ANTE BELLUM TRANSPORTATION INDICES

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Abstract

Using pre-Civil War travellers' guides the most commonly used
transportation routes from Philadelphia to twenty nine locations in the U.S.
and Canada are traced for the years 1836, 1849, and 1862. For the different
years, the different modes of transportation (steamboat, stage coach, and
railroad) used on each leg of each path are aggregated, using estimates of the
speed of each mode of transportation (i.e., hours per mile), into indices
measuring the time it took from Philadelphia to the given locations. Also,
indices of the transportation costs from Philadelphia to the given location
are constructed for the various years. In this paper the data used are listed
and explained. The paper is meant to be a user's manual, and an appendix to
other work.

I. Introduction

Ante bellum America experienced a revolution in transportation technology. For example, in 1836 a traveller going from Philadelphia to Jackson, Mississippi would journey 1054 miles by stagecoach, 115 miles be steamboat, and 40 miles by railroad, a total of 1209 miles. The trip would have taken about 15 and one half days and cost about $60.00. In 1862 the traveller leaving Philadelphia for Jackson would have taken the train for 1347 miles, steamboats for 181 miles, and the stagecoach for only 63 miles. The trip would have taken about four days and cost about $63.00 ($56.80 in 1836 dollars). Over the same period a trip from Philadelphia to Boston would have declined in duration by 65 percent to fourteen hours, and the cost would have declined by about ten percent in real terms. In 1836 the trip to Boston would have been exclusively by steamboat. By 1862 the trip would have been entirely by railroad.

These examples illustrate the generalized improvement in transportation during the period of the Free Banking Era, 1839-1860. During this period railroad mileage nationwide increased from approximately 3,000 to about 30,626 miles (Taylor (1951)). The dramatic increase in railway mileage was not only due to network externalities; it also reflected a number of important advances in rail technology. Railroad tracks, railroad beds, railroad cars, and railroad engines all experienced important technological advances. The development of the railroad is documented by Taylor (1951), Fogel (1964), Fishlow (1965), and Flint (1868). General introductions to the history of transportation in pre-civil War America are provided by Dunbar (1915), MacGill, et. al. (1917), Ringwalt (1888), and Taylor (1951). Taylor (1969) supplies a bibliography to further works.

Measurement of technological change in transportation is important for a number of purposes. This paper explains the computation of some indices of transportation times (durations of trips) and transportation costs for the pre-Civil War U.S. In particular, the focus is on the cost and duration of travel from Philadelphia to various other locations in North America during the period 1839-1860. The computed indices are used in Gorton (1989) to study the pricing of Free Banking Era bank notes.

The distances from Philadelphia to a set of other locations were computed using pre-Civil War travellers' guides. For a desired trip the travellers' guides provide the route of travel and also the mode of transportation used for each leg of the journey. Since different modes of transportation vary by cost and speed, these data must be combined with estimates of the costs and speeds of railroads, stage coaches, and steam boats during the ante bellum period to construct the desired indices.

The discussion of the construction of the indices is divided into two sections. First, in Section II below, the information from the travellers' guides is presented and discussed. While various travellers' guides were consulted, the main source was Disturnell's A Guide Between Washington, Baltimore, Philadelphia, New York, Boston, etc. etc. (various years). Disturnell provides the "generally used" travel paths and modes of transportation for journeys throughout North America. Unfortunately, Disturnell, the most complete guide, could only be found for three years 1839, 1849, and 1862. Disturnell also provides some information about the time it took to travel each leg of the journey, and the cost of each leg. This information was useful for the second step. Unfortunately, this information is only sporadically provided.

The second step, corresponding to Section III below, discusses the computation of miles per hour estimates, and cost per mile estimates, for each mode of transportation, at the three dates (1839, 1849, and 1862). This step is much more problematical than the first step since the data consist, for the most part, of only scattered and impressionistic observations. No single source provides a complete picture. Therefore, disparate observations must be aggregated. Here I summarize some of the data used and discuss some of the issues.

Section IV presents the indices, and Section V concludes.

II. The Travellers' Guides

Travel in pre-Civil War America was difficult. Conditions of travel were hard. Even planning a trip was problematic because information was difficult to obtain. According to Dunbar (1915):

> The travel conditions that prevailed throughout the eastern and middle states from about 1840 to 1850 were confusing and chaotic to anyone who had not purchased his knowledge at the cost of experience. There were so many different methods of making any contemplated journey of length, and so many possible conditions to be encountered during its progress that the prospective traveller was often bewildered---despite the advice he received and the innumerable guide books he read---with regard to the most desrirable plan to pursue in reaching his intended destination. (p. 1105)

The situation for the traveller was so confusing that it led to the practice of defrauding the unwary by means of misrepresentation, a situation which became serious enough for the New York State legislature to investigate in 1849. Guide books were a necessity, and thus arose the business of providing information to the traveller through the publication of guide books.

