Computing the American Way: Contextualizing the U.S. Computer Industry of the 1950s and 1960s

Thomas Haigh, University of Wisconsin--Milwaukee

thaigh@computer.org   www.tomandmaria.com/tom

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This paper will be revised for publication, probably in a special issue of IEEE Annals of the History of Computing showcasing work on Americanization within the Software for Europe project. This version was pre circulated to workshop participants, and was intended particularly for an audience of European historians of computing with an interest in Americanization but without a strong grounding in US business or labor history.

Americanization has emerged as a major theme of the Software for Europe project. Participants are concerned with the influence of American companies, particularly IBM, in the development of European computing. America looms large in all discussion of European computing, as most national narratives or company histories tend to tell the story of promising firms crushed or acquired by American competitors and brilliant innovations sidelined by dominant American technologies. Participants have begun to explore interesting connections, such as the possibility of a distinctively European style of collaboration between university and industrial innovation expressed in the story of the Algol project. But here too the "Europeanness" of something is often reduced to the extent to which it diverged from a perceived American approach. Little wonder that attempts to place European computing in its proper historical context have led participants toward a more active engagement with the academic literature of Americanization.

As a scholar whose research has focused exclusively on developments within the United States my involvement with the Software for Europe project has challenged me to think more about ways in which technologies spread across national boundaries. I've also been exposed to the rich and growing literature advancing Americanization as a key theme in the global history of the twentieth century. But I've also been struck by the distance between the ways in which American historians of technology and business have approached the US in the immediate post-war decades and the rather schematic versions of America that serve as a foil to European narratives. The very concept of Americanization is seldom found in the voluminous American literature on the historical development of business and technology within the United States. It risks the construction a particular vision of America as "other," a colossus of materialism, prosperity, high technology, crassness and unreflective action. Americans do indeed talk a great deal about the essence of American and its special place in the world, but the more thoughtful ones appreciate that (Superman's fight for "Truth, Justice, and the American Way" notwithstanding) the

American Way is a rhetorical position often claimed by both sides in a debate rather than a single shared and fixed set of principles.

My intention, therefore, is to provide the project with a synthetic overview of what was distinctively American about the early domestic US computer industry and how this aligned with the broader economic and political context for the development of the American computer industry in the 1950s and 60s. I put the development of the institutional structures and human resources policies of computing firms, particularly IBM, into the context of major political changes during the period. The paper is focused particularly on the shifting political economy of the US from the 1930s onward, as dramatic expansions in federal government activity during the New Deal, Second World War, and early Cold War made it the leading creator of demand for administrative technology and technical computing services. The computer industry holds an important place within these transitions. Its roots go back for the office equipment industry of the 1880s, which developed by the 1920s as a leader in the welfare capitalism movement. By the 1960s the computer industry embodied American leadership in the world of high technology, and its leading companies represented a new vision of America as a place of political consensus in which business and government worked closely together, workers enjoyed excellent benefits and conditions, and technological advances created a more efficient and orderly world. This was not the only version of the American Way, and it did not fully survive the turmoil of the 1970s, but for a while it seemed a product with considerable export potential.

The "Corporate Liberal" Roots of the Computer Industry

America's first standard commercial computer, a Univac I, was installed in the US Census Bureau in 1951. So it is hard to talk about an American computer industry prior to the 1950s, despite the existence of a few one-off custom development contracts placed with startups prior to this date. But almost all the firms that would go on to compete credibly in the computer market of the 1950s and 60s were already in existence. They just weren't making computers yet.[1]

By the mid-1950s IBM had taken the majority of the US computer market, and it maintained a dominant position for several decades. People joked that the early computer industry of the 1960s consisted of IBM and the Seven Dwarves: Burroughs, Sperry Rand (parent of Univac), Honeywell, NCR, General Electric, RCA and the Control Data Corporation. Historians agree that, although the American computer industry was a convergence of several streams of technological and industrial evolution, the office machine industry was far and away its most important antecedent. Not only the mighty IBM but also Burroughs, Univac (in the shape of Remington Rand) and NCR could trace their roots to the early days of the office mechanization boom in the late 19th century.[2] As the importance of computers to

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[1] Two firms founded during the 1950s did achieve real success in the computer industry by the end of the 1960s: DEC and CDC (both 1957). Rather than compete head-to-head with the strengths of IBM and other entrenched firms they targeted the opposite extremes of computer power, creating the minicomputer and supercomputer markets respectively.

[2] James Cortada, Before the Computer: IBM, Burroughs and Remington Rand and the Industry they Created, 1865-1956 (Princeton, NJ: Princeton University Press, 1993).

administrative automation became apparent they entered the computer industry through a combination of internal development work and the acquisition of specialized startup firms.

Our knowledge of the internal cultures, political roles, and typical worker experiences within these firms remains surprisingly skimpy. The IBM story has been told in shelves of books, though these tend to recycle the same anecdotes and to focus on the outsize personalities at the top of the firm. We know much less about the experiences of mid- and low-level employees. The first few years of Univac have been addressed by several historians, but we know little of its development after the mid-1950s. NCR has received some analysis as a pioneer of welfare capitalism, and the managerial and technical woes of General Electric's computer division are chronicled in a number of memoirs. Material on the others is still patchier.

Office machine companies were prominent among the "welfare capitalism" movement of the early twentieth century. Under welfare capitalism companies provided their workers with pension schemes, health care, recreation clubs and even housing. National Cash Register, the firm where Thomas J. Watson Sr. of IBM learned the office equipment business, was a leader in this movement during the 1910s and 1920s. It was known for its worker suggestion schemes, company picnics, adult education offerings, sports grounds and cultural events. NCR even hired a welfare worker and attempted to reform inhabitants of the local slum. [3] Its leader, James Patterson, combined this commitment to worker welfare with an astonishingly capricious management style, frequently purging his subordinates and, or one occasion, the entire executive team.

This was in part an extension of the Progressive Era reformist spirit into business management, and was closely tied to the emergence of personnel management as a corporate function and occupational specialty. The American office equipment industry boomed during the Progressive Era, in part because of the success these companies enjoyed in promoting their machines as physical manifestations of the vogue for systematization, efficiency, and modernity. So it is not surprising that many of them embraced what was seen as a modern and progressive approach to labor relations.[4] Elspeth H Brown has recently shown that NCR made effective use of its factory improvement schemes for publicity purposes, using photography to create a "showcase for progressive business practices" that would "circulate in a global network of Progressive-era conferences, exhibitions, and educational endeavours."[5]

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[3] A first hand account of NCR during this era, from its future chairman, is given in Stanley C Allyn, My Half Century at NCR (New York: McGraw-Hill, 1967).

[4] The best history of the early human resources movement and the bureaucratization of personnel management is Sanford M. Jacoby, Employing Bureaucracy: Managers, Unions and the Transformation of Work in American Industry, 1900-45 (New York, NY: Columbia University Press, 1985). An overview of welfare capitalism is presented in Stuart D Brandes, American Welfare Capitalism, 1880-1940 (Chicago: University of Chicago Press, 1976). Interestingly these firms did not adopt the techniques of Scientific Management as advanced by Frederick Taylor.

[5] Elspeth H Brown, "Welfare Capitalism and Documentary Photography: N.C.R. and the Visual Production of a Global Model Factory", History of Photography 32, no. 2 (June 2008):137-51.

Watson carried welfare capitalism practices over into IBM, though only in the 1930s did it grow large and profitable enough to support a similarly grand array of schemes.[6] During the 1920s Watson was unable to match the full range of measurers pioneered at NCR, focusing on cheaper to implement measures such as band concerts, baseball games and company outings rather than high wages or formal pension programs.[7] His son noted that "there was no money available to duplicate Patterson's handsome factory buildings and his generous benefits programs. Father used showmanship instead… every kind of fanfare was tried to create enthusiasm."[8] Employees were expected to sing from the company song book and study Watson's writings carefully. Corporate events had the flavor of religious revivals in which commercial success and personal virtue were intertwined. Songs echoed traditional Christian themes while celebrating Watson himself and his commitment to world peace in an almost saintly light. A recent analysis of the IBM songbook identified paternalism, evangelism, and celebration of sales as its main lyrical concerns.[9]

Politically, however, even progressive advocates of welfare capitalism were no more tolerant of government interference in their business, worker rights or labor unions than their conservative colleagues in the steel and mining industries. Both sought unchecked power over their workers and the elimination of socialist sentiment, whether this was achieved through company sponsored art classes and sports leagues or the more traditional methods of violent intimidation.

