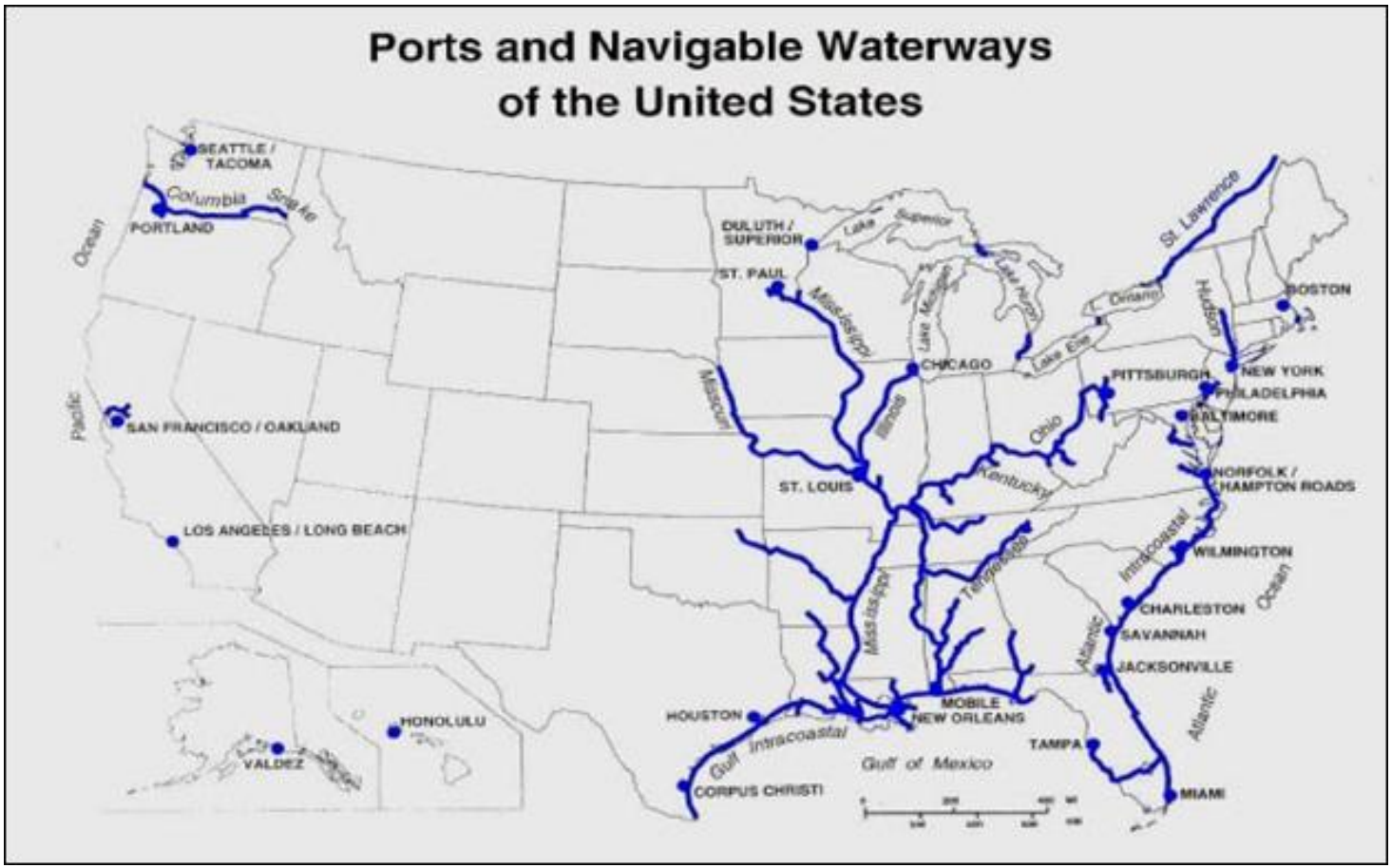
The Transportation Revolution

Transportation in the Early Nineteenth Century

- One of the big benefits the United States retained from British mercantalist policies was well developed ocean transportation
- Inland transportation was pretty much limited to navigable rivers (roads were terrible)
- What this meant was that port cities were in a position to thrive and grow right from the start
- For economic growth in the interior, better transportation would need to be developed to connect people living in the interior to markets

