**AMERICA’S FOUNDING ENTREPRENEURS**

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**Abstract** - Restoring America’s global competitiveness will require wide-ranging cultural changes, as well as changes in policy in areas such as politics, economics and education. America must reclaim its almost-lost heritage as a nation dedicated to a model of entrepreneurship that integrates creativity and innovation with business acumen, customer awareness and a desire to improve people’s lives with, ultimately, a desire to improve the condition of humanity. The Founding Fathers understood that this type of entrepreneurial mindset is not only vital to the nation’s economic health, but also its political health as a democratic republic with sustained independence. This article traces the Founders’ commitment to engineering entrepreneurship, from their own inventions and feats of engineering to their articulation of the pivotal role of industry and enterprise in the rise of the young republic and the preservation of its liberty. If America is to thrive in today’s global context, it must rediscover the entrepreneurial spirit of its origins.

1. Reviving America’s Entrepreneurial Spirit

Recently, a commentator wrote that the United States needs a national “Keep America Entrepreneurial” media campaign, modeled on the “Keep America Beautiful” campaign of the 1970s. This time, he suggested, instead of a Native American shedding a tear as he gazed across a landscape befouled by pollution and litter, the ad should show Benjamin Franklin shedding a tear as he gazes across a landscape befouled by unnecessary, politically motivated construction projects, all covered in those now-ubiquitous signs: “Brought to You by the American Recovery and Reinvestment Act” (Goldberg, 2010).

The choice of Benjamin Franklin is a shrewd one. The Native American in the original ad was a powerful symbol, evoking an aspect of America’s national heritage that the advertisers feared the nation was in danger of losing. Today, we are in danger of losing another aspect of our national heritage, and nothing symbolizes it more powerfully than the Founding Fathers.

Consider a few representative facts gathered in the latest report from the “Rising Above the Gathering Storm” committee on technology and America’s global competitiveness, organized by the National Academies:

- Of Wal-Mart’s 6,000 suppliers, 5,000 are in China.
- In 2009, fifty-one percent of United States patents were awarded to non-United States companies. China has now replaced the United States as the world’s number one high-technology exporter.
- The World Economic Forum ranks the United States 48th in quality of mathematics and science education. Sixty-nine percent of United States public school students in fifth
through eighth grade are taught mathematics by a teacher without a degree or certificate in mathematics.

- The United States graduates more visual arts and performing arts majors than engineers.
- Roughly half of America’s outstanding public debt is now foreign-owned—with China the largest holder (National Academy of Sciences et al., 2010, p. 6-11).

Unfortunately, solving this problem involves more than just changes in economics and politics or even practices in industry or education. It would also involve cultural change, since the underlying problem is a failure of values, self-identity and mindset. The cultural change is what we want to focus on in this article, specifically the need for a rediscovery of the entrepreneurial spirit in American culture.

Standing behind these data are the even more powerful realities of history and national character. An entrepreneurial spirit has always been right at the heart of the American experience. It was not an entrepreneurial spirit primarily focused on starting new businesses or making money; rather, it was one that wedded innovation and creativity with concepts like customer awareness, business acumen, and societal good. The Founding Fathers both embodied this reality in their lives and imbedded it in their vision for America’s future. We must reclaim our almost-lost heritage as a nation dedicated to this type of entrepreneurship.

2. Engineering Entrepreneurs and the American Revolutionary War

The first year of the war went surprisingly well for the Americans. Less than a month after exchanging the first volleys with the British, American forces under Ethan Allen and Benedict Arnold captured Fort Ticonderoga and nearly sixty pieces of much-needed artillery. Then came the famous stand at Breed’s Hill where the British, as a cost for taking the position, suffered more than 1,000 casualties, a disproportionate number of these being officers. In November 1775, Brigadier General Richard Montgomery took Montreal without opposition. Four months later, Henry Knox engineered a logistical miracle by disassembling sixty tons of artillery from Fort Ticonderoga and transporting it via boat, oxen and sleds over 300 miles of snow, ice and pitiful roads to Dorchester Heights allowing the Continental Army to overthrow British occupation of Boston. In June 1776, American forces repelled the British naval attack on Charleston, South Carolina, from the sand-and-palmetto-log fortifications of Fort Moultrie.