Such guide books are a chief source of data for the indices to be constructed. The travellers' guides provide the route of travel, mode of

travel along the way, distances, and instructions. Sometimes information about food and lodging is also given. Usually the guides list only "generally travelling routes" or the "chief routes of travel," but sometimes multiple routes are listed. When multiple routes were listed, the shortest, most railway intensive route was selected for purposes of constructing the index. The 1862 Disturnell Guide described itself in an advertisement in the following way:

> The travelled routes, comprising the chief railroad and steamboat conveyances, have been so arranged on a plan deemed better adapted to the wants of the traveller than any heretofore presented, all the connections with the more important routes being shown in a way to prevent confusion, and give general satisfaction.
>
> To illustrate, starting from Philadelphia, and going West to Pittsburg, the reader will perceive that, after going over the Pennsylvania Railroad, his attention will be directed to the first railroad connection with it, to wit: the Philadelphia and West Chester Railroad, and subsequently to the second, third, and all other connections; thus enabling the travellers to make detours from a main line of travel without being compelled to seek information other than his Guide Book will give him...."

Unfortunately, there is no easy way to check the accuracy of the Disturnell Guide books. Comparison with a small number of other guide books was not possible because the years did not match.

Tables 1, 2 and 3 summarize the information from Disturnell for 1839, 1849, and 1862. For each year the respective table lists the route from Philadelphia to the specified location, and lists the distance in miles and the mode of transportation. As shown in Table 2, the Guide for 1849 also listed some information on costs and durations of each leg of the various trips. This information is used below. Such information was not provided by the Guides for 1839 and 1862.

The information in Tables 1, 2, and 3 is reproduced exactly as found in Disturnell. The careful reader will note that in a few cases the number of

miles on a particular leg of a journey changes while the mode of transportation does not change. In particular, in a few cases the number of miles for a particular leg of a journey _increases_ over time. These may be errors; they may be the results of improved measurements. Possibly, the length of the trip actually did increase. There was not way to check on these puzzling cases.

Table 4 aggregates the first three tables for each year.

III. Miles Per Hour and Cost Per Mile

In pre-Civil War America there were three main modes of transportation used for the transportation of people: stagecoach, steamboat, and railroad. (Canals were chiefly used by barges carrying commodities rather than people.) In order to construct the indices of trip duration and trip cost, the information in Table 4, must be combined with estimates of the cost per mile of each transportation mode at each date and with estimates of the speed of each transportation mode, hours per mile, at each date. In this section these estimates are discussed.

Unlike the above information about miles by each mode, there is no good single source for speed and cost data. I relied on a combination of primary and secondary sources for many impressionistic and scattered observations. Much of these data are reported here to provide a sense of what is available. Each mode of transportation is briefly discussed in turn.

A) Stagecoaches

Travel by stagecoach was primitive. Travellers were subjected to gruelling long rides, froze, were robbed, attacked by Indians, and often had to push and pull the coaches after the horses died or were hobbled. Coaches were overturned and were blown off bridges by high winds. According to

O'Hanlon's Guide: "The roads over which [the stagecoaches] mostly run are so bad that accidents often occur by upsetting, and the passengers are continually jolted against each other. On some of the remote western routes they are nothing more than covered cabs, and afford little protection against cold winter" (quoted by Dunbar (1937), p. 1112.) See Earle (1900) for other descriptions of stagecoach travel.

According to Taylor (1951) a good stagecoach could travel at an average of about 6 to 8 miles per hour. But that was on a very good road. Most of the improvement in stage travel occurred prior to 1840. Before that date there were technological improvements in road beds, bridges, and stagecoach construction. These improvements are described by Dunbar (1937), Earle (1900), Taylor (1951), and Wood (1919).

For purposes here, however, the main point is that after 1840 there was very little improvement in stagecoach travel. According to Fogel (1964):

> There is no evidence that wagon rates fell over the 50 years leading up to 1890. There were no major innovations in wagon construction nor any marked improvement in roads. Indeed, the money cost...appears to have risen...Taylor states that by the fifties 15 cents [per ton mile] was considered the usual rate on "ordinary highways"...

Wagons are not stagecoaches. (Wagons were slower vehicles used to haul freight.) But, the same technology that was used to build stagecoaches was used to build wagons.

While there may have been no technological improvements in stage construction, or in road construction, the best construction methods did become more widespread. Plank roads and turnpikes increasingly became the norm. Also, there were major improvements in bridge construction. (See Taylor (1951).) Thus, stagecoach costs and speeds varied across different location, not because of technological change, but possibly because of the

diffusion of improvements and road and bridge constuction.

In order to construct the indices, data on stagecoach speeds of travel and costs are required. Table 5 collects some of the relevant data about stagecoach travel. In addition, Table 6 presents some information from Warner's The Immigrant's Guide and Citizen's Manual (1848). Also, as previously mentioned, Table 2 provides some information. The data presented in these tables are essentially the only kind of information available. (There is much more information about stagecoach travel for the early part of the century.)