Transportation in the Early Nineteenth Century



Transportation in the Early Nineteenth Century

Transportation Costs, 1815

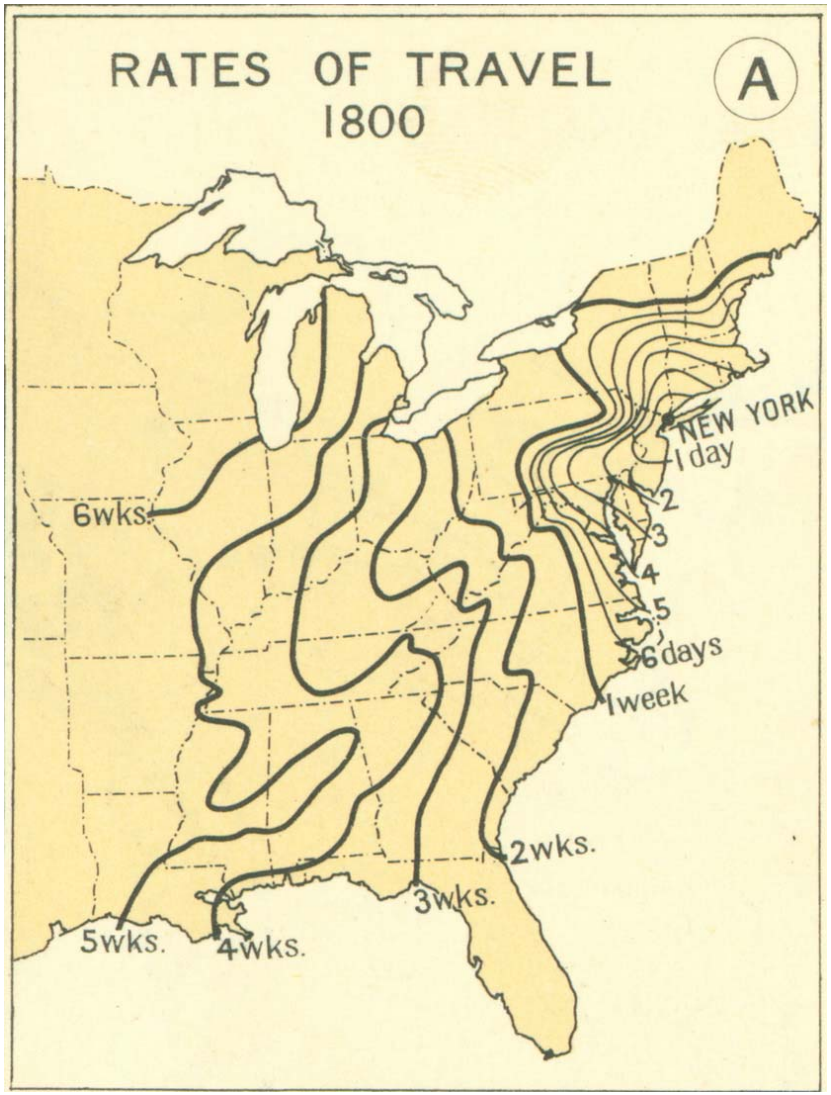
Mode of Transportation	Cost per Ton-Mile
Road	$0.30
River, Upstream	$0.06
River, Downstream	$0.01
Ocean	<$0.01

