

# Technology and Cultural Difference

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The United States is generally understood to be a capitalist, industrial offshoot of Europe, whose culture has been transformed by contact with Native-American, African, and Asian cultures. It is currently unfashionable to assert the existence of a common American cultural experience. I want to confront head-on the question of national character and its relationship to technology. Americans long believed that both their machines and the way they used them made them unique, and it is emphatically not my aim to revive these claims. However, in rejecting the idea of an American exceptionalism based on a uniquely democratic technology, one need not dispense with the idea of divergent national patterns that are expressed in both behavior and material culture.<sup>1</sup>

The United States, as a newly emerging nation in the nineteenth century, sought to shape a separate identity for itself. This story is best known in a literary form, as the struggle of antebellum American writers to free

<sup>1</sup> For comments on this paper I am indebted to members of the Danish American Studies Consortium who participated in a two day Ph.D. seminar in October, 1995.

themselves from English dominance and create a distinctive national literature. Less remembered is the effort to industrialize without repeating the errors of European nations, which had created polluted industrial areas and a miserable proletariat that shocked early American travelers, particularly in England. While many nations have taken pride in particular technical achievements, Americans saw themselves as an ingenious people, a nation of tinkerers and inventors who would industrialize without creating either a proletariat or unhealthy industrial cities. This self-perception has largely disappeared today, as part of a general renunciation of the idea of American exceptionalism, the once popular idea that the history and development of the United States is fundamentally different from that of Europe.

To see how matters now stand, consider a lead essay of the fall 1992 issue of *The Journal of American History* written by the then President of the Organization of American Historians, Joyce Appleby. Her title, "Recovering America's Historic Diversity: Beyond Exceptionalism,"<sup>2</sup> underlines how for many Americanists the idea of "exceptionalism" now posits an unacceptably radical difference between the United States and the rest of the world. Appleby deftly traces some of the ideological underpinnings to "exceptionalism", showing how a good deal of eighteenth-century American history had to be suppressed from view in order to make the nation seem fundamentally different from Europe. Technology, which was once a central part of the exceptionalist argument, is not mentioned at any point in her argument.

This is a remarkable omission.<sup>3</sup> During most of the nineteenth century and a good deal of the twentieth, the national character was thought to be exemplified by a pantheon of inventors, including Eli Whitney, Robert Fulton, Alexander Graham Bell, Thomas Edison, Henry Ford, and the Wright Brothers, to name but a few. The argument has recently been relaunched by Newt Gingrich in *To Renew America*, which celebrates individualism, "the spirit of free enterprise" and "the spirit of invention

2 Joyce Appleby, "Recovering America's Historic Diversity: Beyond Exceptionalism," *Journal of American History* 79:2, Sept. 1992, pp. 419-432.

3 Appleby is not idiosyncratic in omitting the history of technology. In a debate over historical method that pitted the "old history" versus the "new" Gertrude Himmelfarb also ignored the history of technology. "Some Reflections on the New History," *American Historical Review* 94, no. 3 (1989): 661-670.

and discovery." Gingrich declares "We have no caste system, no class requirements, no regulated professions, no barriers to entry." He rejects the idea that "America is no different than Europe."<sup>4</sup> This is a nineteenth century argument, which in its classic form claimed that Americans were ingenious Yankees who focused on practical results. They were less interested in science than engineering, less concerned with aristocratic theory than with the democratic dispersal of useful improvements. Compared to Europeans, Americans were unfettered by guilds, state monopolies, and other artificial restraints on trade.<sup>5</sup> The nation industrialized rapidly after c. 1825, and if in the beginning it necessarily imitated European machinery, there were soon claims for an American style in machine building, in manufacturing, and in business organization. I will take up these three topics in turn, moving from individual machines to their organization in factories and then to how these factories were managed. After this focus on production, I will then briefly turn to the American popular reception of technology. In all four areas some differences between Americans and Europeans can be documented. Do these differences collectively merit the "exceptionalist" label?