The duration and cost of trips using stagecoach varies greatly depending on the condition of the roadway. Roads may vary from plank turnpikes to barely passable dirt and mud. Thus, the number provided, for example, in Table 6 for cost per mile may be relatively high since those routes include many of the most traveled. This kind of consideration makes computation of cost per mile and miles per hour very difficult. Stagecoach travel is only a small part of any trip by 1862 so data on this later date are less important.

B) Steamboats

Steamboats greatly speeded up water travel. The steamboat was made commercially feasible by Robert Fulton in the second decade of the nineteenth century. By 1830 the steamboat was the dominant mode of river transportation. Steamboat travel was not easy; it was fraught with difficulties and dangers. According to Taylor (1951):

> Steam navigation of western rivers presented serious and unusual hazards. The level of water in the rivers was subject to exceedingly wide and sudden fluctuations. At Cincinnati the spread between high and low water might vary forty feet or more within a few weeks. Steamboats, often tied up for lack of water in summer months, had to combat the roaring floods of fall and apring. Ice which closed the river to

navigation in winter became a floating menace when the spring moved
northward, freeing temendous flows in sucessive tributaries. Extended
periods of low water made ledges and rock and sand bars a dreaded threat;
to these must be added the greatest menace of all, the snags. Great
trees thrown into the water by constantly crumbling banks became caught
in the river bed where, year in and year out, they caused more damage to
steamboats than any other single cause. Of steamboats lost in western
rivers, 1811-1851, more than 40 percent were destroyed by snags or
similar obstructions. And of all western steamboats built before 1849,
nearly 30 percent were lost in accidents of one kind or another.
(p. 65-6)

Further background on steamboats is provided by Taylor (1951) and Hunter
(1949).

Fishlow (1972) writes that steamboats had an average speed of 10 miles an
hour, and when travelling south averaged around 15 miles an hour. Further
information on steamboat speeds and costs are provided in Table 2, Table 5,
and Table 7. In Table 7 the costs and durations of trips include steamboat
and canal, and therefore, are likely to be slower and cheaper than trips by
steamboat alone.

C) Railroads

Improvements in roads, stagecoaches, and steamboats helped reduce the
costs and durations of trips. But, the transportation revolution was fomented
by the advent of a very cheap, fast, and flexible method of travel: the
railroad. The first railroad constructed for general transportation purposes
began operation in England in 1825. The first American railroad was
operating in 1826. By 1860 there was over 30,000 miles of track in the
U.S. The diffusion of railroads across the U.S. has been intensively
studied. See Adams (1878), Taylor (1951), Fogel (1964) and Fishlow (1965).
Most of the improvement in the transportation system during the pre-Civil War
period was due to the introduction of the railroad.

Railroad costs differed significantly between the North and South. Thus,

Taylor (1951) writes:

> Almost from the beginning, railroads provided the fastest known method of passenger transportation. Early speeds of 10 to 15 miles an hour were about doubled, so that by 1860 a speed of 20 miles was not uncommon for the better roads, some averaging 25 to 30 miles ah hour. Passenger fares, though still appreciably higher than those by water, were fairly low during the late forties and the fifties. In 1848 rates a mile averaged 3 cents or less in New England, 2.5 to 3.5 cents in New York, less than 4.5 in the West, and 4 to 5 cents in the South. By the middle fifties they appear to have been slightly lower. (p. 144)

Further information about railroad speeds and costs is contained in Table 2, Table 8, and Table 9. Table 8 provides some information from James' Rail-Road and Route Book for the Western and Southern States (1853). Table 9 presents selected information from Appleton's Illustrated Railway and Steam Navigation Guide (1862). These data provide the basis for construction of the indices.

IV. The Indices

There is no way to be completely accurate in combining the disparate and incomplete data on speeds and costs presented above. Any choice of figures is somewhat arbitrary since aggregation of the disparate data is difficult. No attempt is made here to defend one set of cost or speed estimates. Readers should be aware of the difficulties and users should experiment with a variety of numbers.

Table 10 provides one set of cost per mile and miles per hour numbers. The entries in Table 10 are based on the observations presented above, but do not aggregate the observations in any formal way. The table, however, makes use of the following stylized facts. First, most of the change in transportation technology and most of the improvement occurred in rail travel. But, secondly, costs for trains were different between the North and East and, on the other hand, the South and West. Thirdly, there was

relatively little change in steam and stagecoach technologies. Changes in costs and speeds were less dramatic for these modes of transportation.

Indices are constructed by combining Tables 4 and 10. (Miles per hour must be converted to hours per mile.) Table 11 computes Pearson correlation coefficients for the indices. In Table 11 COST refers to the index of transportation costs which weights the miles by each mode from Table 4 by the costs given in Table 10. TIME weights the miles by each mode given in Table 4 with the hours per mile numbers given in Table 10. Finally, DIST refers to the distance in miles which one would drive today, unweighted by cost per mile or by hours per mile.

