenty-fifth anniversary in 1982. Over that period, the company grew from a minuscule operation with $600,000 in assets to a worldwide corporation with assets of $6.9 billion; from a dozen employees to over 56,000; from zero revenues to $4.3 billion. Net profits rose from a negative number to $155 million.

In that anniversary year, Control Data held a commanding worldwide lead in both peripherals and services, and was the major producer of the world's most powerful computers; and in Commercial Credit Company, it was one of America's premier financial institutions. It was altogether an impressive record for a company that had started with paper-thin financial resources and a handful of engineers and technicians without much going for them but exceptional talent and a strong, imaginative leader.

Chapter 3

Serving Unmet Social Needs

At the root of Control Data's phenomenal success was Norris's business strategy: identifying unmet needs and turning them into profitable business opportunities. He began by perceiving the emerging need of the engineering and scientific community for powerful computers to perform large and complex computations that had never before been attempted because machines capable of handling them had not yet been invented. He then moved to address the needs of the computer industry for peripherals that were too costly for most individual manufacturers to design and produce for themselves. He turned next to the needs of smaller clients who could not afford to own powerful computers but would benefit from using them for limited periods of time. In each instance, the need existed but the market did not; it had to be created.

Markets were created in all three areas by recognizing and defining the needs, designing means for approaching them as profit-making enterprises, and bringing the two together to make a market. Basic to this process was new product development. Also basic was understanding that it takes time and commitment to create new markets, and that quick payouts were not to be expected.

Under Norris's direction, Control Data always exhibited a marked willingness to seek out new areas of opportunity, to take risks, and to stick with new ventures through thick and thin. In an era that placed emphasis on short-term earnings rather than on innovation, Norris was viewed as something of a maverick, but for a long time even his sharpest critics could not argue with his success.

In the words of Robert M. Price, who succeeded Norris as chief executive officer in 1986, "Some who do not know [Bill Norris] well think of him as a wild visionary. But that's wrong. He simply sees the potential of things before others do. And he knows what a great advantage it is to be first in a new field." As it turned out, some of those new fields proved surprising.

Computer-Based Education

One of these was the application of computer technology to teaching and training. During his Navy days and later at ERA, Norris had been intrigued with the possibility of improving the quality of instruction by using digital computers, but was discouraged from pursuing the idea by the costs which at that time would have been involved. In 1960, however, he learned that some interesting work along these lines was being done at the University of Illinois, and he followed events there closely. Impressed with the progress being made, in 1963 he offered to install rent-free one of Control Data's high speed computers for the exclusive use of the group working on PLATO, as the project was by this time known. Other than sharing the emerging technology, the only obligation of the university was to cover the costs of insurance and maintenance. This marked the beginning of one of the most fruitful collaborative efforts in the history of academic-corporate relationships. In the early days of the joint endeavor, the National Science Foundation contributed valuable support, but the primary responsibility for furnishing financial and other resources was assumed by the university and Control Data working in cooperation. Over the years that followed, Control Data not only provided successively more powerful computers and substantial funding, but also participated in designing and perfecting ways of turning PLATO into a marketable commodity. Although it was clear from at least 1967 on that the PLATO concept was sound, it was not until 1975 that the system had reached a point where it could be offered commercially. Developing

the technology was a common effort shared by the company and the university, but moving it into the marketplace was Control Data's responsibility.

Learning to Use the Technology: A great deal had to be learned about how to use the new technology. For Control Data, this began with the reorganization of its own technical and management training programs for computer-based delivery. This resulted not only in tangible improvements in the quality of training, but added importantly to the skills required for the effective use of computers in instruction. But it was the introduction of PLATO to the work of the Control Data Institutes that provided the first significant experience in its large-scale use for educational purposes.

The first Control Data Institutes had been established in the mid-1960s to help meet the needs of the rapidly growing computer industry for trained technicians and programmers. The institutes were only marginally successful, however, until on Norris's orders in 1974 they converted from traditional methods of instruction to PLATO. This required the better part of two years and the investment of over $1 million, but PLATO's greater flexibility and cost-effectiveness moved the institutes to comfortable profitability. More importantly, it provided the opportunity to transform PLATO from an interesting laboratory exercise into a demonstrably effective educational system. It was a rich learning experience that laid solid foundations for PLATO's future.