These attempts to remake both companies and workers into new and more perfect forms reflects the faith of many American business leaders in the special character and unique virtue of their nation. This was perhaps clearest in the case of Ford Motor Company, one of America's largest companies during this era. Henry Ford presented himself as a social reformer building not just cars but also American lives for his immigrant workforce. Ford was an outspoken proponent of "Americanization," which during this era referred not to the export of American culture and practices to foreign lands but to the assimilation of foreigners into the US population.[10]

Administering the New Deal

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[6] Watson was also inspired by a local company outside the industry. Endicott, New York, which became a key center for IBM, had previously been dominate by the Endicott-Johnon Shoe Company. Endicott-Johnson was a famously progressive firm, building municipal buildings, a gold course, and sports facilities for the town and providing health and other benefits to workers. Gerald Zahavi, "Negotiated Loyalty: Welfare Capitalism and the Shoeworkers of Endicott Johnson, 1920-1940 ", Journal of American History 70, no. 3 (December 1983):602-20. According to Watson, Jr. its founder, George F. Johnson, was a major influence on his father. Thomas Watson, Jr. and Peter Petre, Father, Son & Co: My Life at IBM and Beyond (New York: Bantam, 1990), 67. An account of their relationship is given in William Rodgers, Think: A Biography of the Watsons and IBM (New York: Stein and Day, 1969), 71-73.

[7] Thomas Graham Bedlen and Martha Robins Bedlen, The Lengthening Shadow: The Life of Thomas J. Watson (Boston: Little, Brown and Company, 1962), 151.

[8] Thomas Watson, Jr., A Business and Its Beliefs: The Ideas that Helped Build IBM (New York: McGraw-Hill, 1962).

[9] Amal El-Sawad and Marek Korczynski, "Management and Music: The Exceptional Case of the IBM Songbook", Group and Organization Management 32, no. 1 (February 2007):79-108.

[10] The classic study of Ford's human resources practices is Stephen Meyer, III, The Five Dollar Day: Labor Management and Social Control in the Ford Motor Company, 1908-1921 (Albany, NY: SUNY Press, 1981).

America's national love affair with capitalism, big business and free markets did not survive the 1930s intact. Franklin Roosevelt used the decade long economic emergency to justify a huge range of New Deal government programs that would have been anathema during a time of prosperity. Labor unions were given legal backing, prices and wages regulated, the banking industry was fundamentally restructured under tight government control, a state pension scheme was introduced, and millions went to work on the government payroll engaged in reconstruction projects. None of this quite succeeded in ending the depression, as signs of economic recovery from 1934 to 1936 were followed by relapse into a new recession when stimulus spending was cut back. Corporate liberals had, despite their prestige, been a definite minority among the business leaders of the 1920s and their numbers had dwindled further during the 1930s as the New Deal pushed business leaders into strident opposition to its reforms. Roosevelt was one of the most widely and deeply loved of presidents, but his policies inspired equally sincere hatred among his political foes who were pledged to reverse the changes of the New Deal.[11]

Thomas J. Watson Sr. was Roosevelt's closest ally in the business community, something of a surprise as he had previously expressed great admiration for Roosevelt's Republican predecessors Herbert Hoover and free market champion Calvin Coolidge. One biographer suggests that "Watson was apolitical; he identified with authority and the repositories of power regardless of party."[12] Both men benefited from the alliance. Watson courted publicity, giving himself and his firm a much higher public profile than IBM's status as a medium-sized producer of specialized business products otherwise warranted. In his remarkably vivid autobiography his son and successor, Thomas J. Watson Jr., notes that Watson had managed to make himself "much more famous" than IBM itself.[13] At a time when most businessmen were vilified by the popular press, Watson established himself as the model of the enlightened and forward looking industrialist.

Watson had supported and helped to fund Roosevelt's successful campaign for president. He continued to speak out in favor of Roosevelt's domestic and foreign policies even after his radical actions alienated the vast majority of corporate leaders. From 1933 he would correspond with the president on a weekly basis, volunteering IBM's services to perform statistical analysis on the economic impact of New Deal programs.[14] Watson Jr. recalls that his father slept several times as Roosevelt's guest in the White House and was flattered by the president's attentions, which included offers of posting as ambassador to the United Kingdom or in Roosevelt's cabinet as commerce secretary. He served instead as "unofficially, as Roosevelt's representative in New York." In this capacity he entertained foreign dignitaries with lavish, quasi-official dinners with business leaders during their visits to the US.[15]

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[11] During the first half of the twentieth century the Republican party was the part of industrial interests, high tariffs, professionals and protestants, strongest in the upper Midwest, New England (except Massachusetts) and the Mid-Atlantic states. The more populist Democratic party represented farmers, immigrants, white southerners, urban workers and Catholics. It dominated the South.

[12] Rodgers, Think, 106.

[13] Watson and Petre, Father, Son & Co, 147.

[14] Bedlen and Bedlen, The Lengthening Shadow: The Life of Thomas J. Watson, 185-89.

[15] Watson and Petre, Father, Son & Co, 44-45.

While Watson supported the right of workers to unionize he was keen to make sure that his own workers did not feel the need to do so. In the 1930s, as most companies practicing welfare capitalism cut back or abandoned their programs, IBM bucked the trend with higher wages, a pension system begun in 1934, health insurance, and, in 1935, built a country club open to all workers. By the same year piecework had been abandoned at all IBM factories. He also favored promotion from within and education programs for workers, providing workers with the same kind of prospects for internal mobility that unionized workers were able to negotiate.[16] David L. Stebenne has recently surveyed the development of IBM's personnel policies during this era, drawing connections between Watson's internal changes and his public involvement with New Deal policies.[17]

One need not be a cynic to note that Watson's devoted support of Roosevelt and the New Deal was in his firm's own interest. Its tabulating machine business had its roots in the contract Herman Hollerith received to build machines for the 1890 United States Census. While many private companies had adopted tabulating technology by the start of the depression, Watson remained well aware of the importance of government agencies as consumers of his company's products. However from 1930 to 1932, immediately prior to the New Deal, government business accounted for only one or two percent of the firm's revenues (and was shrinking as the census bureau returned its leased equipment to cut costs).[18] Thanks to the New Deal the federal government was growing rapidly at a time when most private industries were unable or unwilling to make new investments. The 1935 passage of the Social Security Act created a massive new market for tabulating machines, which were used to keep records for the program and to automatically generate benefit checks on punched cards. By 1937 IBM had already provided social security offices around the country with more than four hundred tabulators and twelve hundred keypunches.[19] As well as establishing the Social Security Agency itself as a leading user of tabulating machines this, like other New Deal initiatives, imposed new and complex record keeping and reporting obligations on private business.[20] For example businesses were now required to keep careful records of wages and hours worked. So this increasing bureaucratization of employment also helps to explain why payroll processing was established as a key application for tabulating machines by the 1940s.[21] In 1936 the first shipment of punched card machines to the Social Security Administration was made. IBM's sales revenues, which had been stagnant since the late 1920s, jumped by around 20% and continued to rise rapidly for the rest of the decade. Watson himself achieved new celebrity as America's highest paid man.[22] By 1940 IBM's revenues were more than double 1935 levels.[23] Social

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[16] Bedlen and Bedlen, The Lengthening Shadow: The Life of Thomas J. Watson, 150-54.

[17] David L. Stebenne, "IBM's "New Deal": Employment Policies of the International Business Machines Corporation, 1933–1956", Journal of The Historical Society 5, no. 1 (Winter 2005):47-77.

[18] Robert Sobel, IBM: Colossus in Transition (New York: Times Books, 1981), 85.

[19] Ibid, 86.

[20] I am not aware of any detailed history of IBM's work on Social Security and other New Deal programs, but a good summary is given in Martin Campbell-Kelly and William Aspray, Computer: A History of the Information Machine (New York, NY: Basic Books, 1996), 51-52

[21] Punched card work during the 1940s and 50s is discussed in Thomas Haigh, "Technology, Information and Power: Managerial Technicians in Corporate America" (Ph.D., University of Pennsylvania, 2003), ch. 4.

[22] Watson and Petre, Father, Son & Co, 46.Watson was already the highest paid man in America in 1934 when figures were first gathered, but this was not disclosed until 1936. Rodgers, Think, 127.

Security payments made via special checks issued on punched cards, giving many people their first sight of machine processed data.

The growing symbiosis between IBM and the federal government developed even as another government agency, the Justice Department, pursued a case filed in 1932 alleging that IBM and Remington Rand were illegally forcing their customers to purchase overpriced cards. In 1936 the government won its case in the Supreme Court.

World War II

Unemployment vanished and industrial output finally soared after 1941 with America's entry into the Second World War and its industrial mobilization on a scale unmatched before or since to create the ships, planes, vehicles and other supplies needed to support the Allied armies. This prosperity came at a price, as the accumulated government debt of 123% of 1945 tax revenues represented an equally unprecedented share of the nation's wealth.