Early American successes, however, forced the British to take more drastic measures. June and July of 1776 saw the arrival of a massive British war fleet in New York Harbor. Hundreds of British ships delivered more than 33,000 troops and 1,200 cannon to America’s doorstep. On July 12, two British frigates sailed safely up the Hudson River, a critical water route penetrating the heart of the American colonies. While the ships did little physical damage, they exposed the American defenses of this important waterway as useless. “The importance of the Hudson River in the present contest, and the necessity of defending it,” wrote George Washington to General Israel Putnam, “are subjects which have been so frequently and fully discussed, and so well understood, that it is unnecessary to enlarge upon them.” If America were to win the war, it would have to protect such a vital artery (Diamant, 2004, p. xiii).

In response, American forces began sinking chevaux-de-frise in the river’s shallower areas. Adapted from century-old Dutch anti-cavalry devices, these obstructions consisted of timber bulwarks with iron spears projecting upward. They were filled with 30 tons of stone and sunk just deep enough so that the spears were invisible from the surface.
Where the water proved too deep for the *chevaux-de-frise*, American forces stretched massive chains across the river, complete with systems of pulleys and mid-stream anchors to adjust the chains’ tension and a series of timber booms to act as shock absorbers should any British ship attempt to snap the chains. The largest was a chain weighing sixty-five tons reaching from West Point to Constitution Island.

Often under-equipped, under-trained, and outnumbered, American forces had to rely on more than traditional military techniques to defeat the British. Historians have written volumes on the importance of the patriots’ guerilla tactics, their knowledge of the terrain, the logistical problems faced by the British, and the French alliance with the rebelling colonies. Whether one believes in divine providence, luck, or both, it is clear that some of America’s success in the war depended on heavy doses of something beyond the control of her military leaders. For concise summaries of the British campaigns, including consideration of the Americans’ unconventional tactics in warfare, refer “The War for Independence, To Saratoga” (Higginbotham, 2003a), “The War for Independence, after Saratoga” (Higginbotham, 2003b), and “Logistics and the Failure of the British Army in America, 1775-1783” (Bowler, 1975). Kennett (1977) considers the importance of France’s involvement to American success.

But little attention has been given to another important factor in American success—the role of engineering entrepreneurship. American forces proved remarkably inventive when facing the superior British army and navy, and this penchant for invention ran all the way up the chain of command. The protection of the Hudson, for example, involved several Founding Fathers. John Jay served as president of the Continental Congress, wrote some of the *Federalist Papers*, accomplished key victories in early American diplomacy and was appointed as the first U.S. Chief Justice; he was also a member of the committee that executed measures to obstruct the river. George Washington delegated oversight of the construction of the chain at West Point to Timothy Pickering, who would later serve as Washington’s postmaster general, secretary of war and secretary of state.

While it might be easy to trot out the well-known phrase about necessity’s relationship with invention, to do so would be to lose sight of the prominent status that invention and engineering enjoyed in the hearts and minds of American citizens, especially her most notable ones. Indeed, the Founding Fathers placed great value on invention, engineering and entrepreneurship by seeing them as essential prerequisites not only to economic success, but also to a healthy republic and sustained independence.

3. Innovations for Post-War Economic Growth

After the war, a new line of social conflict was drawn over exactly what kind of nation the new republic would be. Historians and secondary school history curricula have tended to focus on the aspects that divided these two visions of America’s future. We may, however, learn as much by observing the commonalities between two conflicting factions than by observing what they fight over. It is a deeply revealing fact that both visions emerging in post-revolutionary America centered on invention, engineering and entrepreneurship as core values of the new nation.

Eight years after the American Revolutionary War ended, two of the most prominent leaders in the nation, Alexander Hamilton and Thomas Jefferson, were at fierce odds over which economic path would ensure the fledgling nation’s success. Jefferson believed the agrarian way to be ideal, not only for the nation’s material prosperity, but also for its moral health. “Agriculture…is our wisest pursuit,” he wrote to Washington in 1787 (Lipscomb and Bergh, 1903, Vol.6, p. 277)
“because it will in the end contribute most to real wealth, good morals and happiness.” Jefferson felt even more strongly about the connection between a society based on agriculture and its ability to uphold the newly-formed republic. “Cultivators of the earth are the most valuable citizens,” he once declared to Jay, for “they are tied to their country and wedded to its liberty and interests by the most lasting bonds” (Lipscomb and Bergh, 1903, Vol.5, p. 94).