The Evolution of Travel Times

Maximum Shipping Distance in Miles Before Shipping Costs are Prohibitive, 1815

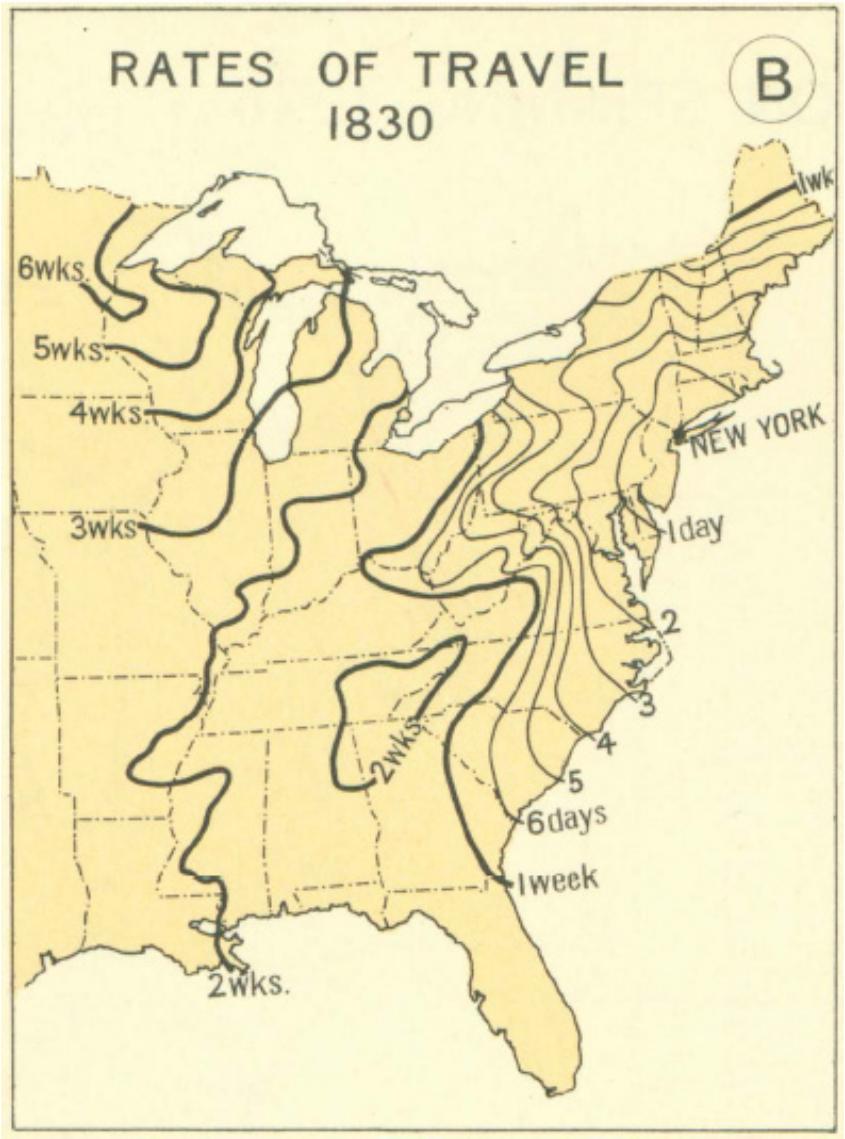
Commodity	Road	River, Upstream	River, Downstream	Ocean
Farm Products				
Corn	40	200	910	1180
Wheat	80	410	1900	2300
Flour	130	670	3080	4000
Tobacco	300	1500	6920	9000
Butter	780	3900	18080	23500
Cotton	870	4330	20000	Anywhere
Tea	3000	15000	Anywhere	Anywhere
Manufactured Products				
Pig iron	90	460	2120	2760
Iron bar	230	1170	5380	6990
Nails	420	2080	9620	12510

The Evolution of Travel Times



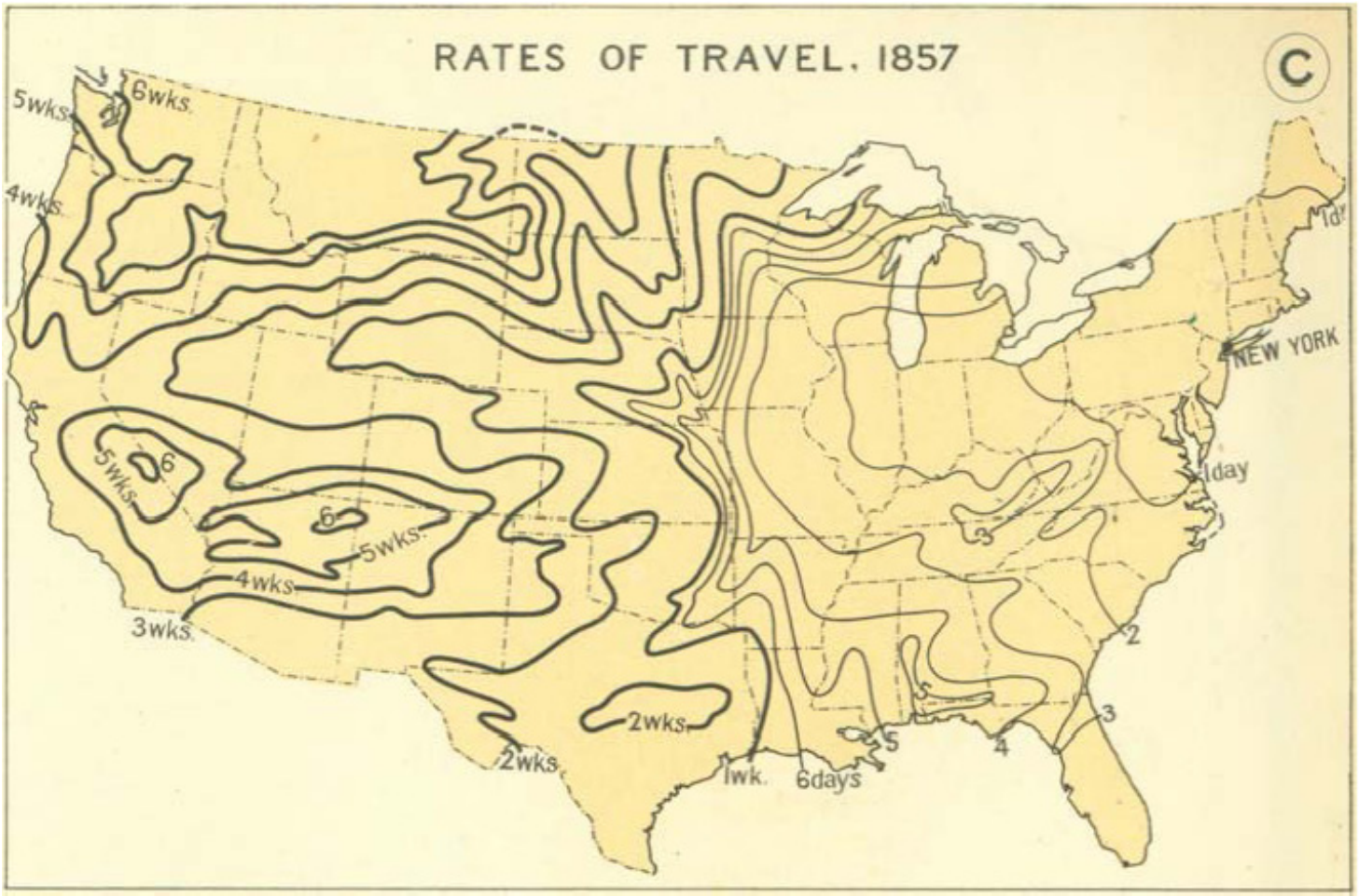
From "Atlas of the Historical Geography of the United States" by Charles Paulin, 1932