Are American machines different from those made in some or all of the European countries? John Kowenhoven argued in his once influential *Made in America* that there was a distinctive American machine design, exemplified in such artefacts as the American ax, the clipper ship, the loosely jointed American locomotive, and the Model T. Ford. All were characterized by simplicity, plainness, efficiency, and a functional aesthetic<sup>6</sup> Furthermore, Americans early began to build machines designed to last only a short time. This practice, often criticized by

4 Newt Gingrich, *To Renew Anzerica*. New York: HarperCollins, 1994, pp. 41-43. Gingrich goes on to name, on the same page, Bill Gates, Steve Jobs, Edison, Ford. He later mentions the older pantheon of Fulton, Whitney, Morse, and the Wright Brothers, p. 44.

5 Of course there was also a counter-tradition, emphasizing the natural landscape (and/or the frontier) as the seedbed of national identity. Thomas Jefferson and Alexander Hamilton argued over how much the nation should industrialize, and had Jefferson's policies prevailed the nation might have been more agrarian, importing many of the finished goods it needed from Europe. Jefferson was not as rabidly anti-technological as many once thought, however. See John Kasson, *Civilizing the Machine*. Penguin. 1977, pp. 36-38.

6 John Kowenhoven, *Made in Anzerica: The Arts in Modern Civilization*. New York: Doubleday, 1962, pp. 26-33, *passim*.

Europeans, emphasized immediate practical results, and assumed that machines would be replaced frequently. Where the English built locomotives to last indefinitely, Americans expected better ones to be invented before long. Likewise, where Europeans early demanded efficiency from stationary steam engines, Americans at first preferred cheapness and simplicity in operation, and willingly used more fuel. Oliver Evans invented just such a device, a new kind of steam engine which ran at high pressure and quickly became standard on American steamboats. "It was smaller, cheaper, and less complex," but it had one serious drawback: it exploded easily.<sup>7</sup> In short, one might make a case for American machines as being distinctively pragmatic, temporary, and functional.

Yet a powerful counter-argument has been in the ascendancy in recent years. Studies in the history of technology have emphasized the exchange of technical information through international networks. For example, the American iron industry was started by English and German immigrants in the colonial period. Major nineteenth century advances such as Bessemer steel and later the open-hearth process were developed in Europe and transferred to the United States.<sup>8</sup> Likewise, canal construction, almost unknown in the new United States of the 1790s, was attempted at first without much success, until aided by William Weston, an immigrant engineer who had worked under the great English canal-builder, James Brindley. From Weston, men in Massachusetts, New York, and Pennsylvania learned surveying, a canal's proper dimensions, the superiority of stone to brick (and of brick to wood) in constructing walls, the design of locks, and the necessity of puddling, or laminating the walls of the canal repeatedly with a clay paste, to make them water-tight.<sup>9</sup> Similarly, the indispensable ingredient in creating an American textile industry was the largely non-verbal knowledge of design brought across the Atlantic by

7 Brooke Hindle, *Emulation and Invention*. Smithsonian Institution: Washington, D.C., 1981, p. 55.

8 An American named William Kelly had independently hit upon something like the Bessemer process, and he was granted a patent. But his discovery was not fully translated into a method and set of equipment, and American steel makers had to buy licenses from both Kelly and Bessemer. For an excellent account of the introduction of the Bessemer process into the United States, see Elting E. Morison, *Men, Machines, and Modern Times*. Cambridge: MIT Press, 1966, pp. 123-205. For a brief account of the iron industry, see W. David Lewis, *Iron and Steel in America* Greenville, Delaware: The Hagley Museum, 1976.

9 Elting Morrison, *From Know-How to Nowhere: The Development of American Technology*. New York: Basic Books, 1974, pp. 22-30.

immigrant textile machine builders.<sup>10</sup> Likewise, French immigrant, Eleuthère Irénée du Pont transferred superior techniques of gunpowder manufacturing to the United States, establishing an extensive works on the Brandywine.<sup>11</sup> Americans already manufactured gunpowder, but of uneven quality. Du Pont had superior techniques, learned in years of training in the French government's industry. Using his contacts he imported a complete set of equipment "essential to every phase of black powder manufacture" and kept abreast of French developments in the trade after he had built his American factory.<sup>12</sup> Even Fulton's famous steamboat used a steam-engine made in England, and he engaged "at least one mechanic who had worked for Boulton and Watt to cross the Atlantic and set up the engine."<sup>13</sup>

The carriers of information were often immigrants, but there were also more formal channels. Technical publications and magazines, world's fairs, congresses, and official visits all sped the flow of innovations, so that even a small factory along the Appalachian fall line, such as the one that Anthony Wallace studied in *Rockdale*, kept abreast of the latest innovations. He found that in the textile industry "nearly all of the several hundred master mechanics of the English-speaking world knew each other by name and reputation," and "each man probably had met with and talked with most of his peers on one occasion or another or had corresponded in writing."<sup>14</sup> In short, the weight of evidence about American machine-making seems to go against the "exceptionalist" hypothesis, although there are cases that point the other way. Clearly Americans were alert to the newest European ideas and innovations, which they combined with their own.