But wartime economic mobilization built powerful new ties, transforming the government into the dominant purchaser of manufactured goods while employing thousands of executives as government administrators. Industrial giants were turned inside out. America's largest firms made rapid shifts in their operations, building new plants and converting old ones. With civilian car production banned, Ford turned its factories over to produce tanks, jeeps and planes. Office equipment firms made similar transitions, as even the production of simple business machines such as typewriters was determined by production quotas and distribution priorities set by the War Production Board.[24] NCR cranked out aircraft engines, gun magazines, and rockets as well as developing special code breaking equipment. Burroughs built the the famous high precision Norden bombsight, a special purpose analog computer. IBM produced guns, and other military items as well as cranking out data processing machines in record numbers for wartime administrative and technical computing purposes. Members of the armed services were given special training with IBM punched card machines, and the firm sent experts to work with the government in developing new procedures and applications. IBM also built new products, including mobile punched card facilities for field use by invading forces and new products for the remote transmission of machine readable information via teletype and encrypted radio.[25] It contributed to operations research analysis for anti-submarine warfare, and performed calculations for ballistics and weather forecasting.[26] Thanks to all these wartime contracts IBM's revenues tripled between 1940 and 1945, having already doubled from 1935.[27]

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[23] Annual figures on IBM income, net profit, and sales revenues are from Cortada, <u>Before the Computer</u>, 152. Cortada identifies "select sale revenues" but does not explain what this means. IBM revenue dipped during 1932 and 1933, but held up remarkably well throughout the depression and the firm remained solidly profitable.

[24] A detailed discussion of the role of the Ward Production Board in coordinating wartime production of office machines is given in Ibid, 193-99.

[25] Emerson W. Pugh, <u>Building IBM: Shaping an Industry and its Technologies</u> (Cambridge, MA: MIT Press, 1994), 90-107 is by far the most complete published summary of IBM's work during the war.

[26] Rodgers, <u>Think</u>, 150.

[27] A complete annual summary of IBM's revenues is compiled in Pugh, <u>Building IBM</u>, 323-24.

In 1945, as the war came to an end, nobody knew for sure whether America would lapse back into recession when this massive stimulus was withdrawn just as it had done in 1937. Likewise nobody knew which of the New Deal's measures could command a political consensus for their continuation when the emergency was finally over and prosperity returned. In fact, years of pent up demand ensured that the economy continued to grow, with high technology companies like IBM, RCA and General Electric leading the way. This happy outcome was neither obvious nor inevitable. The corporate liberals played an important role in setting constructing the political economy of the early cold war era and stabilizing the conditions for their own future success.

Welfare Capitalism Reborn

During the late 1940s the country's future direction was uncertain and bitterly contested. Division of power between employers, labor unions and government remained the key domestic political issue and one with obvious relevance to the country's business leaders. Under Roosevelt the Democrats had built unprecedented majorities in the House and Senate. But Harry Truman, his unpopular successor, could not command the personal loyalties of voters and struggled to deal with a wave of strikes. In 1946 voters handed Republicans, campaigning with the slogan "Had Enough?" a majority in both houses of congress. The Republican leader, Robert Taft, was pledged to roll back many New Deal reforms. In 1947 congress passed the Taft-Hartley act, overriding Truman's veto. This greatly limited the scope of political action by unions, preventing unions from striking or picketing in favor of other unions or funding political parties. It allowed the federal government to break strikes and forbade communists from holding office within unions. States were allowed to pass laws eliminating closed shop contracts, which allowed many Southern states to establish themselves low wage havens to which companies could relocate plants.

In response to Taft-Hartley unions retreated from general political involvement and the interests of the working class in general, instead focusing on the direct economic interests of their members. The shift was cemented in the so-called "Treaty of Detroit" agreed in 1950 between the United Auto Workers union and the major American car companies. Workers gave up the right to annual strikes, limited the scope of bargaining, and abandoned calls for a role in corporate governance in return for long term contacts guaranteeing generous health, unemployment, vacation and pension benefits, job security, and inflation adjusted wage increases. Unions in other industries followed suit. The result, reinforced by the rise during the New Deal of unions based on industry (e.g. auto workers) rather than craft (e.g. carpenters), was a partition of American business into unionized and non union sectors. Companies could stave off the threat of unionization if they provided competitive wages and the other benefits enjoyed by unionized workers.

The computer industry avoided unionization. In his book Modern Manors: Welfare Capitalism Since the New Deal historian Sanford Jacoby has persuasively argued that the human resources policies adopted by modern corporations of the 1960s were a modernization and broad dissemination of the traditions of welfare capitalism practiced prior to the war by firms like IBM and NCR. Companies in many industries sought to bridge class barriers by creating "bonds of shared belief, ethnicity, and gender" so that workers felt themselves part of industrial communities in which they shared livelihoods, skills and

expertise with managers and aspired to rise through the corporate ranks. Profit sharing and the creation of internal labor markets bound workers more closely to firms. According to Jacoby these practices received little attention from human resources specialists during the 1940s and 1950s, in which collective bargaining was seen as the future of industrial relations, but became more representative in the 1960s as they spread beyond a small group of large, non-unionized firms along with the general reorientation of the economy away from mass production. He suggests that historians with an interest in labor practices have systematically skewed attention toward unionized firms and away from the persistence of welfare capitalism. [28]

Certainly IBM and NCR fit the model, with a deliberate attempt to build on their welfare capitalism traditions and strong corporate culture while modernizing both for an era in which management was based more on committees and less on the dictatorial whims of Patterson and Watson Sr. They mirror Eastman Kodak, one of Jacoby's main case studies, as leaders in the welfare capitalism movement that retained their programs through the depression, enjoyed prosperity during the 1940s and 50s in technological niches with little competition, and developed highly distinct corporate cultures based on the internal promotion of managers. Their benefit programs and grievance procedures gave union organizers little to appeal to other than resentment of managerial paternalism. Elizabeth Fones-Wolf has argued that the Second World War played a key role in reviving welfare capitalism at firms like NCR, which had fallen on hard times in the 1930s but took advantage of wartime prosperity and decreased union opposition to experiment with new programs aimed to win worker loyalty.[29]

And, by 1960s, both IBM and NCR had taken steps to retire the most obviously paternalist elements of their cultures. Watson was later critical of the "cult like" atmosphere created around his father.[30] His father's style of celebration with its public carnivals, company songbooks, picnics for thousands, rallies, and fireworks belonged more to the world of the 1930s than the newly prosperous and confident American of the Eisenhower years.[31] At NCR, Patterson's reign of terror was followed in the 1950s by a calmer style of leadership under Stanley C Allyn, one of his protégés. In his autobiography Allyn struck a similar tone to Watson Jr., lauding Patterson's accomplishments and commitment to the wellbeing of the workers while telling revealing anecdotes about his erratic treatment of the firms's managers. He stressed the extent to which his own initiatives, such as a golf course, a systematic complaints system and consultation with workers, build on Patterson's principles.

IBM never was unionized. By 1969 it was introduced by the author of a history as "the world's largest nonunion company," having grown to more than a quarter of a million workers and become America's sixth largest industrial firm measured by revenue.[32] According to Nancy Foy, author of a 1974 study of IBM's history and culture, "incurring a unionization threat is a cardinal sin in IBM terms." She explains

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[28] Sanford Jacoby, <u>Modern Manors: Welfare Capitalism Since the New Deal</u> (Princeton, NJ: Princeton University Press, 1997), the quote is from page 6.

[29] Elizabeth Fones-Wolf, "Industrial Recreation, the Second World War, and the Revival of Welfare Capitalism, 1934-60", <u>Business History Review</u> 1986).

[30] Watson and Petre, <u>Father, Son & Co</u>, 82.

[31] Rodgers, <u>Think</u>, 226.