By 1975 PLATO was ready for the market, but the market was not ready for PLATO. It had to be developed, and that proved more difficult than anticipated. A major hurdle was costs. The original PLATO system consisted of instructional programs stored in a large mainframe computer accessed by local terminals via long-distance telephone lines. Installing PLATO meant buying or leasing terminals for use by teachers and students, plus sizeable monthly telephone charges. The system was simply beyond the means of all but a very few schools.

Then came the personal computer, which revolutionized all computer delivery systems by sharply reducing or completely freeing them from dependence on central mainframes. An aggressive effort was mounted to rewrite teaching materials (courseware, in the parlance of the trade) for delivery by means of diskettes, but this proved to be a mistake because of difficulties from the teachers' standpoint of managing instruction delivered through stand-alone desk-top computers. Only with time and substantial further investment was it possible to work out means for combining the advantages of the huge memory capacities of the central mainfame with the inherent flexibility of the personal computer.

Market Progress: By the time of Norris's retirement in early 1986, PLATO systems—central mainframes with networks of microprocessors—were being widely used in business and industry to meet the massive training and retraining needs created by the decline in basic industries and the rapid changes in industrial technology. They were used by airlines to train flight and maintenance crews, and by utilities to train nuclear workers in safety procedures. Other clients included automobile manufacturers, oil producers, pharmaceutical companies, and financial institutions. PLATO's penetration of the industrial training market was successful, and the potential for further growth was impressive. Progress was also made in developing the military training market, where prospects are especially promising.

Development remained slow, however, in the primary and secondary school market, the area in which Norris was always most interested. He was deeply

concerned over the increasing costs and deteriorating quality of public education, and saw in computer-based instruction the means for generating quantum improvements in the educational system. By and large, the proferred technology was greeted with indifference and in some cases active resistance – attitudes that Norris ascribed to bureaucratic antipathy to change.

Nonetheless, Norris remained confident. He saw education as the last great field for the application of computers. He was convinced that just as business, government, the military, modern medicine, science, and engineering could no longer function without the computer's aid, the challenges facing education required the support of computer technology. Norris saw this as potentially a multibillion dollar market, and he was determined to make sure that Control Data was well prepared to serve it.

Norris never doubted PLATO's potential. At the press conference in January 1986 where he announced his decision to retire as chairman and chief executive officer, he was asked what he considered his proudest accomplishment. His unhesitating answer: PLATO.

Jobs for the Disadvantaged

Throughout his long career, Norris was always a sensitive person about people, concerned about fairness in individual and small group matters. However, during his years at ERA and Sperry and his early years at Control Data he showed little interest in larger social issues. The interest may well have been there, but the demands of struggling new businesses took priority.

In terms of race relations, the summer of 1967 was long and hot, and in July there were violent disorders in many cities across the country. The savagery and destruction of the riots in the Minneapolis northside area, and resulting revelations of the social and economic injustices to which American blacks were still subject, opened Norris's eyes to disturbing realities of American life. Recognizing that much of the racial unrest was rooted in joblessness, Norris decided that this was a problem he could do something about.

He called his staff together and told them flatly that as a major employer Control Data had an obligation to start hiring blacks in significant numbers – not as a civic duty but as an economic necessity. "My god," he expostulated, "you can't do business in a society that's burning. I want to see us taking blacks – especially young blacks – off the street and putting them to work." A task force appointed to find ways of doing this reported that if blacks were to be hired in significant numbers, the jobs would have to go to them, and this would mean putting a plant in the heart of the riot-torn area. Norris's response was brief but telling: "Fine. Make it a new one." He specified a new plant because he wanted the people in the community to know that the company was serious in its intentions and had come to stay.