Yet if their machines must be seen as part of a trans-Atlantic dialogue, did Americans nevertheless manufacture in a distinctive fashion?

10 David J. Jeremy, "Innovation in American Textile Technology during the early 19th Century," *Technology and Culture* 14 (January, 1973): pp. 41-45.

11 Darwin Stapleton, *The Transfer of Early Technologies to America*, Philadelphia: American Philosophical Society, 1987, pp. 72-121.

12 *Ibid.*, pp. 88, 114, *passim*.

13 Hindle, p. 53.

14 Anthony F. C. Wallace, *Rockdale*. New York: W. W. Norton, 1978, p. 219.

At the Crystal Palace exhibition of 1851, European observers found some American machines on view unlike their own. Yet they did not speak at once of an "American system of manufacturing." This idea was invented in the early twentieth century and until recently remained unquestioned. Kouwenhoven argued that "the technology of mass production is as indigenous to the United States as the husking bee," and saw automation, interchangeable parts, and the assembly line as national characteristics.<sup>15</sup> Many historians heralded mass production as a defining national hallmark. Two characteristic heroes in this account were Eli Whitney and Henry Ford.<sup>16</sup> From the moment that Whitney displayed ten muskets with interchangeable parts to President-elect Thomas Jefferson in 1801, he was credited with creating a uniquely American approach to production. Machines would make identical parts for other machines. Historians have found, however, that Whitney did not mass-produce interchangeable components for muskets in 1801; they remained an idea more than a reality for many years.<sup>17</sup> Furthermore, the idea of interchangeability itself was first dreamed in France, during the eighteenth century, by General Jean-Baptiste de Gribeauval. Whitney's workmen made reasonably standardized parts, to be sure, but they did so by hand-filing what came out of the moulds. An astute self-publicist, Whitney emphasized the possible results of his system and made it the ideal toward which many manufacturers strove. Yet the "American system" was not as well-defined or as self-conscious in 1851 as historians once claimed, and a British Parliamentary committee found that even in 1854 Samuel Colt had not yet managed the precision necessary to make identical parts. Rather, they were "very nearly alike."<sup>18</sup>

<sup>15</sup> Kouwenhoven, *op. cit.*, p. 40.

<sup>16</sup> Other figures who usually appeared in these narratives were Elias Howe (sewing machine), Oliver Evans (automated flour mill), Robert Fulton (steamboat), Samuel Morse (telegraph), Alexander Graham Bell (telephone), The Wright Brothers (the airplane), and Thomas A. Edison (phonograph, electric lighting system), plus many more. For a deconstructivist account of how the mythology of the inventor was inscribed on the documents of Thomas Edison, see David E. Nye, *The Invented Self: An Anti-Biography of Thomas A. Edison*. Odense: Odense University Press, 1983.

<sup>17</sup> Merritt Row Smith, "Eli Whitney and the American System of Manufacturing" in Carol W. Pnrsell, Jr. *Technology in America*. Cambridge: MIT Press, 1981, pp. 45-61.

<sup>18</sup> David A. Hounshell, *From the American System to Mass Production, 1800-1932*. Baltimore: Johns Hopkins University Press, 1984, pp. 25-29.

Even if the term "American system" was not used and interchangeability itself was more a goal than an achievement, many first-hand witnesses found American production methods distinctive. An English workingman who came to the United States during the Civil War found that "there are few trades which have not been materially changed" after they crossed the Atlantic. He emphasized that "division of labour is carried out in all the various branches of skilled labour to the fullest possible extent; this system not only facilitates production, but it conduces to perfection in the workmen; machinery, too, is used for every purpose to which it can be applied."<sup>19</sup> This was a difference less in technology than in its organization, turning the focus to management, which pursued interchangeability most vigorously in the United States. Half a century later, the end result of this process was the assembly line perfected by Henry Ford at his Highland Park Plant in 1912. Because of standardization, Whitney's factory required fewer skilled workmen than any previous armory, but Ford went much further. He not only used interchangeable parts, but also sub-divided work more thoroughly than anyone before, and because his semi-skilled workmen could learn their tasks in a matter of days they became largely interchangeable as well.