[32] Ibid, 9.

that in 1960 the manager of the firm's Data Processing Division was removed from his post after a subordinate cut costs too aggressively and left workers delicately hinting that unionization was looking more attractive.[33]

IBM continued to promote its "open door" policy, allowing employees to go over the heads of their bosses, even to Watson himself, with complaints or neglected ideas. This was stressed within the company, to employees, and was also featured prominently when Watson Jr. delivered a series of lectures in 1962 on "A Business and Its Beliefs." Watson claimed that this might make "many a traditional manager's blood run cold" because "Whenever a manager makes a decision affecting one of his people, he knows that he may be held accountable to higher management for the fairness of that decision." [34]

The firm's culture remained a distinctive blend of paternalism and Darwinian struggle for survival. In general lower level employees received more coddling, in part to ensure than unionization remained unattractive and turnover minimal. They benefited from education programs, internal labor markets that offered the chance of rising from low level jobs into professional positions, job security, and of course excellent benefits. Managers, especially at the more senior levels, were at constant risk of being removed from their posts if they failed to meet targets or deliver promised projects within time and budget targets. They knew that that they were in constant competition for promotion opportunities. Yet they were not fired. According to Foy, "The corporate view is that once the company has selected a man and trained him, it has assumed a responsibility for him." Managers who failed at one task would be placed elsewhere. But, in reality, the firm might just "put a man in a backwater where he can cause no trouble and then forget him. Eventually the man in Siberia is expected to retire or be paid off to leave—but he is never directly ill-treated."[35]

International Engagement

Business leaders, among them Thomas Watson, played an important role in shaping America's engagement with the world in the years after World War II. While the ensuing cold war with the Soviet Union might seem, in retrospect, inevitable it took several chaotic years for a political consensus to develop.

Immediately after the war the formation of the United Nations created controversy within the US. As a successor to the ill-fated League of Nations, a pet project of Democratic president Woodrow Wilson, it reopened old partisan debates about the proper level of American entanglement with the outside world. In 1947 and 1948 Taft's dominant Republican faction within congress was not only rigidly opposed to labor unions and government regulation. It was also fervently isolationist, opposed to the formation of NATO and the United Nations, deeply uneasy about the Marshal Plan, and more focused on the threat of unchecked government spending at home than of communism abroad.

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[33] Nancy Foy, The IBM World (London: Eyre Methuen, 1974), 84.
[34] Watson, A Business and Its Beliefs: The Ideas that Helped Build IBM, 20.
[35] Foy, The IBM World, 84.

The Truman administration's policy of containment of the Soviet Union via a global campaign for military and economic superiority cohered through 1946 and 1947, culminating with the declaration of the so-called Truman Doctrine (specifically the resistance of Soviet influence in Greece and Turkey) in March 1947. But this too was a politically charged position. America's military spending was slashed, in pursuit of a balanced budget. Truman was ultimately able to win congressional support for his the Truman Doctrine and Marshall Plan, but military spending remained relatively low even after the Berlin Air Lift of 1948 brought a new directness to international confrontation.

Again the corporate liberals acted to support international engagement. In particular Watson Sr. was a fervent supported of the United Nations, committing IBM staff to the support of its New York operations.[36] Among the attendees at Watson's funeral, in 1956, were Secretary of State John Foster Dulles and United Nations secretary General Dag Hammarskjold.[37] Watson had been a high profile booster of world trade since the dark days of the protectionist 1930s, serving as head of the International Chamber of Commerce in 1937. His faith in the moderating influence of increased trade with Nazi Germany and the USSR would later cause some embarrassment.[38] IBM opened small operations in dozens of countries, many of them named "Watson Business Machines" rather than IBM. He toured these scattered outposts frequently and with great pomp, collecting medals from local dignitaries, though at their interwar peak in 1935 IBM's foreign operations accounted for no more than $1.6 million of its $21 million in revenue.[39]

After the devastation of war Watson retained his belief in world peace through world trade, creating the IBM World Trade corporation in 1949 to consolidate control of IBM's international business in the hands of his son Dick (actually Arthur) Watson. On its foundation it already included sales offices in fifty-eight countries.[40] IBM's foreign operations grew even more rapidly than its domestic business over the following decades, and by 1973 it provided most of the firm's profits and almost half of its revenues.[41]

At NCR, Allyn shared Watson's belief in the power of world trade to bring global peace and prosperity and took part in United Nations and UNESCO delegations. Writing of his experiences visiting German and Japanese subsidiaries immediately after the war he claimed "when we sat down to talk cash registers, accounting machines and business operations we needed no cultural, religious or social interpreters. We spoke a common language, believed in identical principles, sought mutual objectives…. [T]rade is perhaps the best of all meeting grounds."[42]

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[36] Watson and Petre, Father, Son & Co, 162.

[37] Richard S Tedlow, The Watson Dynasty: The Fiery Reign and Troubled Legacy of IBM's Founding Father and Son (New York: Harper Business, 2003), 187.

[38] Watson accepted a decoration from Hitler in 1937, returning the medal only after the outbreak of war in Europe. Rodgers, Think, 121-27. IBM's trade with Germany in the Nazi era has been the topic of considerable controversy, most notably with the publication of the popular polemic Edwin Black, IBM and the Holocaust (New York: Crown, 2001). Watson's 1937 call for closer ties with the USSR accompanied the restoration of diplomatic relations between the two nations. Rodgers, Think, 109.

[39] Sobel, IBM, 184-85. The figure on total revenue is from Pugh, Building IBM, 323.

[40] Cortada, Before the Computer, 229.

[41] Foy, The IBM World, 55.

[42] Allyn, My Half Century at NCR, 109.

Upholding the New Deal Order

Matters came to a head in elections of 1948. The Republicans planned to retake the presidency and repudiate the New Deal once and for all. Yet in this time of fundamental political realignment neither party could command a stable coalition.[43] Within the Republican party Taft lost his bid for the presidential nomination, defeated by Thomas Dewey who represented the (then powerful, now extinct) North Eastern liberal wing of the party. The Democrats were threatened by defections from both extremes of their party.[44] When the votes were counted Truman had pulled off the biggest political upset of the century, in large part by running against the record of the Republican congress. Democrats regained their majorities in both chambers and the Republican assault on the New Deal legacy was checked. The two parties remained almost evenly balanced for most of the 1950s, and Republicans won back control of the senate in the elections of 1952 before losing it again two years later. But with hindsight it is clear that the removal of left wing elements from the Democratic party ensured its natural role as a centrist governing party in Congress. Over the sixty-two year period from January 1933 to January 1995 the Republicans controlled the House for just two years and the Senate for just ten years (six of those in the 1980s).[45]

Historians interested in the internal development of the United States have come in retrospect to see the entire period from Roosevelt's election in 1932 to Regan's triumph in 1980 as a single era: "The New Deal Order."[46] Though the 1950s, 60s and 70s presidents from both parties either supported or made no serious effort to overturn this political order. It was characterized by government regulation of key industries (banking, telecommunications, airlines and public utilities), a patchwork of social programs to support the poor, elderly and disabled, industrial unions focused narrowly on defending the interests of their existing members, progressive taxation and a broadly Keynesian commitment to an active role of the government in managing economic cycles. A similar general consensus on foreign policy ensured that both parties supported massive Cold War defense spending, a global commitment to fight against the expansion of communist influence, and the expansion of free trade. While Democratic presidents were more likely to push for the expansion of government programs, most notably Lyndon Johnson's hugely ambitious Great Society initiatives, Republican presidents did not disrupt the status quo. Even Richard Nixon, rightly remembered an exceptionally divisive and partisan leader, extended government

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[43] The American electoral system is biased toward the creation of coalitions within the two major political parties rather than the emergence of viable smaller parties as coalition partners. In a country as vast and culturally diverse as America this produces some rather odd results, such as the current alliance within the Republican party of Christian fundamentalists eager to give their moral code the force of law and libertarians in favor of limited government and personal freedom.

[44] As the mood of the country turned rightward in 1946 the commerce secretary and former Vice President, Henry A. Wallace, was fired. He became the nominee of the Progressive Party in the 1948 elections, but its perceived sympathy for Soviet communism doomed it. Meanwhile Truman's support for racial integration was beginning to shake its century old lock on the white southern vote. South Carolina Democrat Strom Thurmond led a racist rebellion, winning four southern states for his breakaway party.

[45] However both parties had their own liberal and conservative blocks, and an unofficial block of Southern conservative Democrats and conservative Republicans held an effective veto over legislation for most of this period.

[46] Steve Fraser and Garry Gerstle, The Rise and Fall of the New Deal Order (Princeton, NJ: Princeton University Press, 1989).

oversight of industry with the creation of the Environmental Protection Agency. Only the economic crisis of the 1970s and the growing power of the conservative movement brought this fundamental consensus to an end.

The New Deal Order provided exactly the foreign and domestic conditions best suited for the growth of the computer industry during the 1950s and 1960s. The values of internationally minded corporate liberals such as Thomas Watson were triumphant, while the combination of Cold War spending and a booming international economy laid the foundations for rapid and sustained business expansion.