However, Jefferson’s most bitter political rival felt much differently. Though he acknowledged an important role for agriculture, Hamilton spent his career pushing for a manufacturing economy, believing it to be the nation’s best hope for economic success and political independence. In his famous Report on Manufactures, submitted to the House of Representatives in 1791, Hamilton wasted little time on the merits of Jefferson’s agrarian model. It was true, he wrote, that for many reasons “the cultivation of the earth…has intrinsically a strong claim to preeminence over every other kind of industry.” But that agriculture had “a title to any thing like an exclusive predilection, in any country, ought to be admitted with great caution.” Moreover, where Jefferson believed that agriculture would encourage productivity and strong moral values, Hamilton asserted that if men who are not naturally gifted or inclined toward farming were left with no choice but to follow such “uncongenial pursuits,” they would “fall below mediocrity, and labor without effect.” Manufacturing, in Hamilton’s mind, opened new opportunities and better encouraged the productive use of one’s talents.

Historians have well documented the differences between Hamilton and Jefferson and the political and economic systems espoused by each. Despite these differences, however, the two statesmen did agree on one point: that the value of engineering and entrepreneurship to society was important to sustain a healthy republic and American independence.

Hamilton, of course, made no secret of his admiration for engineering and technology. Report on Manufactures is essentially an extended listing of the ways in which manufacturing and technology would ensure the young republic’s economic and political independence. Yet he also saw how engineering and technology would increase human flourishing in general. For example, relieved of the need to produce his own clothes, barrels or nails, the farmer could devote all of his attention to the cultivation of his land. What is more, with the addition of technology (Hamilton at one point considers the cotton mill) individuals once needed for labor, chiefly women and children, are freed to pursue other activities or provide help in other areas, increasing production all around. Considering, in the case of the mill, that operations “continue with convenience during the night as well as the day, the “prodigious effect of such a machine is easily conceived” (Hamilton, 1971, p. 12).

Jefferson, too, understood the importance of engineering and technology. His preference for an economy based on agriculture rather than manufacturing did not involve any distrust of technology. To the contrary, Jefferson was something of a techno-agrarian, as his many inventions attest; not many Luddites would have devoted the time and effort to invent a new and more efficient type of plow. Jefferson’s opposition to monopolies of any kind initially prompted him to oppose patents for any idea or invention; he wrote “ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and [the] improvement of his condition” (Lipscomb and Bergh, 1903, Vol.13, p. 333) Patents, in Jefferson’s mind, could easily thwart this exchange by granting a monopoly on the product to its inventor who, in turn, would be able to grant his idea only to those who could afford it. However, by 1789, his views had changed. He wrote to James Madison to say that he would like to see an article added to the Bill of Rights declaring that “monopolies may be allowed to persons for…their own inventions in arts” (Boyd, 1950, Vol. 15, p.368) Jefferson had come to understand that under the right conditions, the granting of patents spurred further invention and innovation. Indeed, after the first

A central commitment to engineering entrepreneurship was not limited to this particular debate between Jefferson and Hamilton. Many of the Founding Fathers were inventors themselves. Their interest was not out of mere curiosity or detached “pure scientific” interest; their inventions were innovative, entrepreneurial and designed with concrete service to society in mind.

That certain founding fathers were inventors is no secret. Jefferson, of course, is often remembered for his invention of the dumbwaiter, portable copying press, and moldboard plow. We credit Ben Franklin with inventing or perfecting bifocals, lightning rods, and a wood-burning stove for use in the home. Like Jefferson, Washington also designed and tested a new type of plow. Madison built a walking stick that housed a microscope.

Some thought even bigger, so to speak. To investigate the earthen mounds of Native American burial sites, Jefferson created a method of stratigraphic excavation that geologists still use today. Thomas Paine came up with the earliest American design for an iron bridge and spent much of his post-Revolution career trying to find financing for its construction. Hamilton designed an entire industrial town in Paterson, New Jersey, to serve as America’s model for an integrated manufacturing center. For a general overview of the inventions of certain founding fathers, refer “The Science of Liberty: Democracy, Reason, and the Laws of Nature” (Ferris, 2010).

While the inventiveness of the Founding Fathers is often cited as a testament to their capacity for genius, the usefulness of the inventions themselves is frequently overlooked. Jefferson’s inventions are usually viewed merely as interesting byproducts of an intelligent and curious man. Yet his encryption device for state correspondence in times of war, to cite one example, was reinvented by the military in the 1920s and saw continued use through the Second World War. Franklin’s stove design required less wood than the conventional fireplace and was less dangerous, too. Not only would Paine’s bridge design have spanned rivers, but its single-span design could stretch farther than a bridge made of wood and stone.