Mass production has many forms, however, and while Ford led the world automotive sector for at least a decade, transforming the nature of capital-intensive industry in the process, Americans did not lead in all areas. If one looks closely at a mature industry such as textile manufacturing in the early twentieth century, at precisely the time that Ford was in the ascendancy, American facilities lagged behind much of continental Europe. A comparative study of the textile industry by a German expert, Wilhelm Stiel, revealed that in the 1920s considerable differences existed among the textile-producing countries. England lagged the farthest behind, as they "rested on old tradition ... supported by the fact that a successful spinning industry has grown up on the basis of substantially built mills with well-designed and smoothly running line shafting." Exhaustive efficiency tests showed that, compared to this overhead shafting, group drive [one electric motor to a small number of

<sup>19</sup> J. D. Burn, *The Years Among the Working-Classes of the United States During the War*. London: Smith, Elder and Co., 1865, p. 178.

machines] was better and individual drive [one motor to one machine] was best. Nevertheless, the English retained the line-shaft mill driven by a few large electric motors. In contrast, Germany, Holland, Switzerland, and Sweden converted most of their textile factories to individual electric drive, and as a result had higher productivity, because their machines ran at faster and more constant speeds. American manufacturers were in an intermediate stage of development. They early adopted group drive, most typically with one motor mounted on the ceiling to drive four machines' by belt. Stiel commented that their practices were "founded on the American principle, viz. utmost economy of man-power (production per head and not per machine!) to which a bit of spindle speed is willingly sacrificed, so that American working speeds cannot bear comparison with those in use in Europe."<sup>20</sup> This analysis of one industry is highly suggestive for others. Stiel had noted an American propensity to keep wages as low as possible, which was possible in a largely non-union country. Lower wages made it unnecessary to maximize capital investment in machinery. In other words, Stiel found America distinctive for reasons that were not technological, but social.

The conclusion that United States' industries varied considerably also emerges if one examines the way that workers were paid. Work by piece-rate in the twentieth century enjoyed a revival in labor-intensive industries, such as the shops of the General Electric and Westinghouse. In contrast, the heavily-capitalized assembly line encouraged manufacturers to adopt fixed hourly wages, because workers had no choice but to keep up the pace. More highly skilled work increasingly was done on the basis of daily quotas, with incentives for overproduction.<sup>21</sup> In short, there was not a single "American system" of manufacturing in the early twentieth century, by which time the production system certainly had matured. Rather, there were at least three systems in place. Older industries, such as textiles, kept wages low and modernized equipment with that factor in mind. Newer mass-production industries, epitomized by Ford, developed a high wage policy, for which they demanded fast-paced routine work on

20 Wilhelm Stiel, *Textile Electrification*. London: George Roulledge & Sons, 1933, pp. 150–151. Note that these comparisons are all between highly developed industrial economies.

21 Ronald Schatz, *The Electrical Workers: A History of Labor at General Electric and Westinghouse, 1923-1960*. Urbana: University of Illinois, 1983, p. 138.

assembly lines. Highly-skilled work developed in yet a third direction, as companies adopted piece-rates and individual incentives. In short, there was no monolithic "Fordist" system of production, contrary to what many humanists all too casually assume. Rather, the characteristic American factor was the weakness of organized labor, so that the work-force had to respond to the quite different strategies of large corporations, depending upon whether they were capital or labor intensive, skilled or unskilled. The labor market, more than technology, made America distinctive when compared to Europe, where unions were strong and corporations few. Note that while these comparisons are all between highly developed industrial economies they are further confirmed by looking at labor in developing economies. In the early twentieth century newly industrializing countries such as China and India, even when they purchased up-to-date machinery, were unable to produce as efficiently as England or America because their labor force was not yet sufficiently skilled.<sup>22</sup> Culture is often a more important factor than technology in fostering or limiting economic growth.