Hiring the Hard-Core Unemployed: The employment objective was to hire the hard-core unemployed or underemployed of the area. Norris and his aides were fully aware that building a competent workforce from this kind of labor pool would present difficulties. Prudence might have dictated putting into the plant a product requiring mostly low-skilled workers better suited to the local labor pool and something not vital to the business so that if the project failed not too much would be lost. Instead, Norris insisted that the product selected must not only provide opportunities for advancement in job skills but that it be critical to the company itself. A product that met both criteria was computer controllers. Norris ordered that the company's controller production be concentrated in this

plant, thus making the whole company, domestic and worldwide, dependent on its output. He deliberately created a situation that left no room for retreat. No matter how intractable the problems that might arise, means for dealing with them would have to be found.

There were troubles by the numbers. There were productive and creative answers by the numbers, too—but not by the book; many had to be invented. Some of the problems were internal to the plant itself, but others involved difficulties at home, with creditors, and the law. However they might be categorized technically, in practical terms these were work-related problems and had to be dealt with as such; otherwise, the building of an effective workforce would have been impossible.

Unlike many of the post-riot civic efforts to improve conditions in the community, Northside was never meant to be a philanthropic undertaking. From the outset, Norris insisted that it be measured by the same standards as any other Control Data plant, and that it be held to the same quality, cost, and productivity requirements as its sister plants elsewhere. "If all it does is make jobs that keep people busy and give them some income, it doesn't prove anything. It has to be a business success before it can be a social success." It took longer to reach the proficiency of other plants than had been the company's previous experience, but there was never any question that it would be other than first-rate in every sense of the term. Today, it is one of the most efficient facilities in the entire Control Data system.

Encouraged by this success, Norris laid down a rule that all future new plants were to be located in communities suffering from high rates of unemployment. Some of these were in urban inner city areas, and others in pockets of rural poverty. With what had been learned from the Northside venture, these presented little more difficulty than any other new plant start-up.

One of the most dramatic things Norris and his associates learned from the Northside experience was that many people ordinarily considered unemployable could be converted into motivated, productive workers. In the course of opening other plants in poverty areas, the techniques originally developed for this purpose at Northside were further refined into a replicable body of skills.

Meanwhile, Norris was becoming increasingly troubled by the large numbers of educationally and culturally deprived young people growing up in many parts of the country with little prospect of ever finding a useful and reasonably rewarding place in society. Here was an urgent need with frightening implications, and Control Data had learned how at least part of it might be served. The result was the Fair Break Program, launched in 1978. Later called Employment Readiness Service, the program, sold on a contract basis to state and local job training agencies, made significant contributions to improving the employability of thousands of young people, most of them young and disadvantaged; in doing so, it not only served a major social need but added to the business base of the company.

Evolution of a Strategy

Prior to the Northside experience, Norris had concentrated on developing and applying computer technology in more-or-less standard business and institutional settings. He now saw intriguing possibilities in environments traditionally considered the province of governmental and charitable endeavor. Specifically, he began to explore means by which computers could help serve

unmet or poorly met social needs, and among other computer-based technologies he saw in PLATO an especially useful tool. Most importantly, he saw possibilities for serving these needs not as objects of corporate philanthropy but as straightforward business markets with attractive potential for profit. Other human resource programs designed originally for Control Data's own use were also marketed successfully.

What made these steps significant was the fact that Norris was moving toward recognizing certain unmet social needs as business markets *in their own right*, to be developed like any other business market. He saw a potentially very large market that Control Data with its Northside experience and its maturing PLATO technology was uniquely equipped to pursue. Norris's primary interest had always been in the *applications* of computer-based technologies. He now saw in social needs areas the possibility of creating sizeable markets for new applications that would not only serve the needs themselves but also broaden and strengthen the business base of his company. He was acutely aware of the tremendous strength of IBM and the gathering threat of the Japanese, and he foresaw the drastic shakeout that occurred in the computer industry in the mid-1980s. Other companies would soon be scrambling for niches *within* the industry; Norris was looking *beyond* the industry.

New Business/New Job Creation

From the time of the 1967 riots onward, Norris saw joblessness as the root of many of this country's—and the world's—most troubling problems. The Job Readiness Service was successful in preparing people *for* jobs, but readiness was of no avail unless there *were* jobs. Recognition of this truism fixed Norris's attention on the crucial role of small business in new job creation.