Such a focus on the early 1950s as a time marked by emergence of a centrist political consensus in the face of a perceived Soviet challenge might seem hard to square with popular depictions of the era as a time of witch hunts, loyalty oaths, Hollywood blacklists, and the rampages of Senator Joe McCarthy and the House Committee on Un-American Affairs. The new Red Scare indeed led to the purging from public life of anyone with leftist sympathies and foreclosed the possibility that the strides made by American socialists during the 1930s might result in a major left wing political party of the kind found in all European democracies. But the power of Joe McCarthy and his fellow anti-communist witch hunters was actually short lived. McCarthy began his accusations of communist subversion within the US government in 1950, but his position in the senate was already becoming marginal by the time of his public self destruction during final and most dramatic round of public hearings 1954. He proved an embarrassment to his own party and to the anti-communist cause, particularly after transferring his wild accusations to the new Eisenhower administration. This extremism alienated many business leaders, particularly those committed to international trade, though few sought controversy by making any public statement on the matter. Thomas J. Watson Jr. claims in his memoir to have made attacked McCarthy as dangerously undermining America with "evil or unjustified suspicions" at the height of the latter's fame.[47] McCarthy drank himself to an early death in 1957, three years after being censured by an overwhelming margin in a senate vote.

The Eisenhower Years and the Corporate Commonwealth

Initial Univac deliveries in 1951 marked the beginning of the American computer industry. The next year, in a much repeated story, millions of Americans had their first exposure to computer technology when a Univac correctly projected an unexpectedly strong victory for Dwight Eisenhower in the presidential election on the basis of a handful of early vote totals. In retrospect the machine might have been suspected of self interest, as the Eisenhower years saw the computer industry grow with astonishing speed. Historians studying the construction of the post-War consensus have focused particularly on the Eisenhower years. This was the key period in establishing both the technical and commercial viability of computers as tools for administration, scientific calculation, and military control. Computers and

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[47] Watson and Petre, Father, Son & Co, 234-38. Watson mentions having early, private outrage over McCarthy, expressed initially in small groups and later in a public address. Internal chronology suggests that this took place after McCarthy was humiliated during televised hearings with the famous question "Have you no sense of decency?" and after journalist Edward R. Murrow denounced McCarthy on television. Watson himself suggests that, while "many prominent people" had already criticized McCarthy, his remarks retained the power to shock the conservative business audience in Indiana to which he delivered them.

electronic soon came to symbolize America's booming high technology business sector, culminating in the stock market's so-called "tronics boom" at the end of Eisenhower's term in which investors rushed to purchase the stocks of firms with names such as Circuitronics and Videotronics with little regard to their actual prospects.

The 1950s and 1960s were a time of strong and sustained growth for American corporations. The S&P 500 (an index representing the five hundred largest publicly traded firms) fell in five of these twenty years, but never by more than eleven percent. Each decline was made up several times over the next year as the markets bounced back (with the exception of 1969's, which in economic terms was the beginning of the troubled 1970s).[48] During this long boom computer, electronics, and other high technology firms such as General Electric, IBM, Xerox, Polaroid, DEC, Texas Instruments and ITT came to represent the new mainstream of corporate America. They featured prominently in the so-called "Nifty 50," a list of stocks favored by professional investors because of their steady growth in earnings and consistently rising values. IBM in particular became a quintessential blue chip stock, suitable as what was called a "widows and orphans" investment that would provide assured dividend income for decades.

A popular military leader with no obvious political beliefs, Eisenhower was chosen by Dewey bear the standard of liberal Republicanism in the 1952 election and reclaim the White House after five successive defeats for his party. This he did, beating out Taft for the nomination and Democrat Adlai Stevenson in the general election. Eisenhower was a paradox. His leadership built the Cold War version of the New Deal Order that would endure for decades. In this sense he deserves to be remembered as a transformational president, yet this transformation consisted of accepting and entrenching the fragile status quo that existed at the start of his presidency. Under his presidency unions were neither outlawed nor freed from the restrictions imposed by the Taft-Hartley act. Government regulation of key sectors of the economy was neither deepened nor abolished. The Social Security system of state pensions remained in place, but the US failed to follow the pattern of other industrialized democracies in creating a national healthcare system.

Eisenhower's reassuring temperament was needed because the 1950s were not nearly as dull at home or abroad as popular memory would have it. This may be because it is the first decade to be remembered primarily by its television shows, which did indeed celebrate a rather narrow vision of suburban domesticity. And in certain ways the 1950s did represent an historical blip. The demographics of the 1950s jumped away from the trends of the 1930s.The proportion of women working outside the home crashed, the average age of first marriage for women plummeted to 20.1 in 1956, and the birth rate soared to around 50% above its prewar level.[49] But only in hindsight, and through the monochromatic lens of television, do the 1950s seem a time of inevitable consensus, social conformity and easy prosperity.

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[48] http://www.istockanalyst.com/article/viewarticle/articleid/2803347, though I can find a better source for this standard data.

[49] http://www.census.gov/population/socdemo/ms-la/tabms-2.txt

While the economy grew strongly over the decade it did so in fits and starts, with deep recessions in 1954 and 1958. The Korean War took America by surprise toward the end of Truman's term in office, and in early 1951 the United Nations troops came close to suffering an abject defeat at the hands of what was then called "Red China." During the 1950s the USSR posted record economic growth rates, apparently outstripping those of the US, and was stockpiling its own nuclear arsenal. In October 1957 the Soviets launched Sputnik, triggering a wave of recriminations within the US and a wholesale revamping of the nation's education is science and engineering.

The 1950s were also, as historians of technology are more likely than most to remember, a decade of rapid and fundamental technological advance. Military spending supported shocking developments in jet engines, rockets, atomic weapons, electronic components, and nuclear submarines. The scientists and engineers engaged in these projects did not believe themselves to be living in a blandly uneventful era. They viewed themselves as radical innovators, creating new technologies, systems, and managerial methods able to coordinate projects of unprecedented ambition and complexity.[50]

Cold War spending ensured that the US Federal Government was the world's most important customer. Vast new high technology industries grew up to serve its ever growing appetite for bombs, missiles, jets, electronics, rockets and ships. This played an understandable role in blunting the opposition of business leaders to government spending. At the end of his time in office Eisenhower famously warned of the danger the massive new "military industrial complex" (and its key role in scientific research) posed to the country's traditional individualist values.[51]

But despite this very public gesture of discomfort with the new order, Eisenhower is remembered by historians as the embodiment of what is often called the "corporate commonwealth." In his classic 1982 article "Dwight D. Eisenhower and the Corporate Commonwealth," Robert Griffith provides the following summary of this philosophy:

> As president, Eisenhower sought to create a noncoercive, self-disciplined, and harmonious society by limiting the New Deal state, forging cooperative relations between business and government, promoting social harmony and consensus at home, and maintaining a stable a Western-oriented international order abroad.[52]

As a "product of the organizational revolution that had transformed American life in the twentieth century, a member of the new managerial class that led the nation's great public and private bureaucracies" Eisenhower felt a natural kinship with his opposite numbers in the corporate world.[53] The feeling was mutual, and Thomas Watson built an increasingly close relationship with Eisenhower from the mid-1940s onward. Watson Jr. claims that his father "was using the Truman years to build a

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[50] Thomas Parke Hughes, Rescuing Prometheus (New York: Pantheon Books, 1998).

[51] Dwight D Eisenhower, Eisenhower's Farewell Address, January 17 (Eisenhower National Memorial, 1961 [cited 2008 January 6]); available from http://www.eisenhowermemorial.org/speeches/19610117%20farewell%20address.htm.

[52] Robert Griffith, "Dwight D. Eisenhower and the Corporate Commonwealth", American Historical Review 87, no. 1 1982):87-122, page 100.

[53] Ibid, page 88.

relationship with the one American he thought was as great as Roosevelt…. He gave Eisenhower a transition into civilian life by getting him appointed president of Columbia University."[54] As a head of the board of trustees Watson led Columbia's search for a new president and made the decision to offer the job to Eisenhower, an appointment which one biographer suggests "was supported by many members of the New York financial, management, real estate, and political establishment" but was opposed by many faculty members.[55] Once installed at Columbia, Eisenhower was soon trying to bring together leaders of business, labor, government, and professional groups for cooperative long-term planning. As president he tried the same thing on national and international levels, believing that global prosperity and American self interest were inseparably intertwined.