The Evolution of Travel Times



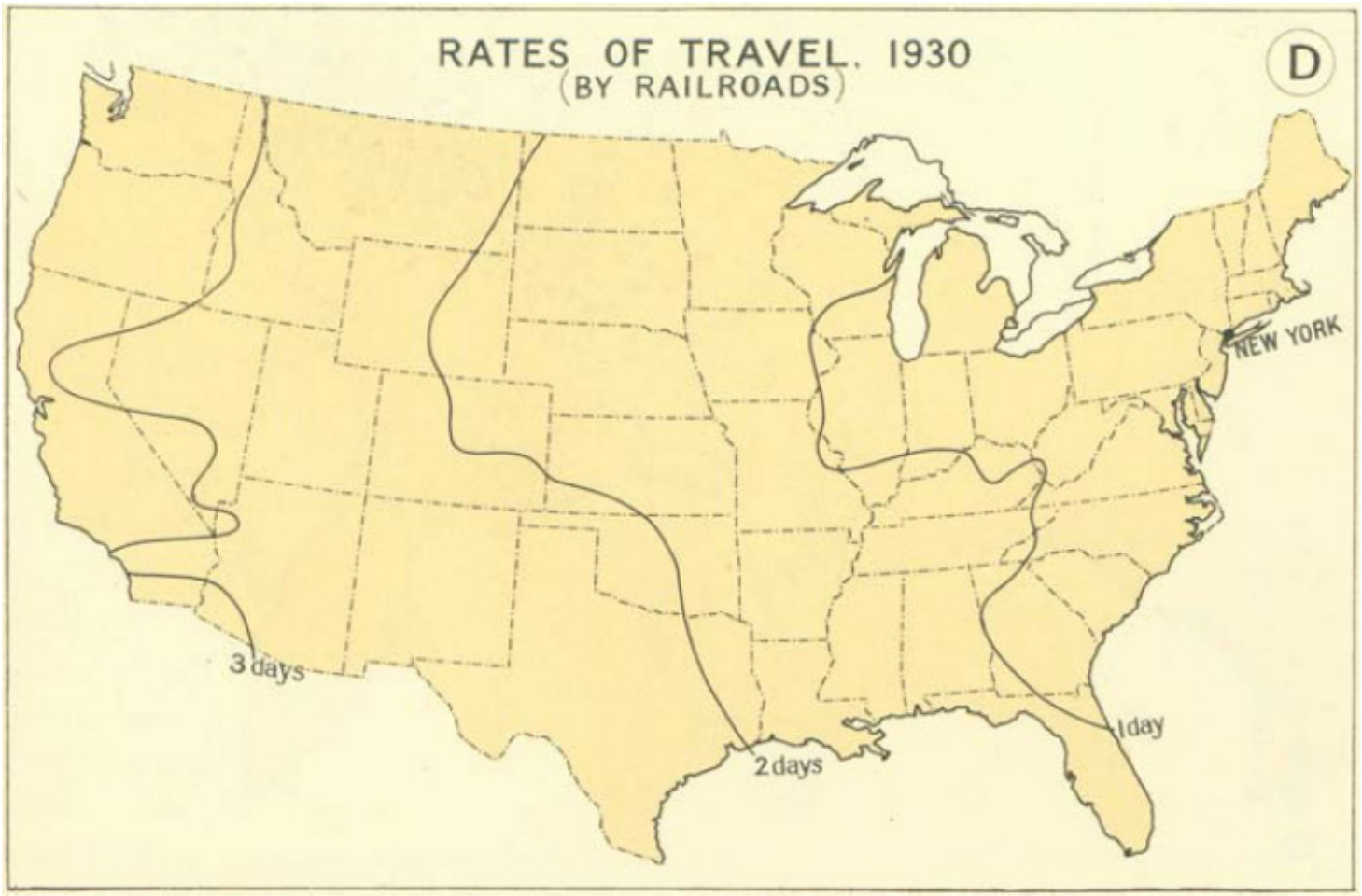
From "Atlas of the Historical Geography of the United States" by Charles Paulin, 1932