There are some 14 million businesses in the United States that employ fewer than 500 workers each, and these in total account for about 40 percent of the gross national product. Most new businesses started each year are small, at least at the outset, and small businesses provide by far the greater part of the growth of the U.S. economy. Norris saw this huge market as an opportunity to greatly broaden Control Data's business base while simultaneously making important contributions to new business and new job creation.

Many companies offer products or services that are utilized by small enterprises, and many of these are designed with small companies in mind. No one before, however, had visualized small business itself as an identifiable market with its own special needs.

The Business Center Program: By the latter part of the 1970s, Control Data under Norris's prodding had developed a variety of services that addressed the needs of small business. Data processing facilities provided payroll and accounting services for companies too small to have computers of their own. Technotec and Worldtech were intended to facilitate technology transfer to encourage both innovation and entrepreneurship. To assist both established and would-be entrepreneurs in improving their business skills, a substantial amount of PLATO-based training material was prepared on how to start, build, and manage a business. Control Data Temps was formed to provide a convenient, cost-effective way for small enterprises to meet their short-term requirements for professional, technical, office, and light assembly workers. One division of Business Advisors, Inc., a wholly-owned Control Data subsidiary, was devoted exclusively to providing consulting services responsive to the special circumstances of small businesses.

These and other new services added significantly to Control Data's ability to aid the small business sector of the economy. But better means of delivery were necessary to make this wide range of services more readily available to larger numbers of small companies. Norris saw in Commercial Credit Company's far-flung network of field offices the framework on which to build a nationwide system of Business Centers to perform this function. The Business Centers would become, in effect, a chain of "retail stores" where small business owners could examine an array of services and select what they needed, returning from time to time as other needs arose.

Norris's sanguine expectations on this score were not realized, due chiefly to lack of experience in retail marketing, and in frustration he turned his attention to other means for creating a small business market for Control Data services. For this purpose, he held especially high hopes for the Business and Technology Centers (BTCs). The first of these opened in St. Paul in 1979, and others followed in other major cities in succeeding years.

Business and Technology Centers: Designed specifically to provide needed support for new and developing small businesses, and located primarily in job-deficient areas, the BTCs provided various combinations of shared facilities and essential services to nurture the start-up and growth of small enterprises. Shared services usually included accounting, word processing, duplicating, drafting, telephone answering, and purchasing. Through PLATO, they offered entrepreneurs training in areas critical to their survival. Economies of scale made it possible to provide tenants with needed facilities and services of higher quality and considerably lower cost than they could get elsewhere.

City Venture Corporation: The Business and Technology Centers came to be essential components of an even more ambitious undertaking. Placing plants in poverty-stricken inner city sites had brought home to Norris in a direct and personal way the extent to which, in his words, "urban blight and decay have turned many American cities into breeding grounds for fear, anger, and despair." To deal with these problems and their social consequences, he sponsored the formation of a broad-based consortium of business, government, civic, and religious organizations to mount a concerted effort to revive the decayed central areas of the major cities across the country. This was City Venture Corporation, a private, for-profit company capitalized at $3 million and launched in 1979. Control Data was the principal stockholder.

City Venture was not a "developer"; rather, its role was to provide management and consulting services to communities, cities, states, and federal agencies on a purchase-of-service basis. Because of the centrality of job creation to City Venture's aims, a key component of each project undertaken was always a Job Creation Network with a Business and Technology Center as its physical anchor.

City Venture's initial aims were high, envisioning nothing less than a comprehensive attack on a wide range of interrelated urban ills. Unfortunately, federal support for urban revitalization began to decrease early in City Venture's history, requiring it to shrink its program essentially to job creation alone. Even so, its accomplishments were impressive. By the time of Norris's retirement in early 1986, there were seventeen job creation networks operating in ten states, fifteen others were in process of organization, and over 1,000 new companies employing more than 13,000 workers had been started. Despite this record, City Venture's prospects were limited and by 1986 it was clear that the enterprise

would fare better as an independent operation. City Venture was reorganized and sold to its president.

Other Unmet Needs

Throughout his adult life, Norris was concerned at the extent to which large-scale corporate farming is eliminating the family farm as a significant component of U.S. agriculture. He was convinced that the application of new and emerging technologies, especially those providing less intensive use of fossil fuels and fertilizers, could reestablish family farming as a vital cultural and economic resource, and that information technology in particular could be adapted to the special needs of small- and medium-scale agriculture. Characteristically, he devised a strategy centered on special applications of computer technology.