The basic conclusion that emerges from Table 11 is that all the indices are highly correlated. The costs and times associated with each mode of transportation, from Table 10, vary little. Distance, itself, seems to be the determining factor. This is true even if the numbers in Table 10 are varied within reasonable bounds suggested by the discussion in Section III. This result is not surprising since trips which take longer are likely to cost more. And longer trips are likely to take longer.

A potentially important problem with the indices is that there is no way to accurately take into account the cross location variation in costs and times for a given mode of transportation. For example, stagecoach and steamboat travel costs and times vary by route due to seasonal differences. Southern rivers do not freeze, making steamboat travel possible all year, whereas this is not the case in the North. Similarly, stagecoach travel is seasonal. In addition, road and bridge construction was more advanced in the North and East compared to other regions. These differences are not taken account of on a trip by trip basis.

V. Conclusion

Using pre-Civil War travellers' guides, the most commonly used transportation routes from Philadelphia to twenty nine locations in the U.S. and Canada were traced for the years 1836, 1849, and 1862. For the different years, the different modes of transportation (steamboat, stagecoach, and railroad) used on each leg of each path were aggregated, using estimates of the speed of each mode of transportation (i.e., hours per mile), into indices measuring the time it took from Philadelphia to the given locations. Also, indices of the transportation costs from Philadelphia to the given location were constructed for the various years. The resulting indices are high correlated with each other and with the raw distance using current highways.

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TABLE 1

Chief Routes of Travel, 1836

Destination	Distance (Miles)	Mode of Transportation
1. To Richmond, VA		
Philadelphia to Baltimore	115	Steamboat
Baltimore to Washington	40	Railroad
Washington to Potomac Creek	50	Steamboat
Potomac Creek to Richmond	77	Stagecoach
2. To Montpelier, VT		
Philadelphia to New York	87	Steamboat
New York to Albany	145	Steamboat
Albany to Montpelier	160	Stagecoach
3. To Memphis, TN		
Philadelphia to Baltimore	115	Steamboat
Baltimore to Wheeling	279	Stagecoach
Wheeling to Louisville	495	Steamboat
Louisville to Nashville	524	Steamboat
Nashville to Memphis	239	Stagecoach
4. To Providence, RI		
Philadelphia to New York	87	Steamboat
New York to New Haven	76	Steamboat
New Haven to Hartford	37	Stagecoach
Hartford to Providence	69	Stagecoach
5. To Pittsburg, PA		
Philadelphia to Pittsburg	223	Stagecoach
	82	Railroad
6. To Harrisburg, PA		
Philadelphia to Lancaster	70	Railroad
Lancaster to Harrisburg	31	Stagecoach
7. To Lancaster, PA		
Philadelphia to Lancaster	70	Railroad

TABLE 1 (continued)

Chief Routes of Travel, 1836

Destination	Distance (Miles)	Mode of Transportation
8. To Cincinnati, OH		
Philadelphia to Pittsburg	223/82	Stagecoach/Railroad
Pittsburg to Beaver	28	Stagecoach
Beaver to Lower Sandusky	197	Stagecoach
Lower Sandusky to Cincinatti	195	Stagecoach
9. To Trenton, NJ		
Philadelphia to Trenton	28	Stagecoach
10. To Concord, NH		
Philadelphia to New York	87	Steamboat
New York to Boston	228	Steamboat
Boston to Concord	64	Stagecoach
11. To Baltimore, MD		
Philadelphia to Baltimore	115	Steamboat
12. To Jackson, MS		
Philadelphia to Baltimore	115	Steamboat
Baltimore to Washington	40	Railroad
Washington to Columbus	920	Stagecoach
Columbus to Jackson	134	Stagecoach
13. To Detroit, MI		
Philadelphia to Pittsburg	223/82	Stagecoach/Railroad
Pittsburg to Beaver	28	Stagecoach
Beaver to Lower Sandusky	199	Stagecoach
Lower Sandusky to Detroit	102	Stagecoach
14. To Boston, MA		
Philadelphia to New York	87	Steamboat
New York to Boston	228	Steamboat

TABLE 1 (continued)

Chief Routes of Travel, 1836

Destination	Distance (Miles)	Mode of Transportation
15. To Springfield, MA		
Philadelphia to New York	87	Steamboat
New York to Boston	228	Steamboat
Boston to Springfield	138	Railroad
16. To Portland, ME		
Philadelphia to New York	87	Steamboat
New York to Boston	228	Steamboat
Boston to Concord	64	Stagecoach
Concord to Portsmouth	50	Stagecoach
Portsmouth to Portland	54	Stagecoach
17. To New Orleans, LA		
Philadelphia to Pittsburg	223/82	Stagecoach/Railroad
Pittsburg to New Orleans	2003	Steamboat
18. To Indianapolis, IN		
Philadelphia to Pittsburg	223/82	Stagecoach/Railroad
Pittsburg to Beaver	28	Stagecoach
Beaver to Lower Sandusky	199	Stagecoach
Lower Sandusky to Cincinatti	195	Stagecoach
Cincinatti to Indianapolis	112	Stagecoach
19. To Chicago, IL		
Philadelphia to Pittsburg	223/82	Stagecoach/Railroad
Pittsburg to Beaver	28	Stagecoach
Beaver to Lower Sandusky	199	Stagecoach
Lower Sandusky to Detroit	102	Stagecoach
Detroit to Chicago	286/711	Stagecoach/Steamboat