The Evolution of Travel Times



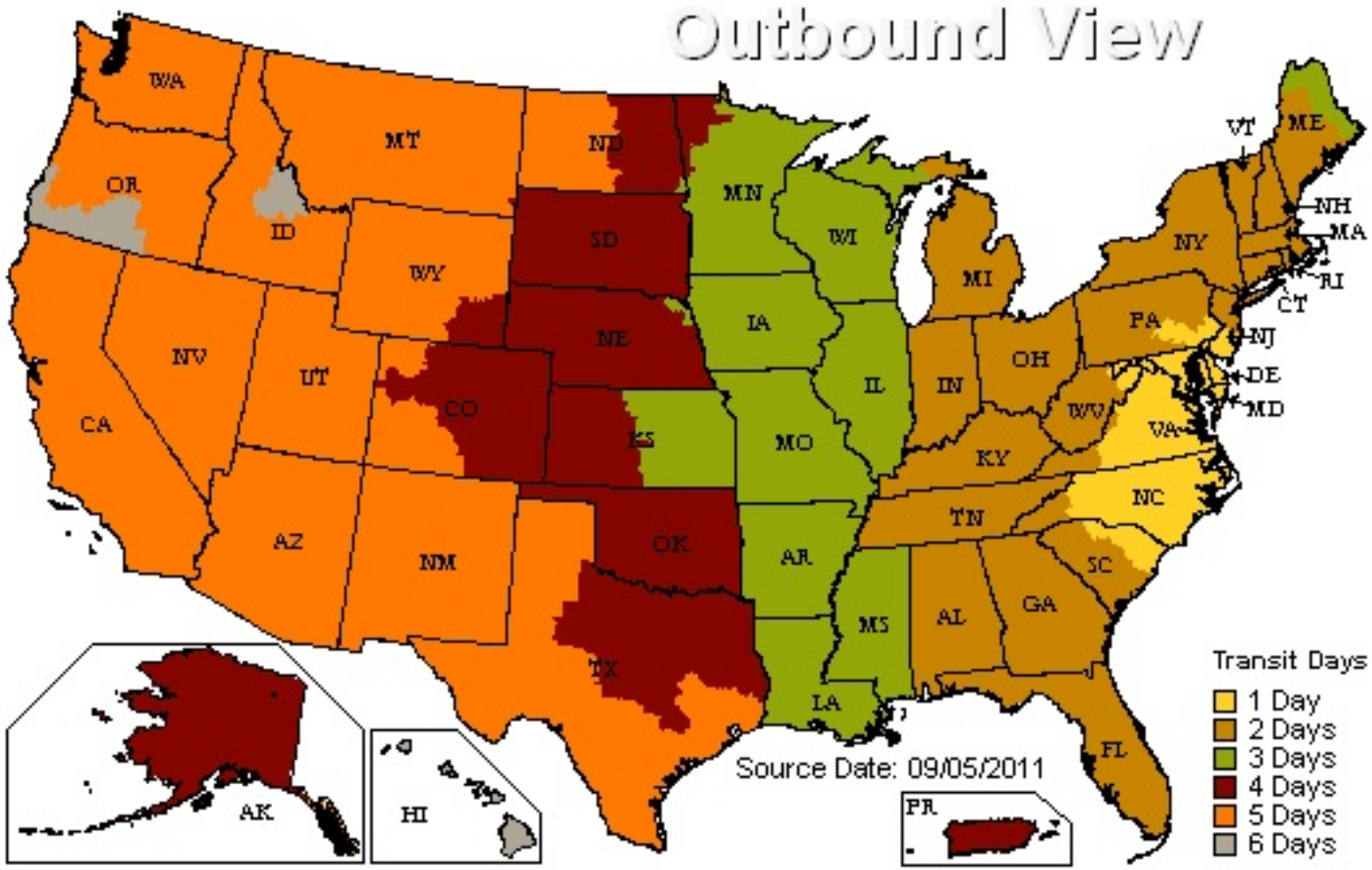
From "Atlas of the Historical Geography of the United States" by Charles Paulin, 1932