While perhaps not as exciting as the engineering feats that drove the British from Boston or prevented them from penetrating the Hudson, items such as Franklin’s bifocals and Jefferson’s plow provided tremendous service to society. In fact, providing benefit to others was the motive behind much of the invention. Franklin had “long been impressed with…the conveniences of common living, and the invention and acquisition of new and useful utensils and instruments.” John Adams once remarked in a letter to Jefferson that “the eighteenth century…has been, of all that are past, the most honorable to human nature,” because “sciences useful to men, ameliorating their condition, were improved” (Banning, 2004). Writing in 1794 to Richard Morris, an inventor attempting to patent a type of waterproof cloth, Jefferson heralded Morris’ invention as “a valuable discovery…because it will enable many to guard themselves against the effects of wet” (Matsuura, 2006). Demonstrating a keen grasp on customer focus and business acumen, he added that the invention’s importance “will be truly great if the process be so cheap as it will admit to be used for the laboring part of mankind” (Franklin, 1901, p. 244).
5. Political Independence: “Liberty…Is the Great Parent of Science and Virtue”

The understanding of the important role invention and engineering would play in the new republic led the Founders to create an environment in which such activity was encouraged. Washington advocated for a unified patent system and signed a bill that laid the foundation for what would later become the patent system we have today. Though Jefferson refused to patent any of his own creations, he did much to establish intellectual property rights. As secretary of state, he reviewed patent applications and granted patents as a member of the first Board of Arts. He even drafted his own patent bill in 1791.

Beyond recognizing that inventions often provided beneficial services to others, the Founders wanted engineering and entrepreneurship (though they did not use those terms) to characterize American life. To nudge society in the direction of manufacturing, according to Hamilton, was to “cherish and stimulate the activity of the human mind, by multiplying the objects of enterprise” (Hamilton, 1971, p. 14). In the Federalist Papers, Hamilton often spoke fondly of an “adventurous spirit” or “spirit of enterprise,” which distinguished the commercial character of America (Hamilton, 1961a, c). The nation was always innovating, always improving, and the Founders admired that. “Let your youth be instructed in all the means of promoting national prosperity and independence,” wrote Benjamin Rush, “whether they relate to improvements in agriculture, manufactures, or inland navigation.” In his first annual address to the Congress, Washington urged Congress to give “effectual encouragement…as to the exertions of skill and genius in producing [inventions] at home” (Rush, 1798).

Such encouragement of engineering and invention went far beyond a desire to secure economic prosperity. The Founders understood that economic prosperity and political independence were intertwined. Hamilton understood the danger of remaining too dependent on foreign goods while exporting only agricultural products. The “natural remedy” to this, he wrote, was “to contract as fast as possible” our dependence on Europe for imported goods. On a deeper lever, though, the Founders understood the link between the areas of science, engineering and entrepreneurship and ideas such as democracy, liberty and independence. A citizenry imbued with the knowledge and motivation to create something new and improve upon that which existed was far more likely to cherish and actively protect its newfound liberties and independence (Hamilton, 1971, p. 18).

For example, in the Federalist Papers, Hamilton contrasted the regimented life of ancient republics with the individual liberty of the modern American republic and identified as its cause a widespread devotion to the improvement of life through entrepreneurial work: “The industrious habits of the people of the present day, absorbed in the pursuits of gain and devoted to the improvements of agriculture and commerce, are incompatible with the condition of a nation of soldiers, which was the true condition of the people of those [ancient] republics” (Hamilton, 1961b).

While Hamilton’s language (“absorbed in the pursuits of gain”) seems to suggest a society built on greed to our twenty-first-century sensibilities, in the late eighteenth century, the concept of “gain” was deeply integrated with the concept of producing valuable services that benefited others and made the world a better place (“the improvements of agriculture and commerce”). The “gain” in question was the nation’s gain, not just an individual’s.

In the most famous sections of the Federalist Papers, Madison articulated the central dynamic of politics in a free and commercial society—the management of conflict between “factions.” What
is less famous is that Madison was primarily thinking of economic conflicts. Although factions arise from religious, geographic, or other differences, “the most common and durable source of factions has been the various and unequal distribution of property.” The creation and distribution of property looms largest in a commercial society of the type that the Founders were building (Madison, 1961).

The chief danger Madison worried about was people using political power to advance their own economic advantages. “The distribution of property” properly belongs in the hands of an economic system that rewards industry and enterprise. Government’s proper role is to be a just judge of disputes and uphold laws; when economic factions use government to redirect the distribution of property, political power serves private ends rather than the public good. When Madison writes those famous lines about factions as the chief danger to liberty, he is primarily concerned with competing economic interests using public policy to control and redirect economic action.