TABLE 1 (continued)

Chief Routes of Travel, 1836

Destination	Distance (Miles)	Mode of Transportation
20. To Savannah, GA		
Philadelphia to Baltimore	115	Steamboat
Baltimore to Washington	110	Railroad
Washington to Richmond	127	Stagecoach
Richmond to Raleigh	169	Stagecoach
Raleigh to Charleston	258	Stagecoach
Charleston to Savannah	111	Stagecoach
21. To Wilmington, DE		
Philadelphia to Wilmington	28	Stagecoach
22. To Hartford, CT		
Philadelphia to New York	87	Steamboat
New York to New Haven	76	Steamboat
New Haven to Hartford	37	Stagecoach
23. To Little Rock, AR		
Philadelphia to Baltimore	115	Steamboat
Baltimore to Washington	40	Railroad
Washington to Memphis	844	Stagecoach
Memphis to Montgomery's Point	154	Steamboat
Montgomery's Point to Little Rock	286	Stagecoach (assumed)
OR		
Philadelphia to Memphis (see #3)		
Memphis to Montgomery's Point		
Montgomery's Point to Little Rock		

TABLE 1 (continued)

Chief Routes of Travel, 1836

Destination	Distance (Miles)	Mode of Transportation
24. To Mobile, AL		
Philadelphia to Baltimore	115	Steamboat
Baltimore to Washington	40	Railroad
Washington to Milton	247	Stagecoach
Milton to Yorkville	197	Stagecoach
Yorkville to Abbeville	106	Stagecoach
Abbeville to Milledgeville	115	Stagecoach
Milledgeville to Columbus	133	Stagecoach
Columbus to Mobile	283	Stagecoach
25. To Charleston, SC		
Philadelphia to Baltimore	115	Steamboat
Baltimore to Washington	40	Railroad
Washington to Richmond	127	Stagecoach
Richmond to Raleigh	169	Stagecoach
Raleigh to Charleston	258	Stagecoach
OR (from New York)		
Philadelphia to New York	± 87	Steamboat
New York to Charleston	900	Steamboat
26. To Washington, DC		
Philadelphia to Baltimore	115	Steamboat
Baltimore to Washington	40	Railroad

TABLE 1 (continued)

Chief Routes of Travel, 1836

Destination	Distance (Miles)	Mode of Transportation
27. To Louisville, KY		
Philadelphia to Cincinnati (see #8)		
Cincinnati to Lexington	88	Stagecoach
Pittsburg to Louisville	587	Steamboat
OR		
Baltimore to Wheeling	277	Railroad
Wheeling to Louisville	495	Steamboat
28. To Tallahassee, FL		
Philadelphia to Savannah (see #20)		
Savannah to Jacksonville	230	Steamboat
Jacksonville to Mobile	xxx	xxxxxxxx
Mobile to Tallahassee	493	Steamboat
29. To Canada		
Philadelphia to Albany (see #2)		
Albany to Saratoga Springs	32 1/2	Railroad
Saratoga Springs to While Hall	37 1/2	Stagecoach
White Hall to Montreal	182	Steamboat
Montreal to Quebec	170	Steamboat

TABLE 2

Chief Routes of Travel, 1849

Destination	Distance (Miles)	Mode of Transportation
1. To Richmond, VA		
Philadelphia to Baltimore (6hrs., $3)	97	Railroad
Baltimore to Washington ($1.80)	40	Railroad
Washington to Richmond ($5.50)	120	Railroad
2. To Montpelier, VT		
Philadelphia to New York ($3.00)	90	Railroad
New York to Albany	151/160	Steamboat/Stagecoach
OR		
New York to Bridgeport	63	Steamboat
Bridgeport to Albany	136	Railroad
Albany to Montpelier	156	Stagecoach
3. To Memphis, TN		
Philadelphia to Charleston	682	Railroad/Steamboat[a]
Charleston to Kingston	367	Railroad
Kingston to Gunter's Landing	99	N/A[b]
Gunter's Landing to Decatur	58	Steamboat
Decatur to Tuscumbia	44	Railroad
Tuscumbia to Memphis	163	Stagecoach
4. To Providence, RI		
Philadelphia to New York ($3.00)	90	Railroad
New York to Greenport	96	Railroad
Greenport to Allyn's Point	32	Steamboat
Allyn's Point to Boston	110	Railroad
Boston to Providence ($1.25)	42	Railroad

[a]This was assumed to have been 341 miles by railroad and 341 miles by steamboat.

[b]Assumed to have been stagecoach.