In implementing that strategy, extensive data banks of technical information were assembled to provide, through Control Data's AgTech service, what amounted to an electronic library geared to the special needs of the family farmer. PLATO training programs were developed to cover many phases of farm operation, and computer-based management systems were designed to maintain production and financial records and to assist farmers in making critical planting and marketing decisions.

Rural Ventures, Inc.: These services were delivered in a number of ways, the most important of which was Rural Ventures, Inc. (RVI). Organized in 1979 as a for-profit venture with eighteen shareholders, of which the largest was Control Data, RVI was designed to work on a contract basis with governmental agencies, groups, and individuals to serve the specific needs of particular farm communities. The first two projects were in rural Minnesota and the third in Alaska where the clients were two Eskimo villages. Projects were subsequently established in other parts of the country.

Rural Ventures was successful in improving the efficiency and amenities of life of the farming communities it served, but was only marginally successful as a commercial enterprise. A major difficulty was the lack of government interest in the family farm and a consequent scarcity of funding; agencies at both federal and state levels apparently do not consider small- and medium-sized farms as coming within the scope of their economic development interests. In 1986 the shareholders of Rural Ventures sold their shares to the same person as did the shareholders of City Venture; the two companies were merged, with City Venture the surviving corporation.

Improving the Corrections System: Closely related to the Fair Break-type of training program were a number of programs Control Data introduced in the penal corrections area. The first of these was the installation in 1972, at Control Data's expense, of a bank of PLATO terminals to deliver basic education at the Minnesota State Prison at Stillwater. The results were sufficiently encouraging for Control Data to undertake a modest educational program for correctional institutions.

Just as the Northside experience had led to company plants being placed in other poverty areas, the experience with inmate education led to work being placed in prisons. Control Data in 1981 entered into a contract with the Minnesota Department of Corrections to assemble computer peripheral equipment at the Stillwater prison. Many of the same practices that had worked to bring Northside online were employed there, and the project was as successful in its way as Northside had been. Unlike the typical prison industry jobs of making license plates and similar unskilled work, assembling computer equipment provided training on which prisoners could build new lives after leaving prison.

One consequence of the Fair Break/PLATO/prison manufacturing experience was to instill in the minds of Norris and others in the higher levels of Control Data management a lively interest in the problems of the U.S. correctional system. They were appalled by what they learned about it: the rapid rise in the prison population, the urgent need for new prison facilities, the enormous and escalating cost of new prison construction, the failure of the system to rehabilitate, the high rate of recidivism, and the fact that most inmates returned to society as greater risks than when they were first incarcerated. As Norris and his associates weighed these worrisome issues, they came to see corrections as a major potential market.

This line of thought led Norris to explore with City Venture Corporation the idea of private-sector financing, construction, and management of the non-security functions within prisons. A detailed business plan was presented in 1983 to the City Venture board, where it met with a cool reception and was placed on hold. The Fair Break education and training component, however, remained very much alive as part of Control Data's Employment Preparation Services.

Computers: The Common Thread

Beginning in the mid-1970s, Control Data under Norris's direction embarked on many programs that at first glance seemed to have little in common: new business and new job creation, technology transfer, converting the educationally and culturally handicapped into productive workers, assistance to small business, rejuvenation of decayed inner-city communities, making the family farm competitive, improving the correctional system. All of these were—and still are—serious problems of twentieth century society. The programs Control Data developed to deal with them used computers to provide education, training, and better management services. The common thread through all these projects was computer-based management of information.

The greatest entrepreneurial opportunities always lie in areas where existing goods and services fall most critically short of meeting needs. By this measure, some of the areas in which Norris was interested were among the greatest untapped opportunities the contemporary world has to offer. Each has grave problems urgently in need of attention. Norris saw in them significant business opportunities for Control Data Corporation.