After winning office Eisenhower gave business leaders positions in his cabinet and established new networks of advisory councils to weave their influence into policy making. Eisenhower bonded with business leaders at lavish "stag dinners." He remained close with Watson until the latter's death. Indeed, Watson's authorized biography, ominously titled The Lengthening Shadow, begins with the entire text of a short letter Eisenhower wrote to Watson in 1949 urging him to consider commissioning a biography because "an account of your life would be a story of practicable achievement in the free enterprise system that would be far more effective in support of my argument [against paternalistic government] than almost anything else could be."[56]

Lou Galambos used Griffith's phrase in the title of his historical overview of American business "The Rise of the Corporate Commonwealth."[57] This reflects a national system which, while still less regimented than a corporate state on the model of fascist Italy, had made a decisive break from the free market and minimal government of American myth. As an editor of Eisenhower's presidential papers as well as a leading historian of business, Galambos was particularly well placed to understand the coevolution of corporate and political institutions in this era. He is most closely associated, however, with another phrase that he introduced in a seminal 1970 article, "The Emerging Organizational Synthesis in Modern American History." This turned the same idea into a historiographic principle: that the shift to "large national formal organizations… characterized by a bureaucratic structure of authority" and increasing professionalism had given business, professional, religious, reform, labor and government organizations similar "orientation… values and… institutionally defined roles" to big business.[58] In this synthesis Galambos relied particularly on the work of Robert H. Wiebe, whose influential book *The Search for Order* depicted the 1877-1920 era as a national struggle for institutional stability which gave birth to a bureaucratic middle class.[59]

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[54] Watson and Petre, Father, Son & Co, 163.

[55] Rodgers, Think, 204-08.

[56] Bedlen and Bedlen, The Lengthening Shadow: The Life of Thomas J. Watson.

[57] Louis Galambos and Joseph Pratt, The Rise of the Corporate Commonwealth: United States Business and Public Policy in the 20th Century (New York, NY: Basic Books, 1987).

[58] Lou Galambos, "The Emerging Organizational Synthesis in Modern American History", Business History Review 44, no. 3 (Autumn 1970):279-90.

[59] Robert H. Wiebe, The Search for Order, 1877-1920 (New York: Hill and Wang, 1967).

This deliberate blurring of boundaries politicized business leadership at the same time it depoliticized government administration. The Cold War required a strong and united America, committed to military strength, the aggressive containment of communist abroad and to social harmony at home. The freedom and prosperity of the American worker as the best argument that could be made against the international appeal of communism, and it would have been hard to make that argument if the government had tolerated a return to the pre-New Deal tendency of the more aggressive corporations to beat, intimidate, and occasionally shoot, striking workers. Meanwhile the rapid growth in living standards and corporate profits during the 1950s and 60s appeared to provide unequivocal proof that worker rights and corporate capitalism could thrive together. After being nominated as Eisenhower's Defense Secretary in 1953 auto industry executive Charles E. Wilson defended himself from suggestions that his huge holdings of company stock might skew his actions in government with the famous rejoinder that he believed "what was good for the country was good for General Motors and vice versa." What was good for both was coming to include a unionized blue collar workforce earning enough money to support a family, drive a nice car and live in a comfortable home.

Computing in the Corporate Commonwealth

Computer companies grew rapidly as an increasingly crucial part of Eisenhower's corporate commonwealth. As we saw earlier, the federal government was the original customer for tabulating machines and had ramped up its use of office machines substantially during the 1930s and 40s. This continued in the 1950s, with the Defense Department the world's largest user electronic computers for administrative purposes. Indeed, it was its growing array of incompatible machines which inspired the DOD to nurture the COBOL standard effort and then to spur compiler development by requiring computer manufacturers to provide an implementation of the language if they wanted their computers considered for procurement.

But computer companies also moved quickly to win government contracts in new military markets far removed from their roots in the administrative technology business. Burroughs, formerly known only for its adding and bookkeeping machines, became a major supplier of military command and control systems. Office machine conglomerate Remington Rand became part of Sperry Rand, lending its expertise in computer technology to a firm best known for its specialized military automation technologies such as the marine gyrostabilizer, computer controlled bombsights, autopilots, and airborne radar systems. Other firms that entered the computer industry in the 1950s made similar transitions. Honeywell pioneered thermostatic heating control, but built up defense production during the second world war and during the Cold War manufactured missile guidance systems, bombs, land mines and napalm for the US military. Its computing business grew out of a 1955 joint venture with military electronics firm Raytheon. General Electric had previous diversified into the production of a wide range of equipment for producers, industrial consumers, and domestic users of electrical power. Expertise in power and turbines led to a major new government contracts to build jet engines and nuclear reactors.

IBM underwent a dramatic shift toward defense business. Its first stored program electronic computer to reach market, the IBM 701, was originally codenamed the "Defense Calculator" and was developed as

a response to the outbreak for the Korean War.[60] These expensive number crunchers were designed for scientific calculation and were ordered almost exclusively by defense contractors and military installations, to support the development of airframes, missiles, turbines and atomic weapons. The 701 was so closely associated with the cold war that the priority list setting the order in which machines were to be supplied was drawn up not by IBM but by the National Production Authority according to "the relative urgency of each situation."[61]

Even this, however, understates the importance of the new political economy of the Cold War to IBM's emergence as the computer industry's leviathan. In 1950 IBM accepted a government contract to produce NORC, the Naval Ordnance Research Calculator, which on completion in 1954 was the world's fastest computer. According to Emerson Pugh this reflected a new policy of supporting the firm's move into electronic computers with government funding. While the project was undertaken on a non-profit basis, IBM did gain "favorable publicity, experience in design, construction, and maintenance of a supercomputer, and profits." [62] Another government contact was to be still more important. In 1953 IBM won an initial competition to supply two prototype computers for the massive SAGE air defense network.[63] Delivery of production models followed from 1956 to 1963 as the system entered operation. These were the largest standard machines ever produced, with two identical computer systems filling an entire floor in each of the 23 SAGE command centers. During IBM's first years in the computer industry, from 1952 to 1955, it brought to market the successful 701, 702, 704, 705 and 650 computers. But 80% of its revenue from stored program computers over this four year period came instead from its contract to supply the snappily named AN/FSQ-7 computer at the heart of SAGE.[64] IBM also produced Bomb-Nav analog guidance computers for use in B-52 bombers. By the end of the 1950s IBM had installed well over a thousand general purpose computers within the US, but over the entire decade revenue from these product lines was smaller than that received from SAGE and the other military computer contracts ($705 million versus $792 million).[65]

IBM faced a new antitrust investigation from 1952 onward, centered on anti-competitive abuses of its monopoly position in the punched card market. It's an interesting feature of the distributed nature of

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[60] According to Pugh authorization to proceed with the IBM 701 stemmed from Watson Sr.'s suggestion that IBM create a new division to provide specialized defense products on the outbreak of the Korean war. While engineering efforts had been underway prior to this, no official plan to develop a computer product had been approved. Pugh, Building IBM, 167-72.

[61] H R Keith, Letter to R E Clement, October 27, 1952, contained in Cuthbert C. Hurd Papers (CBI 95), Charles Babbage Institute, Minneapolis.

[62] Pugh, Building IBM, 161.

[63] The story of SAGE is told from a technical perspective in Kent Redmond and Thomas Smith, From WHIRLWIND to MITRE: THe R&D Story of the SAGE Air Defense Computer (Cambridge, MA: MIT Press, 2000) and from a cultural and political one in Paul Edwards, The Closed World: Computers and the Politics of Discourse in Cold War America (Cambridge, MA: MIT Press, 1996), ch. 3.

[64] Pugh, Building IBM, 219.The figure should be read carefully, as IBM was paid up front for the AN/FSQ-7s whereas investment in developing and manufacturing machines for its regular product line was recouped via lease payments spread over a number of years. But the military revenues were certainly invaluable in developing underwriting its entry into the computer business, especially given Tom Watson Sr.'s deep aversion to incurring corporate debt.

[65] Ibid, 326.

power within the US system that the government was suing to address a monopoly it had done more than any other customer to create and maintain. Watson Sr. refused to sign a consent decree issued by a judge, but Watson Jr.'s 1956 decision to sign the decree and make peace with the government over his father's objections signaled both the final transfer of power within the firm and the arrival of a new and less personalized managerial culture for the new era.[66]

Watson quickly produced what he claimed was first formal organization chart ever drawn of IBM, and launched the first in what became a regular series of reorganizations to prune the dozens of executives reporting directly to the top and create clearer areas of responsibility and accountability. A Corporate Management Committee was established. Rhetorically, at least, the management and design of the company became a more collegial affair. A few years later Watson recalled that "In late 1956… we called the top 100 or so people in the business to a three-day meeting… we went into that meeting a top-heavy. Monolithic company and came out of it decentralized."[67] But, according to David Hart's recent analysis of the evolution of IBM's relationship with the US government, Watson Jr. continued his father's pattern of personally handling IBM's political relationships. Only in 1975, after his retirement, did the firm establish a formal Washington lobbying office, something Watson criticized as "the worst way" to manage this relationship.[68]

Similar transitions were taking place in other computer producing firms. General Electric, in particular, stood in the 1950s as the exemplar of a new and distinctively American approach to the professionalization of management in its commitment to decentralized organization, its faith in the power of managerial education, and its attempt to create a class of managers equipped with the tools to manage any part of the company. Talented young managers were educated at Crotonville, its internal business school. As they rose through the ranks they were liable to be moved many times, to different plants, different states and, for the most successful, fundamentally different businesses. (IBM adopted a similar practice by the 1960s). According to the company's president, Ralph J. Cordiner, in his 1956 book New Frontiers for Professional Managers, the hallmark of the modern manager was expertise in management itself, rather technical knowledge of the internals of gas turbines, lamps or electronics.[69]

General Electric also popularized the use of a multidivisional structure to manage a range of fundamentally different business units within a single corporation. Under its decentralized regime

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[66] The story appears prominently in most histories of the company, and is well told by Watson himself in Watson and Petre, Father, Son & Co.

