The Transportation Revolution

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Much of the expansion and growth that the United States economy experienced in the first half of the nineteenth century was made possible by a series of transportation (and communications) improvements that began to link together the nation not only economically but also politically, socially, and culturally. Although these links would be cut by a devastating civil war between 1861 and 1865, the transportation and communications network begun in the first half of the nineteenth century provided the basis for the creation of the well-integrated national economy that emerged in the United States in the period between the end of the Civil War and the beginning of World War I. What I’d like to do today is to detail briefly the transportation and communications improvements of the first half of the nineteenth century, for these improvements did more than provide the basis for a unified national economy later on: they underpinned and reinforced economic expansion and growth in the early national- and antebellum periods as well.

First, however, a quick discussion of how and why improvements in transportation and communications are so important to economic life. One of the great insights of the eighteenth-century Scottish economist Adam Smith, often considered the father of modern economics, was the idea that economic growth is based largely on economic specialization and the division of labor. According to Smith, if individuals—or geographical units for that matter—are allowed to specialize in that economic activity or those economic activities that they are best suited for, whether by nature, aptitude, or training, those individuals or those units, generally speaking, will be better off in economic terms. Why? Because instead of devoting labor and other resources to activities for which they are unsuited—activities for which, in economic terms, they have no “comparative advantage”—they can concentrate their efforts and resources on those activities that suit them well. If a person is great at gardening, for example, but bad at woodworking, it hardly makes sense for him or her to spend half of his or her time in each activity, particularly if he or she can concentrate on gardening, and exchange a portion of the fruits and vegetables produced from such gardening efforts for furniture made by someone particularly adept at woodworking. The same principle holds true for regions. If one area is well suited for the production of sugar, but ill-suited for the production of wheat, it hardly makes sense for that region’s population to devote itself equally to the production of both commodities. Generally speaking, it would be more rational in economic terms for that region to devote itself to sugar production, and to trade some of its extra sugar for wheat produced in an area well suited for the production of small grains.

Such strategies seem reasonable, do they not? Most economists and economic historians since Smith have thought so. There is a catch or, more properly, a limitation on the degree of specialization and division of labor possible in any setting: the effective size of the market, that is to say, the number of people willing and able to participate in an economy based on the trade and exchange of commodities, goods, and services. A hermit living in a remote area cut off from human contact and communication of any
kind will have to perform every economic activity necessary for his or her survival, whether or not he or she wants to or not, and whether or not he or she can do all such activities equally well. Similarly, a country totally cut off from trade and exchange will have to produce or provide every commodity, good, or service its population desires or that population will have to do without. Both at the individual level and at the regional, national, or international level, though, growth in the size of the “market”—the number of people (and places) effectively participating in production, trade, and exchange—conditions, shapes, and determines the degree of specialization and division of labor possible. The bigger the effective size of the market, the more specialization and division of labor possible, and presumably, the greater the economic efficiency possible.

Markets can grow in several ways. One way, obviously, is through population growth. Another way is through gains in income and wealth. A wealthier population will be able to participate more consistently and intensely in market activities than a population that is very poor. Yet another way for market size to increase is if people who at one time were not inclined to participate in trade and exchange (and in an economy predicated on specialization and the division of labor) change their minds and decide to participate in the same. Finally, the effective size of a market can grow if transportation and communications improvements allow more people access to trade and exchange. A population can be willing to participate in a market economy based on specialization and the division of labor, but it won’t be able to unless it has adequate transportation and communications links to make such participation possible.

In the period between roughly 1800 and 1860 the effective size of the U.S. “market” grew in each of the ways mentioned above. Population grew dramatically from a little over 5 million people in 1800 to over 31 million people in 1860. This population grew wealthier over the course of this period, and people’s values changed in ways making them more receptive to trade, exchange, and consumption. Perhaps most important, though, a range of improvements in transportation and communications enabled an increasing proportion of this growing population of wealthier, more market-oriented people to specialize, and to register the economic benefits arising therefrom. Indeed, the role of transportation improvements and innovations in this period was so great as to lead some historians to say that a “Transportation Revolution” took place in America during this period.

What were these improvements? How did they come about? Who paid for them? When and where in particular did they occur? To answer the latter questions first, most of the improvements came after about 1815 and these improvements were heavily concentrated in that part of the United States to the east of the Mississippi River. These improvements (and innovations) came about in a variety of ways, and were paid for in a variety of ways: some by private investors, others by the government (local, state, or federal), and others still through public-private partnerships, a form of enterprise known at the time as “mixed enterprise.”

Many of the early transportation initiatives represented attempts to improve America’s roads and highways. Some of these initiatives preceded 1815, but most were sparked by concern over the transport difficulties U.S. military forces experienced during the War of 1812. As a result, between about 1815 and 1835 in particular, many new highways and turnpikes were built in America, and many older roads were improved. In an economic sense, however, other transportation improvements were much more
important. For the most part, American roads were still pretty rudimentary, even at the
time of the Civil War. They were often impassable because of mud or bad weather, for
example, but, even more important, overland transport costs via roads and highways were
much higher than costs via water or, later via the railroad, particularly heavy and bulky
agricultural commodities, which possessed low value per unit of weight.