TABLE 2 (continued)

Chief Routes of Travel, 1849

Destination	Distance (Miles)	Mode of Transportation
5. To Pittsburg, PA		
Philadelphia to York	158	Railroad
York to Pittsburg	151	Stagecoach
OR		
Philadelphia to Harrisburg ($4.00)	106	Railroad
Harrisburg to Holidaysburg	146	Canal
Holidaysburg to Johnstown	36	Railroad
Johnstown to Pittsburg	104	Canal
6. To Harrisburg, PA		
Philadelphia to Harrisburg ($4.00)	106	Railroad
7. To Lancaster, PA		
Philadelphia to Lancaster	70	Railroad
8. To Cincinnati, OH		
Philadelphia to Pittsburg (see #5)		
Pittsburg to Cincinatti (3 days, $5)	460	Steamboat
9. To Trenton, NJ		
Philadelphia to Tacony	8	Steamboat
Taconey to Trenton	22	Railroad
10. To Concord, NH		
Philadelphia to Boston (see #4)	328	
Boston to Concord	75	Railroad
11. To Baltimore, MD		
Philadelphia to Baltimore (6 hrs., $3)	97	Railroad

TABLE 2 (continued)

Chief Routes of Travel, 1849

Destination	Distance (Miles)	Mode of Transportation
12. To Jackson, MS		
Philadelphia to Memphis (see #3)	1412	
Memphis to Jackson	253	Stagecoach
13. To Detroit, MI		
Philadelphia to New York (6 hrs., $3)	90	Railroad
New York to Buffalo (2 days, $13)	471	Steamboat/Railroad[a]
Buffalo to Sandusky (1 day, $6)	252	Steamboat
Sandusky to Detroit (8 hrs., $2)	73	Steamboat
14. To Boston, MA		
Philadelphia to New York (6hrs., $3)	90	Railroad
New York to Greenport	96	Railroad
Greenport to Allyn's Point	32	Steamboat
Allyn's Point to Boston	110	Railroad
15. To Springfield, MA		
Philadelphia to New York (6 hrs., $3)	90	Railroad
New York to New Haven	75	Railroad
New Haven to Hartford ($1.12)	36	Railroad
Hartford to Springfield ($0.50)	26	Railroad
16. To Portland, ME		
Philadelphia to Boston (see #14)		
Boston to Portland ($2.00)	105	Railroad

[a]236 miles assumed railroad; 235 miles assumed steamboat.

TABLE 2 (continued)

Chief Routes of Travel, 1849

Destination	Distance (Miles)	Mode of Transportation
17. To New Orleans, LA		
Philadelphia to Pittsburg (see #5)		
Pittsburg to Cincinatti (3 days, $5)	460	Steamboat
Cincinatti to New Orleans (7 days, $12.50)	1588	Steamboat
OR		
Philadelphia to Charleston (56 hrs., $21)	682	N/A
Charleston to Montgomery (52 hrs., $26.50)	510	N/A
Montgomery to Mobile (48 hrs., $6-$10)	327	Steamboat
OR		
Montgomery to Mobile (40 hrs., $8)	205	Stagecoach
Mobile to New Orleans (20 hrs., $5)	178	Railroad
18. To Indianapolis, IN		
Philadelphia to Cincinatti (see #8)		
Cincinatti to Indianapolis	110	Stagecoach
19. To Chicago, IL		
Philadelphia to Detroit (see #13)		
Detroit to Chicago (3 days, $10)	720	Steamboat
OR		
Detroit to Niles	218	Railroad
Niles to Michigan City	54	Stagecoach
Michigan City to Chicago	60	Stagecoach
20. To Savannah, GA		
Philadelphia to Charleston (56 hrs., $21)	682	Railroad/Steamboat
Charleston to Savannah	106	Steamboat
21. To Wilmington, DE		
Philadelphia to Wilmington	28	Railroad

TABLE 2 (continued)

Chief Routes of Travel, 1849

Destination	Distance (Miles)	Mode of Transportation
22. To Hartford, CT		
Philadelphia to New York (6 hrs. $3)	90	Railroad
New York to New Haven	75	Railroad
New Haven to Hartford	36	Railroad
23. To Little Rock, AR		
Philadelphia to Memphis (see #3)		
Memphis to Little Rock	150	Stagecoach
24. To Mobile, AL		
Philadelphia to Charleston (see #20)	682	
Charleston to Montgomery (52 hrs., $26.50)	510	N/A
Montgomery to Mobile (48 hrs., $6-$10)	327	Steamboat
25. To Charleston, SC		
Philadelphia to Charleston (56 hrs., $21)	682	N/A
26. To Washington, DC		
Philadelphia to Baltimore (6 hrs., $3)	97	Railroad
Baltimore to Washington ($1.80)	40	Railroad

TABLE 2 (continued)