Consolidation And Crisis

By 1980 Norris's business strategy was essentially in place. Control Data Corporation was firmly established as a producer of powerful computers, and with nearly half the world market for memory devices it dominated the peripheral products field. With IBM's former Service Bureau Corporation thoroughly integrated into the company's data services business, Control Data occupied an exceptionally strong position in the domestic and international data services market. As a by-product of its work in computer systems and data services, Control Data's professional and engineering services were securely rooted in that profitable and growing field. Through Commercial Credit, Control Data had become one of the country's most important financial institutions. The technology of computer-based education was well developed, and despite on-going marketing problems PLATO's future was beginning to look promising, even to skeptics. And despite difficulties, Norris's unconventional notion about addressing major unmet social needs as business opportunities had progressed beyond the talking stage and was an operative reality. Norris had cause to be satisfied with the shape his work had taken.

Preparations for Succession

In 1980 at age sixty-nine, Norris, while not yet ready to retire, began planning for that eventuality, and in May of that year he informed the directors that when the time came for him to retire, at some yet unspecified time, he intended to recommend that his duties be divided between Robert M. Price and Norbert R. Berg, with Price as president and chief executive officer and Berg as chairman of the board. In preparation for that eventual transfer of power, the by-laws of the corporation were amended to create a Corporate Executive Office with Norris as chairman and chief executive officer, Price as president and chief operating officer, and Berg as deputy chairman of the board. Norris continued to be responsible for overall company performance; Price, subject to that higher level of authority, was to manage the day-to-day affairs of the company, and Berg was to assume certain defined functions, notably the "identification and development of business opportunities in areas of societal needs."

The basic purpose of the Corporate Executive Office was "to provide opportunities for Price and Berg to acquire hands-on experience in the exercise of major corporate responsibilities." Norris delegated to Price broad responsibility and commensurate authority for all phases of company management, and was careful not to interfere with or second guess his decisions; Price thus had an opportunity rarely afforded understudies to "exercise major corporate responsibilities."

Freed from day to day operating duties, Norris was able to spend more time pursuing long-range strategic interests and his ideas for improving the economic, social, and political environment of business in general and Control Data in particular. There were elements in that environment that he found deeply disturbing: the perennial problem of joblessness, the precarious state of family farming, the threat of hostile corporate takeovers, the need for more effective technological cooperation, and the continued erosion of U.S. strength in international markets. In an effort to deal with these and related matters, he embarked on what amounted to a one-man crusade to alert people in national leadership positions of the dangers and to outline the courses of action he considered essential for the good of the economy and the country. He used to good advantage the time he gained by turning over company operations to Price.

Gathering Storm Clouds

During the early years of the Corporate Executive Office, things seemed to go very well. Revenues and profits grew handsomely, and many who had been critical of Norris's ventures into unorthodox fields began to be more optimistic about the company and its future. As early as 1982, however, things began to go wrong. The trouble started in the peripheral products area.

The decision to enter the OEM and plug-compatible markets had for some years appeared to be well grounded: by 1983 Control Data peripheral products were a $1.5 billion business, and with 47 percent of the OEM disk drive market Control Data dominated the peripherals industry. But difficulties had already begun to surface; the business started to come apart in 1984 and crashed resoundingly in 1985 with a staggering loss of over $300 million. In late 1984 the company withdrew suddenly and completely from the plug-compatible disk drive business, taking a $130.2 million write-off in the process.

A key reason for Control Data's going into plug-compatibles was the assumption that it would be an incremental business. So it was at the beginning, but it did not stay that way. The cost of keeping pace with IBM's technological advances in memory technology proved prohibitive, and Norris and Price, in a difficult decision, decided to cut their losses and get out of the plug-compatible business altogether.

Additional difficulties soon compounded this major setback. The market for Control Data's OEM products was the computer industry itself, and 1985 marked one of the most drastic downturns in the industry's history. To complicate matters further, an explosion of new technologies yielded superior products that competitors were selling at sharply lower prices. Any of these problems alone would have created serious problems for the company; in combination they were awesome.

Peripheral products were not the only part of the business in trouble. The company's data services divisions had also seen better days. Remote data processing was losing money in Europe, partly as a result of several acquisitions that had turned sour but also because of difficulties inherent in maintaining economies of scale on a continent divided by many national boundaries.