As suggested above, water transport better suited many of America’s economic
needs during the period, and we see a range of improvements and innovations in this
realm. Many canals were constructed in the eastern half of the United States, particularly
between about 1815 and 1850. The rationale for canals grew out of the recognition that it
was cheaper to move goods, especially heavy agricultural goods, by water than via
wagons or carts on the country’s rough and often unreliable roads and highways. Canals
--essentially shallow ditches filled with water--were seen as particularly useful if they
could connect without too much in the way of construction costs two relatively important
market centers on natural bodies of water. This said, the most famous and most
important canal of the period the state-owned Erie Canal in upstate New York, deviated
from this hope: it was no less than 363 miles long. Constructed between 1817 and 1825,
this canal connected Albany, New York on the Hudson River to Buffalo, New York on
Lake Erie. Because New York City lies at the mouth of the Hudson, the Erie Canal in
essence connected, via the Hudson River, New York City and, by extension, the Atlantic
Ocean, with Lake Erie and the rest of the Great Lakes. While the possibilities entailed by
such long-distance connections captured the imagination of nineteenth-century
Americans, the Erie Canal’s principal effect was to extend the “market” to upstate New
York, which led in turn to rapid commercialization and economic development in the
region.

Given the great success of the Erie Canal, it is not surprising that there were many
attempts at emulation. In 1816 there were only about 100 miles of operative canals in the
entire U.S.; by 1850 the total had risen to about 3800 miles. By modern standards, transit
by canal seems quite primitive--merchandise was placed on rafts or canal boats and
pulled or dragged through the canal by horses or draft animals on adjacent paths—but
transport via canals was nonetheless much cheaper than overland transport by cart or
wagon. If many canals never proved profitable because they cost too much to build and
maintain or failed to connect trade centers sufficiently important to justify their expense,
they still represented an important development in the story of American transportation.

Other improvements and innovations in water transport were important as well.
The introduction of steam engines on American boats serves as a case in point.
Successful experiments to employ steam power in water transport date from the first
decade of the nineteenth century, most notably those of Robert Fulton, of course. By the
1820s, steamboats had become common in America, and transportation on the Ohio and
Mississippi rivers, as well as the on the Great Lakes, was transformed as a result. Steam
power solved one of the thorniest problems impeding trade in the new nation: the
inability to conduct two-way traffic between many trade centers because it was too
difficult and costly to get a boatload of merchandize upstream against strong currents.
The steam engine greatly mitigated this problem, and steamboats and, by the 1850s,
oceangoing steamships were transforming the world of trade.

Before moving on to the single most important transport development of the
period--the railroad--it is important to note that water transport also benefited from a
number of innovations and improvements besides canals and steam engines. Sailing ships improved dramatically in the period, witnessed by the rise in the 1840s of the famous Yankee clippers, and the entire shipping industry became better organized, more efficient, and cheaper in relative terms. By the end of the period, mercantile insurance rates had fallen significantly, loading and unloading ships took less time, and vessels sailed faster, needed fewer guns for defensive purposes (because of the Pax Britannica), and, in relative terms, employed smaller crews.

When all is said and done, however, it was in fact the railroad that was the most important transportation innovation of the age. If the “iron horse” is no longer seen, as it once was, as being absolutely indispensable to America’s expansion and growth in the nineteenth century, it clearly played the preeminent role. From the time of the first U.S. experiments in the 1820s, the railroad industry grew rapidly, and by 1860 the U.S. had roughly 30,000 miles of trackage, roughly two-thirds in the North, with the remaining third in the South. American railroad lines were almost all concentrated in the area to the east of the Mississippi River, and no true “system” could be said to exist: Most lines were short, and there was little uniformity in standards, let alone in the width of track gauges. An integrated system or network of long-distance (“through”) lines would only emerge later. The railroad proved vital to the expansion and growth of the antebellum economy nonetheless.

Why, one might ask? Not because it proved the cheapest form of transport. To be sure, shipping merchandise via the railroad was much cheaper than shipping merchandise via overland alternatives such as wagons or ox carts, but water transport proved cheaper still. In the 1850s, the cost of shipping a ton of merchandise one mile was 15 cents by wagon, 3 cents by rail, and only 1 cent by water. The railroad’s advantage was not necessarily based on price, then, but on a combination of relatively low prices, dependability, speed, and, most of all, freedom. People could build railroads pretty much wherever they wanted to. Water transport was much more limited: you had to use natural bodies of water for the most part, supplemented in relatively minor ways by manmade canals. With a railroad, by way of contrast, you could connect Point A to Point B whether or not either was anywhere near navigable water. Think of how difficult it would have been later in the century to connect the relatively arid and dry western United States to the rest of the country without the railroad.

In any case, the railroad, along with the other innovations mentioned above broadened and tightened the U.S. market significantly in the period before 1860, allowing for much greater levels of individual and regional specialization, division of labor, and economic efficiency. Paralleling these developments were a series of supplementary and complementary developments that improved communications in the United States. An improved and enlarged postal system, for example, the spread of newspapers and specialized agricultural, commercial, and business journals and periodicals, and most importantly, the advent in the 1840s of the telegraph, which allowed for the first time in human history the possibility of instantaneous or nearly instantaneous communications. If we conceive of the above communications developments as “vehicles” through which a particular type of good or product--information--is transported, we can better understand the close links between the transportation and communications sectors, and appreciate the many ways in which improvements in these sectors in the 1800-1860 period helped to remake the economy of the United States.