Chief Routes of Travel, 1849

Destination	Distance (Miles)	Mode of Transportation
27. To Lexington, KY		
Philadelphia to Cincinnati (see #8)		
Cincinnati to Lexington	84	Stagecoach
28. To Tallahassee, FL		
Philadelphia to Savannah (see #20)		
Savannah to Jacksonville	234	Steamboat
Jacksonville to Mobile	xxx	xxxxxxxx
Mobile to Tallahassee	285	Stagecoach
29. To Canada		
Philadelphia to New York	90	Railroad
New York to Albany	145	Steamboat
Albany to Saratoga Springs	36	Railroad
Saratoga Springs to While Hall	38	Stagecoach
White Hall to Rowse's Point	134	Steamboat
Rowse's Point to Montreal	47	Steamboat
Montreal to Quebec	180	Steamboat

TABLE 3

Chief Routes of Travel, 1862

Destination	Distance (Miles)	Mode of Transportation
1. To Richmond, VA		
Philadelphia to Baltimore	98	Railroad
Baltimore to Washington	40	Railroad
Washington to Acquia Creek	55	Steamboat
Acquia Creek to Richmond	75	Railroad
2. To Montpelier, VT		
Philadelphia to Tacony	8	Steamboat
Tacony to New York	79	Railroad
New York to Albany	144	Railroad
Albany to Rutland	96	Railroad
Rutland to Burlington	100	Railroad[a]
Burlington to Montpelier	50	Railroad[a]
3. To Memphis, TN		
Philadelphia to Washington	138	Railroad
Washington to Acquia Creek	55	Steamboat
Acquia Creek to Chattanooga	921	Railroad
Chattanooga to Stephenson	38	Railroad
Stephenson to Decatur	126	Steamboat
Decatur to Tuscumbia	43	Railroad
Tuscumbia to La Grange	63	Stagecoach
La Grange to Memphis	50	Railroad
4. To Providence, RI		
Philadelphia to Boston	323	Railroad
Boston to Providence	43	Railroad
5. To Pittsburg, PA		
Philadelphia to Pittsburg	353	Railroad
6. To Harrisburg, PA		
Philadelphia to Harrisburg	104	Railroad

[a]These are guesses based on maps.

TABLE 3 (continued)

Chief Routes of Travel, 1862

Destination	Distance (Miles)	Mode of Transportation
7. To Lancaster, PA		
Philadelphia to Lancaster	68	Railroad
8. To Cincinnati, OH		
Philadelphia to Pittsburg	353	Railroad
Pittsburg to Cincinatti	460	Steamboat
9. To Trenton, NJ		
Philadelphia to Trenton	29	Railroad
10. To Concord, NH		
Philadelphia to Boston	323	Railroad
Boston to Concord	75	Railroad[a]
11. To Baltimore, MD		
Philadelphia to Baltimore	98	Railroad
12. To Jackson, MS		
Philadelphia to Memphis (see #3)		
Memphis to Jackson	200	Railroad[b]
13. To Detroit, MI		
Philadelphia to Cleveland	492	Railroad
Cleveland to Detroit	140	Steamboat
14. To Boston, MA		
Philadelphia to Boston	323	Railroad
15. To Springfield, MA		
Philadelphia to New York	87	Steamboat
New York to New Haven	76	Railroad
New Haven to Springfield	62	Railroad

[a]Assuming railroad from 1849 existed (map shows it).
[b]Guess (according to map).

TABLE 3 (continued)

Chief Routes of Travel, 1862

Destination	Distance (Miles)	Mode of Transportation
16. To Portland, ME		
Philadelphia to Boston	323	Railroad
Boston to Portland	112	Railroad
17. To New Orleans, LA		
Philadelphia to Washington	138	Railroad
Washington to Acquia Creek	55	Steamboat
Acquia Creek to Montgomery	954	Railroad
Montgomery to Stockton	168	Stagecoach
Stockton to Mobile	37	Steamboat
Mobile to Lower Poncharitrain	154	Steamboat
Lower Poncharitrain to New Orleans	4	Railroad
18. To Indianapolis, IN		
Philadelphia to Pittsburg	355	Railroad
Pittsburg to Cincinatti	460	Steamboat
Cincinatti to Indianapolis	112	Railroad
19. To Chicago, IL		
Philadelphia to Chicago	865	Railroad
20. To Savannah, GA		
Philadelphia to Charleston	730	Railroad
Charleston to Savannah	206	Railroad
21. To Wilmington, DE		
Philadelphia to Wilmington	28	Railroad

TABLE 3 (continued)

Chief Routes of Travel, 1862

Destination	Distance (Miles)	Mode of Transportation
22. To Hartford, CT		
Philadelphia to New York	87	Railroad
New York to New Haven	76	Railroad
New Haven to Hartford	36	Railroad
23. To Little Rock, AR		
Philadelphia to Memphis (see #3)		
Memphis to Little Rock	150	Railroad[a]
24. To Mobile, AL		
Philadelphia to Washington	138	Railroad
Washington to Acquia Creek	55	Steamboat
Acquia Creek to Montgomery	954	Railroad
Montgomery to Stockton	168	Stagecoach
Stockton to Mobile	37	Steamboat
25. To Charleston, SC		
Philadelphia to Charleston	730	Railroad
26. To Washington, DC		
Philadelphia to Washington	138	Railroad
27. To Lexington, KY		
Philadelphia to Louisville	854	Railroad
Louisville to Lexington ($3.10)	94	Railroad
28. To Tallahassee, FL		
Same as 1849		

[a]Guess (map shows railroad).