[67] Watson, A Business and Its Beliefs: The Ideas that Helped Build IBM, 67. Watson Sr. preferred an idiosyncratic management style relying less on formal organization and more on force of personality and constant personal involvement. Until the 1960s IBM lagged far behind the pioneers of modern managerial organization such as DuPont and General Motors, which became textbook examples for managerial education thanks to the work of Alfred Chandler. Alfred D. Chandler, Jr., Strategy and Structure: Chapters in the History of the American Industrial Enterprise (Cambridge, MA: MIT Press, 1962).

[68] David M Hart, "Red, White, and "Big Blue": IBM and the Business-Government Interface in the United States, 1956-2000", Enterprise and Society 8, no. 1 2007):1-34.

[69] Ralph J Cordiner, New Frontiers for Professional Managers (New York: McGraw-Hill, 1956). In fact GE ultimately failed in the computer business, and accounts by former members of its computer division invariably single out the firm's repeated installation of managers with no understanding of the computer industry as a primary reason for its humiliation.

managers were supposed to receive considerable leeway to run their own parts of the company, provided that they met agreed performance targets. Using standardized financial measures of the success of different parts of the company allowed corporate leaders to make investment and promotion decisions on a consistent basis across a wide range of different business units. In 1962 Alfred Chandler set the agenda for decades of work in American business history with his book Strategy and Structure, which mirrored the mood of this era by presenting the multidivisional form as the key technical innovation in the emergence of the modern corporation. Chandler later suggested that successful diversified firms could achieve "economies of scope" in the combination of distinct but related activities which were just as important as the traditional "economies of scale" achieved by consolidating activities of a particular kind within a single firm. But a decentralized, multi-divisional structure could separate activities geographically as well as by business area. So its adoption was a crucial step in the evolution of American firms into true multinational enterprises.

Allyn's own successor at NCR, Robert Oleman, wrote in the late 1960s that

> Management by despotic rule, no matter how benevolent, has today been almost universally superseded; teams of specialists run the vast majority of today's large enterprises, and their decisions of of necessity based on much broader factors than those of a simpler era. This evolution in management techniques, so vital to the maturing of our free enterprise system, could not have occurred had not …. men like S. C. Allyn quite literally made possible the unprecedented level of economic activity which has characterized the 1960s.[70]

Continuity and Conformity in the 1960s

In American popular memory and political discourse the 1950s and 1960s have come to symbolize the opposing poles of the culture wars. The 1950s are remembered as a time of conservative orthodoxy, economic prosperity, peace, certainty, family values, marriage, military strength, and heterosexual suburban contentment. The 1960s are remembered for unrest, student protest, drugs, experimental lifestyles, the breakdown of social cohesion, urban race riots, experiments in music and art, women's liberation, domestic terrorism, assassination and a military and political establishment humbled in a lost war against a peasant army.

None of this is entirely untrue, but much of it is unrepresentative of typical experience in the decade concerned and most of it is unhelpful as a guide to the business culture of the era. To begin with we must recognize that most of the key events of "The 1960s" took place at the very end of the decade, in 1968 and 1969. These included the moon landings, public recognition that American had failed in Vietnam, the assassinations of Robert Kennedy and Martin Luther King, the "summer of love" and the moon landings. The broader trends we associate with the 1960s such as increased sexual experimentation, higher divorce rates, widespread drug use, public discussion of homosexuality, and the feminist movement were all contained within fairly narrow demographic groups during these years but expanded massively during the 1970s. And it was during the 1970s, not the 1960s, that inflation, oil shocks, surging unemployment and the Watergate scandal really undermined public faith in the

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[70] Allyn, My Half Century at NCR.

direction of the country and shattered the political consensus of earlier decades. For most Americans most of the decade represented a fundamental continuity with the 1950s rather than a radical break in matters of fashion, music, and lifestyle. Were we historians able to overturn the entrenched thinking of popular culture it would surely make more sense to regard 1968 as an early start to the turbulent 1970s than a very late start for the radical 1960s. But as the 1970s are in turn remembered for punk rock, platforms and disco then it seems more prudent to leave 1968 and 69 in the 1960s and move most of the rest of the decade to what one might, on the model of the "long nineteenth century" call a "very long 1950s." Along these lines we should not forget that even 1968, the year of revolution, concluded with the election of Richard Nixon whose personal appeal and economic policies both rested on a return to the Eisenhower era.

The 1960 in America, oddly, had more in common with popular conceptions of the 1950s than the actual 1950s do. Suburbanization proceeded at a massive rate, boosted by white flight from urban centers as restrictions placed on where black families could live were lifted. Real wages for ordinary Americans grew more rapidly and more consistently than during any other decade of the century. Income inequality dwindled even as corporate profits surged. Stocks enjoyed rapid growth without prolonged interruption, and ordinary Americans began to invest in large numbers for the first time since the ill-fated surge of speculation in the 1920s. Big business had regained the trust of the American people. Political thinkers believed that America had passed through the age of major ideological disputes, in favor of an age of government by experts united in their pragmatic desire to solve social and economic problems. Men still wore stylish suits and drove big cars, though hat wearing entered a sharp decline. Women dressed well tended not to work outside the home if blessed with husbands able to support the family in comfort. While the mounting casualty count of the Vietnam war did weigh on national confidence by the end of the decade, more Americans died in Korea between 1950 and 1953 than in Vietnam during the whole of the 1960s.

International tensions, particularly the Cuban missile crisis of 1962 and the ongoing escalation of America's entanglement in Vietnam, ensured that the cold war remained at the center of political discourse for much of the decade. Computer industry leaders were not ashamed to publically tie their own interests to those of world freedom. In 1961 Dick Watson gave the keynote speech at the annual meeting of the Systems and Procedures Association (home to what were called "systems men" in the US and would have been called "organization and methods" experts in the UK). Taking as his theme "major world issues" he warned of the need to "mobilize the resources of the free world" to fight the forces of international communism.[71] After being rejected by his brother as a possible successor to head IBM, Dick finished his career outside IBM as Ambassador to France. The appointment was made by Richard Nixon in 1970, after Dick switched from his family's usual support for Democrats to support his election bid.[72] Dick's growing alcoholism led to the end of his ambassadorial career in 1972 (and apparently contributed to his premature death two years later). A few years later, Thomas Watson Jr., having

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[71] Arthur K Watson, "Major World Issues", in Ideas for Management: 14th International Systems Meeting, ed. Anonymous (Detroit: Systems and Procedures Association, 1961).
[72] On the end of Dick's career see Tedlow, The Watson Dynasty: The Fiery Reign and Troubled Legacy of IBM's Founding Father and Son, 230258-.

retired from IBM, was serving as American ambassador to the USSR when Soviet troops marched into Afghanistan. Under his leadership IBM had begun efforts towards sales and technical collaboration with the USSR and China in the early 1970s.[73] Their careers show the ease with which well placed individuals could shift between political and business spheres during the final decades of the New Deal Order.