While exceptionalism based on American machine design or a distinctive system of manufacturing are implausible, Alfred D. Chandler has advanced a theory of business organization based in part on American uniqueness. He argues that in the United States the private corporation developed a distinctive form in response to the sheer size of the continental market served by railroads and canals. Unlike the fragmented, small, and protected European markets of the nineteenth century, which encouraged small-scale production, American businessmen faced a market that was unified, large, and highly competitive. These conditions encouraged both economies of production and large organizations. In response, Americans early began to move away from partnerships and family firms toward corporations. In the process they developed new forms of accounting, production, and marketing. Most important of all, they invented a new form of the corporation, which no longer was created by a special act of the legislature, but rather could be formed by any

<sup>22</sup> See Gregory Clark, "Why Isn't the Whole World Developed? Lessons for the Cotton Mills," *Journal of Economic History*. vol. XLVII, no. 1, March 1987, pp. 141-173.

group of people who wished to limit their personal liability to the amount they invested in a new firm.

In contrast, when partnerships and family firms went bankrupt, the investors could lose all their capital. Such companies, which need to be more cautious in management and which have more difficulty raising large sums, were still the norm in most of Europe until World War II. They grew to a large scale less frequently, first because they operated in small markets, and second because they depended on a family or small group to be talented, united, and well-capitalized over extended periods. Thus it was the United States, not Europe which emerged at the end of the nineteenth century as the premier site of the corporation. Nor did this result from blind economic forces at work. Chandler attacks the traditional *laissez-faire* notion of the "invisible hand of the market," arguing instead that it was the *visible hand* of management that shaped American corporations, which he regards as the dominant institution in the life of the United States.<sup>23</sup>

Yet while Chandler may at first appear to be an exponent of American exceptionalism, his subsequent work reveals an interest in how corporations developed outside the United States. German development was directed more by banks than in the United States. British firms resisted incorporation and tended to remain family-run or partnerships down to World War II. Japanese trading companies developed into manufacturing firms in close cooperation with the government.<sup>24</sup> In short, Chandler's work can in fairness only be used to make an argument for American exceptionalism if one is also prepared to argue for a degree of "exceptionalism" in other nations as well. Chandler's work ultimately only makes a case for a certain soft determinism. In his scenario large, private, diversified, corporations catering to a mass market have a decisive competitive advantage over businesses that are small, that are public, that produce only one thing or a small number of things, and that cater to smaller markets. In other words, if the original idea of an "exception" is that there is a "rule" followed elsewhere, then Chandler grants American business exceptional status only in that its managers

23 Alfred D. Chandler, *The Visible Hand*. Cambridge: Harvard University Press, 1977.

24 Alfred D. Chandler, "The Beginnings of 'Big Business' in American Industry." In Richard Tedlow and Richard John, eds. *Managing Big Business*. Boston: Harvard Business School Press, 1986.

grasped the key factors of corporate development sooner than others and in that Americans have chosen to institutionalize these factors somewhat differently than Germany, England or Japan. Such a theory does not really grant America an exceptional status, but rather argues for certain ground rules of capitalist development that permit a range of cultural variation.

Economic geographers Michael Storper and Richard Walker corroborate this general approach, while developing their own typology. They identify four distinctive patterns of capitalist development. That in the United States has been characterized by high wage levels, high worker consumption, moderate profits, and moderate investment. An Asian model, exemplified by Japan, sets more modest levels for wages and consumption, with higher rates of profit and investment. The Brazilian economy represents yet another path, with low wages, permitting high investment levels and many exports but weak domestic consumption and erratic overall performance. Finally, the British system is characterized by modest wages, moderate mass consumption, low profits, and weak investment.<sup>25</sup> As these comparisons suggest, capitalism is not one system, but rather a variety of culturally inflected developments. Energy use is an important part of each of these forms of capitalism, and not surprisingly, the United States, with its emphasis on high rates of consumption, uses more energy per capita than any other nation.