On the other hand, when political power is kept in its place and liberty is established, people flourish both economically and morally. Jefferson may have understood this best. He spoke of the “value of science to a republican people; the security it gives to liberty, be enlightening the minds of its citizens; …the virtues it inculcates” (Jefferson, 1821). Jefferson, in fact, recognized the deeper truth that science itself depended on liberty: “We have spent the prime of our lives in procuring [young men] the precious blessing of liberty. Let them spend theirs in showing that it is the great parent of science and virtue; and that a nation will be great in both always in proportion as it is free” (Foley, 1900, p. 791).

The link was so clear, in fact, that Jefferson was greatly befuddled by the collapse of similar political experiments in Europe. “How then has it happened,” he asked Adams in 1815, “that these nations, France especially and England, so great, so dignified, so distinguished by science and the arts [i.e. technology], plunged at once into all the depths of human enormity, threw off suddenly and openly all the restraints of morality, all sensation to character, and unblushingly avowed and acted on the principle that power was right?” To the Founders, liberty depended upon science and vice versa (Foley, 1900, p. 594).


There was much to sort out when beginning a new republic. But the Founders understood the importance of that “spirit of enterprise” to the great political experiment.

Perhaps the most striking historical fact of all is one that is curiously overlooked in almost all retellings of the story. For all his antipathy toward Hamilton personally, even Jefferson came late in his life to support a manufacturing economy, because it was the only way to support the engineering innovation necessary for the security of the republic. Although he had once believed Hamilton’s vision of a country built primarily on manufacturing “flowed from principles adverse to liberty” (Koch and Peden, 1944, p. 518), he had changed his mind:

You tell me I am quoted by those who wish to continue our dependence on England for manufactures. There was a time when I might have been so quoted with more candor, but within the thirty years which have since elapsed, how are circumstances changed! We must now place the manufacturer by the side of the agriculturist….He, therefore, who is now against domestic manufacture, must be either for reducing us to dependence upon that foreign nation, or to be clothed in
 skins, and to live like wild beasts in dens and caverns. I am not one of these; experience has taught me that manufactures are now as necessary to our independence as our comfort (Foley, 1900, p. 532).

At a time when America was once again falling into “dependence upon a foreign nation” for “manufactures,” this late conversion of the great American champion of agrarian life to the manufacturing economy stands out like a beacon.

But simply pining for the bygone days of a healthy manufacturing base will do no good. If all we want is manufacturing for the sake of manufacturing, it can be achieved at any time by enacting huge tariffs and trade barriers on imported goods; and thus, the U.S. economy must expand manufacturing but at a terrible cost. It would destroy all incentives for innovation and true entrepreneurship, because the economy would reward companies for currying political favor rather than for productive innovation. It would be a perfect example of what Madison warned against in *The Federalist Papers*—the use of government power to redirect economic activity, destroying the natural commercial system that rewards industry and enterprise. Instead of growing domestic manufacturing jobs by innovating to earn the world’s business, America would simply be using political power to destroy jobs overseas.

Nor will innovating for the sake of innovation accomplish much if America is not focused on better serving the needs of customers, both domestically and abroad. Yes, the Founders valued innovation, creativity, and manufacturing. But their primary aim, in Jefferson’s words, was “the improvement of [man’s] condition.” The old adage does not say, “build a new and different mousetrap and the world will beat a path to your door.” The point of innovation is to make products better—by making people more well off. If we want the world to once again beat a path to America’s economic door, we must go back and learn from the Founders that the ultimate purpose of economic activity is to serve the world’s needs and improve everyone’s lives.

The Founders thought America had the potential to be a great gift to the world. Europe was the center of wealth and power, but it was also “the old world.” It was wedded to old ways that no longer served people’s needs, and its culture was driven by aristocratic power structures rather than industry and enterprise. The whole world—the human race at large—desperately needed the emergence of a new nation whose culture was oriented toward making the world a better place through liberty and entrepreneurship.

America is no longer a new nation. Nor are we, as we once were, the only nation on the face of the earth dedicated to “the improvement of [man’s] condition” through industry and enterprise. But America still has much to offer the world if we can make the hard choices that truly entrepreneurial change requires. We can, if we wish, become the new Europe: wedded to old ways and with an economy driven by power games rather than by serving people’s needs better and better. Or we can recover America’s founding entrepreneurial spirit and become, once again, a great gift to the world.

It is not really much of a choice. All other concerns aside, the long-term economic penalty for becoming the new Europe would make the recent financial crisis look tame by comparison. If we do not “Keep America Entrepreneurial,” it will not be long before Jefferson’s reference to being “clothed in skins” and living in “dens and caverns” will not sound so exaggerated.
References