The best known of these individuals, however, was Robert S. McNamara. McNamara never worked in the computer industry, but he captured the essence of a new generation of systems oriented, mathematically savvy young managers who gained wartime experience tackling massive logistical challenges and were keen to apply fresh thinking and new technologies to post war bureaucracies. Unlike most of this cohort of "systems men" he succeeded in gaining executive power, rather than working in a staff or consulting position. In 1960 McNamara joined Kennedy's administration as Secretary of Defense, following his success as CEO of Ford where he and his team of similarly youthful "whizz kids" had turned a struggling family firm into a model of modern management. His bold attempts to reengineer the military bureaucracy around the techniques of systems analysis and cost benefit analysis did nothing to help him appreciate the messy realities of the Vietnam war. That story is too well known to recount here, but it is worth pointing out that McNamara's philosophy supported a massive increase in US government consumption of computer hardware and associated services.[74] According to Paul Edwards, "computers became icons," within military decision making.[75] The invocation of a computer model or simulation became an essential rhetorical flourish when advancing any kind of initiative. Budgeting, strategy, administration, and military systems were all computerized. Battlefield data was punched onto cards and aggregated for managerial use, transplanting techniques from Ford but with body counts and kill ratios replacing sales records and profit margins. When the last Americans withdrew from Vietnam they left behind an estimated $250 million dollars of computers used to administer the war effort.[76]

Jen Light has drawn similar parallels between other aspects of 1960s politics and the cold war. Following a series of urban riots from 1965 onward and the rapid expansion of Lyndon Johnson's Great Society social programs the solution of deep seated social problems loomed as the next frontier for the "defense intellectuals" providing the government with system development and policy analysis at elite military-linked institutions such as RAND Corporation, MITRE Corporation and SDC. Light argues that these developments made urban planning into an important arena for the extension of cold war techniques and assumptions. Again, mastery of arcane techniques based on the use of high end computer technology was presented as the foundation of a special strain of technocratic expertise applicable to all aspects of human society.

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[73] Foy, The IBM World, 166-7.

[74] The title of the classic journalistic account of America's early blunders in Vietnam refers ironically to the Whiz Kids. David Halberstam, The Best and the Brightest (New York: Random House, 1972). In his memoir McNamara regrets many of the details of his political career but never rejects his fundamental managerial philosophy. Robert S McNamara, In Retrospect: The Tragedy and Lessons of Vietnam (New York: Times Books, .

[75] Edwards, The Closed World: Computers and the Politics of Discourse in Cold War America, 133.

[76] Jack B Rochester and John Gantz, The Naked Computer (London: Arlington Books, 1984), 245. The exact source of the estimate is unclear.

In this sense the corporate commonwealth established by Eisenhower lived on well into the 1960s. To corporate leaders, particularly in the high technology field, the challenges and priorities of business and government seemed to be growing closer together. In his 1969 autobiography Stanley Allyn of NCR suggested that techniques pioneered by business could and should replace the messy traditions of politic. He believed that 'the city is in fact a corporation…' and so can be best run by experienced businessmen.[77] Allyn funded many civic projects and charities, and claimed that the selling and organizational skills of business leaders made them natural experts to run community affairs.

By the end of the 1960s some corporate leaders had begun to talk about the "social responsibilities" of their firms to address major problems such as urban poverty and racial inequality. The movement spread further during the 1970s. This was the latest evolution of corporate liberalism, and again computer companies led the way. IBM added social responsibility to its corporate mission, and in the early 1970s employees were able to devote up to ten percent of their working time to community projects and to apply for small cash grants for worthy organizations.[78] Supercomputer pioneer CDC was another leader in this area. Social initiatives became a personal priority for its leader, Bill Norris. He ordered factories constructed in areas of urban blight and channeled hundreds of millions of dollars into the development of computerized education technology.[79]

This too can be framed in the cold war context. Soviet propaganda had long used depictions of racism and poverty to discredit America's claims to moral superiority. As these problems gained political prominence they disfigured the nation's self image, challenging its foreign policy goals as well as its domestic harmony.

The initial impact of the celebrated 1960s counterculture on the computer industry appears to have been quite limited. Pictures of computer company staff and corporate data processing teams throughout the decade generally show men wearing the same dark suits, skinny dark ties and thick dark glasses favored by NASA engineers. Computer company employees, particularly in sales departments, were expected to dress and act like neater versions of the managers they were selling to or servicing. By the end of the 1960s American work clothes had become more casual, and even Tom Watson abandoned the wearing of detachable stiff collars and experimented with non-white shirts. Neatly trimmed beards were glimpsed on the faces of IBM employees, though as late as 1971 Watson issued a reminder to his employees that "they looked best in white collars and short hair."[80] Hippies were not welcome in the corporate world of the 1960s, though by the end of the next decade long hair and hideously colored suits and ties had won mainstream acceptance.

Alongside a new concern over urban development and race relations, the late 1960s also saw the rise of what was then most often called the "women's liberation movement." Liberally minded companies such as IBM began making a particular effort to hire and retain black and female employees in more senior

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[77] Allyn, My Half Century at NCR, 138.

[78] Foy, The IBM World, 187.

[79] Norris is profiled in Peter Eckstein, "Biographies: William Charles ('Bill') Norris", IEEE Annals of the History of Computing 29, no. 2 (April-June 2007):80-86.

[80] Foy, The IBM World, 4.

positions. Statistics on these areas began to appear in the firm's annual report, and in 1971 it was pleased to announce the appointment of Patricia R. Harris, a black female lawyer, to its board.[81]

Another side of the experience of the 1960s has only recently begun to receive significant scholarly attention. The political legacy of the 1960s had long been thought of as the expansion of social provisions with Lyndon Johnson's Great Society programs and a new kind of left wing politics stressing racial and sexual identities. Johnson's landslide victory over Barry Goldwater in 1964 appeared to represent a final rejection of ideological conservatism as Americans came together in support of civil rights and a relatively high level of government spending. Just two years later, however, Republicans made significant gains in congressional elections and shifted the balance of power away from liberal reform. The thesis of long-term conservative decline was shaken by Regan's triumph in the 1980s and further battered by Newt Gingrich's congressional "Republican Revolution" of 1994 and by George W. Bush's appointment to the presidency in 2000. Regan, Gingrich and Bush all saw themselves as part of a modern conservative movement with its roots in Goldwater's attempt to articulate a libertarian philosophy of limited government spending, economic deregulation and personal freedom. Recognizing this historians have come to view conservative social movements of the decade as being just as important, and perhaps more influential, than their better known radical cousins.

But identities, both radical and conservative, were much more complex than current political discussion would admit. If the computer industry and its workers are hard to accommodate within current narratives of the 1960s (except, of course, as a tool of the military industrial complex and a cog in the Vietnam war effort) this probably says more about the lack of a satisfactory historical synthesis of the era than about their actual marginality. US historians have been slow to achieve real historical distance from the 1960s, probably because the decade continues to play a prominent role in the political narratives on both sides of the political spectrum. Most work continues to adopt the perspectives and analytical categories held by veterans of the era's cultural struggles, rather than imposing the new analytical frameworks that signal the beginnings of mature historical scholarship. Historians of technology, and in particular of computing, may be able to play an important role in moving our understanding of American experience during the decade beyond the clichés of hippies, student protestors, school busing, assassinations and napalm. Fred Turner has performed trailblazing work toward this end in his recent book, From Counterculture to Cyberculture on the career of counterculture entrepreneur Stewart Brand, who was responsible for the Whole Earth Catalog of the 1970s, the WELL online system of the 1980s, and the creation of Wired Magazine in the 1990s.[82]

Turner argues powerfully for the need to separate the political activism of the New Left from the lifestyle tinkering of what he calls the New Communalists. More provocatively, he suggests that the attachment of Brand and his colleagues to cybernetics, systems thinking, interdisciplinary collaboration, and ad-hoc non-hierarchical forms of organization did not, as they believed, set them aside from the military-industrial-academic complex of the Cold War. Instead he insists that these values united the

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[81] Ibid, 117.

[82] Fred Turner, From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism (Chicago: University of Chicago Press, 2006).

counter culture with the elites of the Cold War research world. We glimpse a forgotten radicalism at the heart of the defense complex. Similar insights may follow when cultural historians begin to explore the computer industry. The neat clothes, short haircuts, and commercial zeal of successful IBM staff during the period should not be enough to condemn them to a permanent historical role as a backdrop of faceless conformists against whom the decade's more interesting characters react.

Conclusion

In summary then, the computer creating firms of the 1950s were at the forefront of a number of key shifts. As they began to market computers internationally, an activity which began in earnest only in the early 1960s, they represented a particular and historically grounded version of the American Way.[83] They were at the heart of a new and enduring political consensus, favoring America's engagement with the world and a newly active role for government in both domestic and foreign arenas. They had embraced the Cold War and used the massive expansion in military spending to support their entry into new businesses and their development of new technologies. They were not unionized, but several led the way in offering workers generous benefit packages and job security designed to keep workers so happy that they would never consider unionization. They were among the fastest growing, most innovative firms in an era of rapid economic growth and technological advance. In these areas the 1960s were a decade of expansion and consolidation for the industry, rather than one of radical departure.

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[83] On early export efforts by two American computer companies see Corinna Schlombs, "Engineering International Expansion: IBM and Remington Rand in European Computer Markets", IEEE Annals of the History of Computing 30, no. 4 (October-December 2008):42-58.