The Evolution of Travel Times



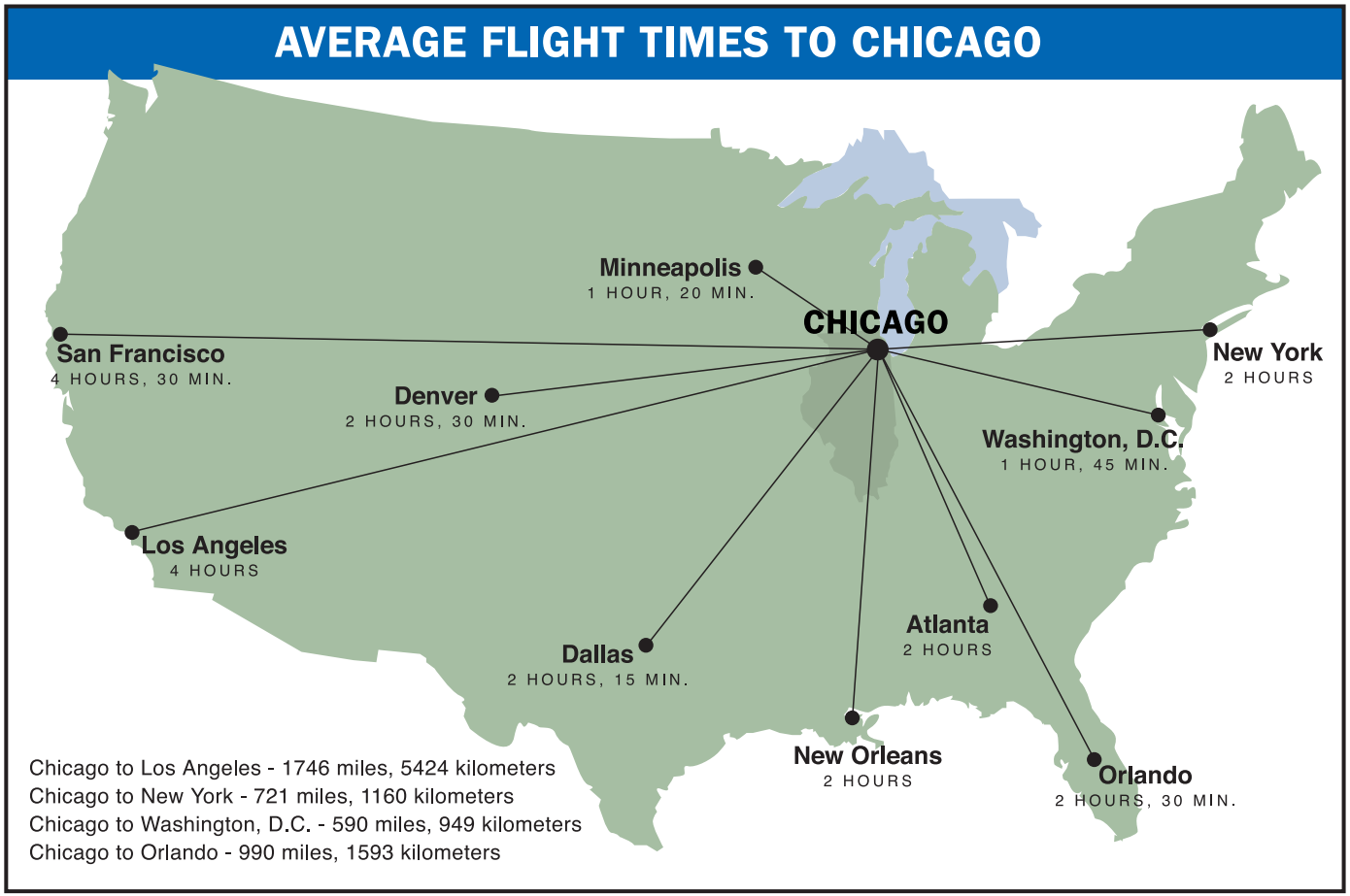
From "Atlas of the Historical Geography of the United States" by Charles Paulin, 1932