If one looks at the first three sections of this chapter together, rather than separately, Chandler's theory does not contradict either the notion that American machines were built for maximum short-term efficiency or the idea that Americans pioneered mass production within an international context of technology and information exchange. Indeed, Chandler allows us to replace the rather woolly and undefined idea of "national character" as the driving force at work, with the far more specific idea that managers selected machines and organized factories in a distinctive American way because they catered to and competed in the world's first mass market. In other words, it was not that Americans *lacked* the traditional monopolies and government restrictions of Europe, a negative

<sup>25</sup> Michael Storper and Richard Walker, *The Capitalist Imperative: Territory, Technology, and Industrial Growth*. Oxford, Blackwell, 1989.

argument that focuses on an *absent* obstacle that did not stand in the way of vaguely-defined actors. Rather, American managers faced the demands of a large market which offered competitive advantages to those who could produce and sell on a large scale. This is a positive argument that focuses on incentives to clearly-defined historical actors. However, such an argument leaves most Americans out of the discussion, as it focuses on the management elite. What of the "mass" in the "mass market?"

The French traveller Michael Chevalier noted in the 1830s that, "There is a perfect mania in this country on the subject of railroads."<sup>26</sup> This enthusiasm could be seen among virtually all citizens. For example, in Baltimore the entire city turned out to celebrate the construction of the nation's first railway line. That they held this celebration on Independence Day in 1828 suggests how technology early intertwined with American nationalism. The event went off without a dissenting voice, with a huge parade in which most of the artisans of the city participated. In contrast, two years later when the Liverpool and Manchester Railway opened, it drew a much larger crowd estimated at 400,000, which lined the tracks for most of the distance. If Baltimore's citizens had eagerly gathered to celebrate technological advance, many in the English crowd protested the new railway. Some spattered mud on the clothes of the ladies and gentlemen who were the first passengers. On a prominent spot above the crowd, a poorly dressed hand-loom weaver sat as a silent protest, understood by Fanny Kemble to be "a representative man, to protest against this triumph of machinery, and the gain and glory which the wealthy Liverpool and Manchester men were likely to derive from it."<sup>27</sup> The English, more than the Americans, viewed industrialization in terms of class exploitation, satanic mills and frankensteinian monsters.

Americans have long embraced new technologies with far less criticism than Europeans. A particularly striking example was the American

<sup>26</sup> Michael Chevalier, *Society, Manners, and Politics in the United States*. New York: Doubleday, 1961, pp. 71, 73-74. For more on the tendency of Americans to see their railroads in nationalistic terms, see James A. Ward, *Railroads and the Character of America, 1820-1887*. Knoxville: University of Tennessee Press, 1986.

<sup>27</sup> Cited Francis Klingender, *Art and the Industrial Revolution*. Ed., Arthur Elton. New York: Augustus M. Kelley, 1968, p. 147.

enthusiasm for spectacular electrical displays, first at expositions in the 1880s and 1890s and later in the commercial zones of American cities. Where English and French communities successfully legislated against enormous electrical signs, only a minority of Americans opposed them, almost entirely without success. Times Square and the Great White Way became the models that other American cities imitated when they strove to be glamorous and modern.<sup>28</sup> Nor was extensive lighting merely a ploy on the part of businessmen. They spent millions of dollars on electrical displays because the public demanded it, and patronized the areas of the city that were most brilliantly (Europeans would say garishly) illuminated. Spectacular lighting displays still remain popular in the United States today, as, for example, in the extensive use of laser beams in the ceremony rededicating the Statue of Liberty in 1986.<sup>29</sup> Perhaps the clearest example of the difference between American and European views of technology is the popular response to the two space programs. Where hundreds of thousands, and on some occasions millions, of Americans turn out to see a launching, Europeans display little enthusiasm for their space program. Launchings have never inspired a great deal of European newspaper or television coverage, and almost no one would consider using vacation time and money to travel to French Guinea to see a rocket go up. Americans have long enjoyed technological display more than Europeans, and these displays have often been understood in terms of a nationalism that borders on the claims of exceptionalism. As one woman at a Cape Kennedy launch put it succinctly, "There isn't another country in the world that's going to do this – you've got to say America's first."<sup>30</sup>

Just as Appleby made no reference to technology, so too today's technological historians seldom refer to "exceptionalism." The once acceptable ideas that American machines and manufacturing methods were fundamentally distinctive have given way to discussion of international networks of information exchange, flowing through immigration, trade journals, world's fairs, joint work on engineering projects, and

<sup>28</sup> See David E. Nye, *Electrifying America: Social Meanings of a New Technology*. Cambridge: MIT Press, 1990, chapter two, "The Great White Way."