The advent of microcomputers in the early 1980s had a serious impact on the data services business. Many customers now found that they could use desk-top computers to handle on site many of the tasks for which they had formerly used Control Data timesharing services. The new technology presented opportunities as well as problems, but the company was slow in finding ways to combine the inherent advantages of desk-top computers with those of large central mainframes, and the resulting loss of revenues compounded the problems created by difficulties in the peripherals business.

While peripherals were foundering and data processing services were having problems, other parts of Control Data's service business were doing well. Arbitron, Ticketron, and Engineering and Professional Services were thriving, as were government systems and, for a time, the computer mainframe business. Revenues and profits from these operations largely masked what was happening elsewhere in the company.

Liquidity Problems

By the fall of 1984 Control Data was facing growing liquidity problems. In peripheral products, the downturn in the computer industry had resulted in excess inventories, and sharply intensified competition had created the need for

costly improvements in manufacturing facilities. The data services business had to be restructured—also at considerable expense—and major research and development dollars had to be invested to maintain the company's position in the supercomputer end of the business. Cash flow became a critical problem.

Selling Commercial Credit seemed a logical way to raise the needed cash. The need had long since passed for the lease-financing function Commercial Credit had originally been acquired to serve. Commercial Credit had a net worth of over $800 million, and a selling price anywhere near that figure would solve Control Data's liquidity problems overnight. The company's investment bankers, Goldman, Sachs & Co., strongly recommended this course, and in November of 1984 Control Data announced that Commercial Credit was for sale. Unfortunately, finding it impossible to negotiate a sales agreement on acceptable terms, Control Data took Commercial Credit off the market in June of 1985.

Meanwhile, Control Data's financial problems had grown worse than when Commercial Credit had first been put up for sale. Foreseeing the possibility of difficulty in finding a suitable buyer for Commercial Credit, work had been started early in 1985 on a prospectus for a public securities offering of $200 million in bonds and $100 million in preferred stock. In July, after the sale of Commercial Credit had fallen through and before the new securities had been placed on the market, a letter was received from the Securities and Exchange Commission challenging the accounting treatment of certain portions of the company's 1984 earnings report. While disagreeing in principle with the SEC position, Control Data in August restated its 1984 year-end earnings from $31.6 million to $5.1 million, and at the same time recognized the effect of updated financial information and restated its second quarter 1985 figures from a $3.8 million profit to a $4.3 million loss.

Financial Restructuring

Besides triggering a series of stockholder lawsuits, the new earnings figures placed Control Data in technical default on its bank indebtedness. Urgent negotiations resulted in temporary waivers of loan covenants, giving the company until September 15 to bring itself back into compliance. The new $300 million securities issue was already important; it now became imperative.

But worse was still to come. Continued deterioration in the company's business had by this time made it clear to insiders that the company would suffer a far larger loss for the year than had been expected, causing increasing concern to both Control Data and the managers of the prospective offering, Goldman Sachs and Merrill Lynch. The night before the scheduled closing on September 17, Price, his chief financial officer, and representatives of the two investment firms debated in a lengthy telephone conference whether or not to go ahead. After painful review, the wrenching decision was made to cancel the offering.

This eleventh-hour move sent shock waves through Wall Street and rocked the already damaged confidence of many in Control Data's future. The price of Control Data stock dropped sharply, and other troubles mounted swiftly. A short-term moneymarket debt outside the bank agreement was due to mature in a few days, and the company expected to meet it by drawing on approximately $100 million still available under revolving fund agreements that were not in default. The company's bankers, however, refused to advance additional funds and as a result Control Data defaulted on the short-term debts, which in turn placed it in default on its principal bank indebtedness. The situation was critical.

At first there was panic on the part of the bank representatives, but they

soon learned from examination of the books that Control Data's assets were far more than enough to pay off 100 cents on the dollar. After months of tortuous negotiation, in June of 1986 the sale of $125 million in accounts receivable was completed and the defaults were cleared by a new override agreement. Control Data was no longer in default, but the new covenants were tightly restrictive.

With its financial house in order, Control Data went to market on July 31, 1986—nearly a year after the earlier abortive effort—with a new securities offering of $200 million in senior notes and $150 million of convertible debentures. The investment community, its confidence returning, oversubscribed the two issues by a total of almost $50 million. The company could now breathe easier.