The Evolution of Travel Times



UPS Ground transit times from Williamsburg, VA

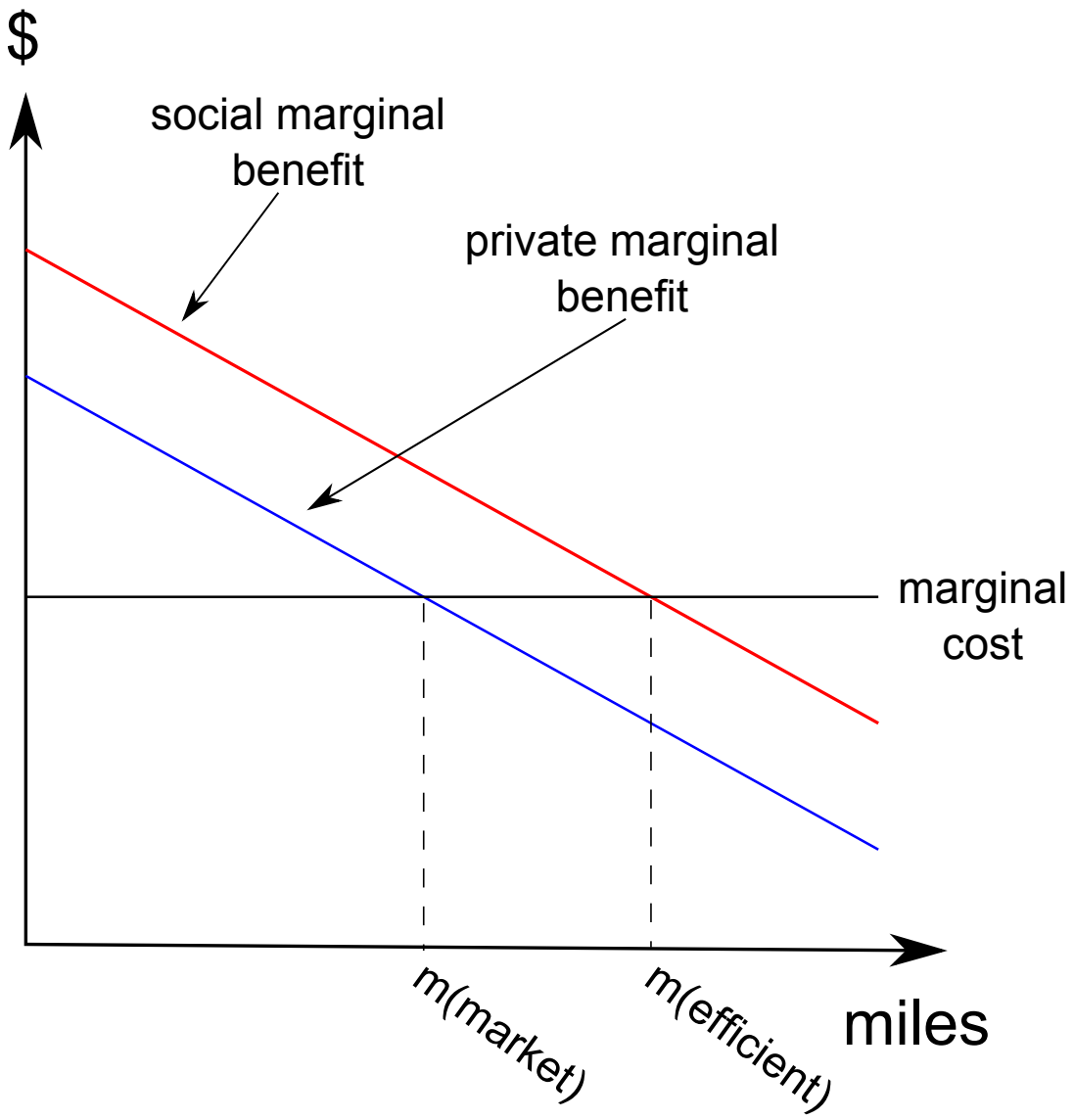
The Evolution of Travel Times



Problems With Developing Transportation

- Transportation without private control leads to a free-rider problem
- Transportation with private control has a couple of problems of its own:
  - Private companies may not be able to acquire the parcels of land needed for a useful transportation system
  - If a privately controlled transportation system can be built, monopoly power will lead to socially inefficient outcomes
  - Even if competitively priced, transportation may be underprovided
- Transportation systems have serious scale issues (it's difficult to start small)

Problems With Developing Transportation



Plan for Studying the Transportation Revolution

- We are going to trace the history of each major transportation advance (roads, canals, steamboats, railroads)
- For each form of transportation, we'll consider the following questions:
  - How was expansion funded?
  - Was it a private or public endeavor?
  - What were the private returns to investment?
  - What were the social returns?
  - How did it reshape the economy?

Roads

Roads

Excerpts from a 1918 publication of the North Carolina Good Roads Association on the reasons for state highways:

- ...the success of the agricultural, industrial, economic and social life of our State depends largely upon transportation...
- ...highways contructed and maintained by the State mean equal rights to all, special priveleges to none...
- ...more and better roads can be built and properly maintained by the State than through hundreds of local units...
- ...every individual in the State of North Carolina will benefit directly or indirectly from a system of public roads and, therefore, should contribute towards their construction...