<sup>29</sup> I devote a chapter to this event in *American Technological Sublime*, Cambridge: MIT Press, 1994.

<sup>30</sup> *New York Times*, April 13, 1981.

other kinds of technological transfer. While American mills and factories had distinctive features, they were clearly related to European facilities, sometimes ahead of them, at times not. In short, when emphasizing technology alone, *exceptionalism* proves to be a lame horse, if not a dead one. But if one looks instead at business organization and the popular reception of technology, the United States appears distinct from Europe. The social construction of technology in America, whether examined in terms of institutional arrangements or in terms of the formation of popular consciousness, suggests a national pattern.

Why does Appleby prefer to omit American technological history from her account, if recent research in the field does not lend support to the exceptionalist thesis? She notes that "Remembering and forgetting determine the history we tell." Appleby also attacks the penchant Americans have had for erasing much of the past, in order to create the clean slate of an exceptionalist nation, "born free" on "virgin land."<sup>31</sup> But in her brief for multicultural history, she has erased areas of the past as well. In her account, rather significant areas are simply wiped out, including business, technology, invention, and science. Furthermore, theories of multiculturalism, such as Appleby's, seem to require the suppression of observed commonalities in the United States. Indeed, the multicultural approach has the very faults that are usually attributed to "exceptionalism" itself. Each ethnic, racial, and gender minority claims to be radically different from every other. In this "essentialism," each group claims to have a cultural essence that is in danger of being polluted or destroyed by the larger society. The history of technology thus has not only been associated with the exceptionalist thesis, it is widely understood as a central part of the hegemonic culture that multiculturalism opposes. It is the unspoken absence at the heart of many multicultural texts. There is considerable irony in the situation. Many have cast aside "American exceptionalism" only to embrace instead a "multi-exceptionalism" in which America is rewritten as a nation of heterogeneous groups, each of which can only be interpreted by cultural insiders.

Such an approach focuses on details and overlooks the larger structures of American culture. For example, Americans may crave a

31 Appleby, pp. 427, 430.

variety of ethnic cuisines, but increasingly these are processed foods cooked in a microwave or bought at a fast food restaurant. The specific food is distinctive, but the packaging, advertising, preparation, and the consumption time are commonalities. This may be seen, for example, at the immigration museum on Ellis Island, where a variety of ethnic fast-foods are available, each being sold and consumed in the same way. Is this multi-ethnicity?

Many other similarities exist among Americans, but those embracing multiculturalism spend little time looking for shared characteristics or shared technical systems.<sup>32</sup> There is a common core to American culture which makes it distinctive and identifiable, although not exceptional, and the social construction of technology reveals part of that common core. There are many characteristic American patterns, including wasteful consumption habits, the world's highest energy use, heavy reliance on processed foods, longer work hours and less vacation time than in European countries, the sprawling layout of cities and suburbs, the general rejection of mass transit, and so forth. Those living in the United States seem blind to such commonalities, but they immediately strike any outside observer.

For more than a decade Americans have been over-emphasizing their differences, and there is not a little irony in this development. At the very moment when interchangeability, mass production, television, and the computer have fully penetrated not only production but also the spheres of consumption and cultural reproduction, at the very moment when virtually all Americans are enmeshed in advanced technological systems that bind them together, they have chosen to ignore their material connectedness and to insist on the primacy of inherited or newly rediscovered cultural values. The very elimination of technology from Appleby's text and from most discussions of multiculturalism signifies a reluctance to confront the structures that have penetrated thoroughly into every aspect of daily life. Meanwhile, Newt Gingrich and the Republican Party win elections by championing individualism, free enterprise and

<sup>32</sup> The crowd at a mass sporting event or at the launching of a space shuttle comes from all segments of the population. See chapter nine in David E. Nye, *American Technological Sublime*. Cambridge: MIT Press, 1994.

exceptionalism, in combination with a nineteenth-century vision of liberating technology.