Chapter 5

Changing the Guard

During the critical period 1984-85, Control Data was the subject of considerable adverse press attention. Much of this was directed at Norris himself who became, in effect, the lightning rod for complaints about the company's poor performance. There was widespread belief that the problems were rooted in Norris's unconventional notions, that he was "frittering away resources on offbeat social schemes" and neglecting "the day-to-day details of running a business for profit."

This attitude reflected a serious misunderstanding of the facts. Not all of Norris's novel ventures had been successful and some of those that showed promise had not yet reached profitability, but less than 5 percent of the company's assets were employed in the so-called societal needs areas. The problems that brought Control Data to the brink of disaster were in its basic businesses: peripheral products, data services, and, somewhat later, computer systems.

Both in the press and in private conversation, reference was often made to Norris's age—seventy-four in July of 1985—and to the fact that he had well-overstayed the time chief executives customarily retire. Norris was reluctant to do so, however. He was in superb health and had many goals he still wanted to achieve; not least important, he did not want to leave while the company was in trouble—"I don't like to walk away from a fight."

Even so, he was not unaware of the turning of the calendar pages. He had put his basic plan for eventual retirement in place as far back as 1980 when at his request the board had created the Corporate Executive Office with Price and Berg as his designated successors. He was pleased with the way that arrangement had worked. Price was handling the company's problems with confidence and skill, and Price and Berg together had demonstrated their ability to function as a first-class management team.

One thing Norris found particularly reassuring was the systematic way Price had set about reviewing and evaluating all of Control Data's businesses. Starting in November of 1984, Price had begun holding strategy meetings with the directors of the company on the afternoons and evenings before regular board meetings. Detailed analyses of problems were presented, and the pros and cons of alternative courses of actions were discussed. By this means the directors were kept informed on the directions management proposed to go, and management had the benefit of the directors' counsel. Norris was satisfied with the course of these meetings and the resulting clarification of the company's strategic directions.

Thus reassured, he advised his outside directors in November of 1985 of his intention to retire as chief executive officer. His original plan, going as far back as 1980, had been to recommend that Price succeed him as president and chief operating officer and that Berg succeed him as chairman. Some of the directors, however, objected that while the original plan might have been sound under normal circumstances, the company's critical condition made it essential that there be no ambiguity as to the chief executive's authority. Recognizing the seriousness of potential divisiveness within the board, Berg, in a private conversation, urged Norris to change his position. Norris reluctantly agreed and recommended that Price be named chairman, president, and chief executive officer and that Berg be renamed deputy chairman. The directors approved without further debate.

The actual transfer of power took place at the regular meeting of the board on January 10, 1986. Immediately following the meeting, Norris, Price, and

Berg faced a battery of television cameras and journalists from national and local news media who had gathered for the event. In a prepared statement, Norris expressed confidence that "the company's basic strategy is sound." He emphasized that he had "confidence in Bob Price's capabilities to implement the decisions that have been made" and that he was pleased that Berg would "continue his active involvement in the company as deputy chairman of the board."

Price, for his part, paid graceful tribute to Norris and confessed that it would not be "easy to follow a legend." He went on to sketch the progress being made in restructuring the company's finances and outlined in broad terms the courses he planned to follow. "Control Data," he concluded, "is a company with great pride in its past and great confidence in its future... [Armed] with that pride and that confidence and the legacy of Bill Norris's vision, we are eager to move into a new era."

After months of highly critical comment, the reaction of the press to Norris's retirement was predominantly complimentary. An editorial in the *Minneapolis Star and Tribune* was typical. Under the heading "A Good Corporate Citizen Steps Down, Not Out," the paper paid tribute to Norris as "a man with many visions" and concluded with a stirring encomium: "Because Norris wasn't afraid of mistakes, he made them. Because he was a man of vision, he sometimes went too far. Because he was a self-confident leader, he wouldn't be second-guessed. As a result, some promises were not delivered. But because of that courage, vision and leadership, many promises were. Minnesota and America are richer in many ways because of him."

An era had come to an end, but a new era had already begun.