Roads

- Roads were really, really bad (mudpits, deep ruts, rocks, tree stumps, etc.)
- Maintenance of roads presents classic free rider problems
- An early solution, when roads were maintained by town governments, was a road labor tax
- It became clear that state and local governments weren't up to the task of providing better roads
- An alternative was the private provision of roads: turnpikes

Roads

Excerpt from the compiled Nebraska state statutes:

SEC. 79. [**Allowance for work.**]—The overseer shall allow all persons who may appear in pursuance to such notice and offering to pay their labor tax and three-fourths [of] their road tax in labor, under his direction, the sum of $1.50 for every day he shall actually work eight hours on such road, $1.50 for each yoke of oxen, and $1.50 for each span of horses he shall furnish agreeably to the requirements of the overseer; and for such labor performed the overseer shall give to such person a certificate, which certificate shall be received by the county treasurer in discharge of the labor tax and three-fourths of the road tax of such person as aforesaid. The one-fourth of the road tax shall be paid in cash; *Provided*, That any person who is a resident of the district not notified by the overseer to labor upon the roads as hereinbefore provided, shall be discharged from the payment of said labor tax and three-fourths [of] said road tax.

The Growth of Turnpikes

Turnpikes as a percentage of all business incorporations, 1800-1830

State	All Incorporations	Turnpike Incorporations	Turnpikes as a % of all incorporations
New York	993	339	34
Pennsylvania	428	199	46
New Jersey	190	47	25
Maryland	194	54	28
Connecticut	234	77	33
Rhode Island	127	34	27
Massachusetts and Maine	880	104	12
New Hampshire	304	51	17
Vermont	177	41	23
Total	3527	946	27

The Growth of Turnpikes

Cumulative Turnpike Investment (1800-1830) as % of 1830 GDP

State	Cumulative Turnpike Investment	Turnpike Investment as a % of 1830 GDP
Maine	35,000	0.16
New Hampshire	575,100	2.11
Vermont	484,000	3.37
Massachusetts	4,200,000	7.41
Rhode Island	140,000	1.54
Connecticut	1,036,160	4.68
New Jersey	1,100,000	4.79
New York	9,000,000	7.06
Pennsylvania	6,400,000	6.67
Maryland	1,500,000	3.85
Total	24,470,260	6.15

How Turnpikes Worked

- Most were financed through private stock subscription and structured to pay dividends
- The initial sale of stock provided the funds to build the turnpike, toll receipts would then cover operating expenses
- In practice, little was left over to pay dividends
- The lack of profits is a little misleading
- The social returns were greater than the private returns and many investors cited civic duty as an important reason for the investment

Government Efficiency vs Private Sector Efficiency

A Comparison of Private and Public Ventures

	Pittsburgh Pike	National Road
Route	Pittsburgh to Harrisburg	Maryland to West Virginia to Midwest
Cost per mile	$4,805	$13,455
Maintenance	tolls	government outlays
Financing		
Result	cut freight rates in half between Pittsburgh and Philadelphia	never completed

Problems with Turnpikes

- Turnpikes faced some controversy
- People feared owners abusing monopoly power and objected to paying for something that used to be free
- To keep the public happy, legislators wrote restrictions into turnpike charters
- Examples of these restrictions:
  - Toll gates could be spaced no closer than a specified minimum distance
  - Exemptions from toll payment for particular people
  - Toll and penalty increases required petitioning the legislature
- Even with better roads, land transport was still costly compared to water transport

The End of Toll Roads

- Despite the regulations, many private toll roads were chartered and in use throughout the 19th century
- They were often more successful than government efforts to expand roads
- In the late 1800s, sentiment turned against toll roads
- State and federal governments developed anti-toll road policies
- The network of private toll roads had disappeared by 1920

The End of Tollroads

The Extent of Private Toll Roads

Toll Road Movements	Incorporations	% Successful in Building Road	Roads Built and Operated	Average Road Length	Toll Road Miles Operated
Turnpikes Incorporated from 1792 to 1845	1562	55	859	18	15000
Plank Roads Incorporated from 1845 to 1860	1388	65	902	10	9000
Toll Roads in the West Incorporated from 1850 to 1902	1127	40	450	15	7000
Other	1000	50	500	16	8000
Total	5000-5600	48-60	2500-3200	12-16 miles	30000-52000

Roads - Not Much of a Revolution

- Large investments were made in turnpikes, mainly in the mid-Atlantic states and New England
- While not all that profitable for the investors, the roads did cut travel costs in half
- Turnpikes were typically private endeavors with a slight public twist to them
- Governments were typically unable to finance and maintain roads or were very inefficient at it
- Road transportation still remained costly: it was slow and took up manpower and animal power for an extended period of time
- Roads weren't going to be the transportation revolution the economy was looking for