In contrast, historians of technology question both the idea that American machines and manufacturing systems are hallmarks of national identity and the Whig idea of history as the story of amelioration. Questioning the idea of a national character and the idea of progress leads one to focus on the cultural meaning of technological systems themselves. Do different ethnic and racial groups work on assembly lines in fundamentally distinctive ways? Do they drive automobiles on different kinds of roads and follow different traffic rules? Do they plug their electrical appliances into different grids? Do they use different credit cards or use them in fundamentally different ways? Do some of them reject items made with interchangeable parts in favor of hand-made items? By such tests, only a few groups really merit the name "multicultural," including the Amish, many Native-Americans, some of the rural poor, and some of those living in communes. Most Americans are inextricably bound up with their technological systems, which they use to shape their lives as producers and consumers within the world's most energy-intensive culture. Indeed, this quantitative difference in energy use is so large that it translates into important qualitative distinctions between the United States and other nations. The American organization of production and consumption displays a discernible pattern, whose lineaments can be traced through history, and whose existence undercuts the more extreme claims for multiculturalism.

Americans of different ethnic and racial backgrounds usually resemble each other more than they do people from their nations of origin. Their similarities emerge in habits of energy use, which include the electrified home, automobile, and air-conditioner, and which touch virtually all aspects of life, including even those that seem most distinctive. For example, production and consumption of food is a central part of maintaining a cultural tradition. In the United States, food requires 17% of all the energy used, with 6% for production, another 6% for processing, and 5% for transport, refrigeration, cooking, and washing dishes. Ethnic differentiation in cuisine thus exists within an energy-intensive framework. By the 1980s a typical large supermarket stocked an average of 30,000 items. The price of achieving this variety was a decline in the total number of markets in the 1980s, while the average floor space of the

remaining stores doubled. The ethnic variety on the shelves is based on capitalist rationalization, packaging, and distribution. At the supermarket multiculturalism and advanced capitalism prove compatible, just as they do in merchandizing by mail, in narrow-casting in the broadcast media, and in other forms of market segmentation.

Furthermore, whatever the preferred cuisine, Americans of all ethnic and racial backgrounds tend toward high sugar and high fat diets that lead to the "diseases of affluence." Finally, much of the variety of ethnic cuisine is maintained as a business: "55 percent of America's consumer food budget is spent on restaurant meals and ready-to-eat convenience foods."<sup>33</sup> This is a far higher percentage than in most other cultures, and further indicates how market forces maintain a veneer of ethnic diversity. The businesses of transportation, food preservation, marketing, and advertising prove central to the creation of a surface appearance of variety, in stark contrast to the small grocer of c. 1920 who bought from local farmers and regional suppliers.

Virtually every foreign observer from Tocqueville to Weber to our own time has noted the centrality of business in American culture, a fact perhaps so obvious that those living inside the United States tend to overlook it. As the Dutch historian Johan Huizinga noted a lifetime ago in *Life and Thought in America*, "The progress of technology compels the economic process to move toward concentration and general uniformity at an ever faster tempo. The more human inventiveness and exact science become locked into the organization of business, the more the active man, as the embodiment of an enterprise and its master, seems to disappear." By extension the distinctiveness of whole groups of immigrants and minorities was eroded both by immersion in corporate work cultures and by the all pervasive character of American consumption. Note that, as in Chandler's argument, this is not a brief for technological determinism. Rather, Huizinga argued, like Tocqueville before him, that "The American *wants* to be like his neighbour," and he went one step further, expressing the power and importance of the idea of interchangeability, noting that the American "only feels spiritually safe in what has

<sup>33</sup> Alan Durning, *How Much is Enough? The Consumer Society and the Future of the Earth*. New York: Norton, 1992, pp. 69, 74, 68, 45.

been standardized.”<sup>34</sup> If one doubts this statement consider the popularity of national merchandizing chains that guarantee a consumer the same products and services coast to coast. The uniformity in American life has become so great that a European, flying a thousand miles to a new city inside the United States, can frequently be disappointed, because the new place seems so much like all the other places.

Multiculturalism is perhaps best understood as a reaction against the uniformities noted by Tocqueville, Weber, and Huizinga. It is an attempt, focused primarily within the realm of consumption, to counter the pressures toward standardization, efficiency, and business-directed routines in both the work place and private life. If advocates of multiculturalism such as Appleby ignore technology, it is not because they reject the almost forgotten exceptionalist history of American technology, but because they mistakenly (and implicitly) conceive of technology as a deterministic system.

34 Johan Huizinga, *Life and Thought in America: A Dutch Historian's Vision, From Afar and Near*: New York: Harper Torchbooks, 1972, pp. 234,237.