TABLE 3 (continued)

Chief Routes of Travel, 1862

Destination	Distance (Miles)	Mode of Transportation
29. To Canada		
(1) Philadelphia to New York	87	Railroad
New York to Troy	150	Railroad
Troy to White Hall	72	Railroad
White Hall to Rowse's Point	152	Railroad
Rowse's Point to Montreal ($2)	42	Railroad
Montreal to Richmond	74	Railroad
Richmond to Quebec	97	Railroad
(2) New York to Buffalo ($3.50)	419	Railroad
Buffalo to Goderich	160	Railroad
(3) Philadelphia to Niagra Falls	438	Railroad
Niagra Falls to Windsor ($7)	229	Railroad
(4) Philadelphia to Burlington (see #2)		
Burlington to Toronto	39	Railroad
30. Milwaukee, WI		
Philadelphia to Chicago (see #19)		
Chicago to Milwaukee ($2.50)	72	Railroad

TABLE 4

Total Miles by Mode of Travel and Destination, 1836

Destination	Miles by Steamboat	Miles by Stagecoach	Miles by Railroad
Richmond, VA	165	77	40
Montpelier, VT	232	160	0
Memphis, TN	1134	518	0
Providence, RI	163	106	0
Pittsburg, PA	0	223	82
Harrisburg, PA	0	31	70
Lancaster, PA	0	0	70
Cincinnati, OH	0	643	82
Trenton, NJ	0	28	0
Concord, NH	315	64	0
Baltimore, MD	115	0	0
Jackson, MS	115	1054	40
Detroit, MI	0	552	82
Boston, MA	315	0	0
Springfield, MA	--	--	--
Portland, ME	315	168	0
New Orleans, LA	2003	223	82
Indianapolis, IN	0	757	82
Chicago, IL	0	838	82
Savannah, GA	115	665	40
Wilmington, DE	0	28	0
Hartford, CT	163	37	0
Little Rock, AR	269	1130	40
Mobile, AL	115	1081	40
Charleston, SC	115	594	40
Washington, DC	115	0	40
New York, NY	87	0	0
Albany, NY	232	0	0

TABLE 4 (continued)

Total Miles by Mode of Travel and Destination, 1849

Destination	Miles by Steamboat	Miles by Stagecoach	Miles by Railroad
Richmond, VA	55	0	202
Montpelier, VT	145	156	90
Memphis, TN	399	262	752
Providence, RI	32	0	338
Pittsburgh, PA	0	151	158
Harrisburg, PA	0	0	106
Lancaster, PA	0	0	70
Cincinnati, OH	460	202	95
Trenton, NJ	8	0	22
Concord, NH	32	0	371
Baltimore, MD	0	0	97
Jackson, MS	399	515	752
Detroit, MI	560	0	326
Boston, MA	125	0	180
Springfield, MA	0	0	227
Portland, ME	125	0	290
New Orleans, LA	2048	151	158
Indianapolis, IN	460	312	95
Chicago, IL	1280	104	544
Savannah, GA	445	0	341
Wilmington, DE	0	0	28
Hartford, CT	0	0	201
Little Rock, AR	399	412	752
Mobile, AL	668	510	341
Charleston, SC	341	0	341
Washington, DC	0	0	137
New York, NY	0	0	90
Albany, NY	145	0	90

TABLE 4 (continued)

Total Miles by Mode of Travel and Destination, 1862

Destination	Miles by Steamboat	Miles by Stagecoach	Miles by Railroad
Richmond, VA	55	0	213
Montpelier, VT	8	0	469
Memphis, TN	175	63	1190
Providence, RI	0	0	366
Pittsburgh, PA	0	0	353
Harrisburg, PA	0	0	104
Lancaster, PA	0	0	68
Cincinnati, OH	460	0	353
Trenton, NJ	0	0	29
Concord, NH	0	0	398
Baltimore, MD	0	0	98
Jackson, MS	175	63	1390
Detroit, MI	140	0	492
Boston, MA	0	0	323
Springfield, MA	0	0	225
Portland, ME	0	0	435
New Orleans, LA	246	168	1096
Indianapolis, IN	460	0	465
Chicago, IL	0	0	865
Savannah, GA	0	0	936
Wilmington, DE	0	0	28
Hartford, CT	0	0	199
Little Rock, AR	175	63	1340
Mobile, AL	92	168	1092
Charleston, SC	0	0	730
Washington, DC	0	0	138
New York, NY	0	0	87
Albany, NY	0	0	231

TABLE 5

Early Travel Information

Year	Destination	Time	Cost [$/mile]	Distance
A. Stagecoach Information				
1802†	Boston to New York New York to Philadelphia Philadelphia to Charleston Charleston to Savannah	4 days 1 1/2 days 15 days 2 days	$10.00 ⎤ $5.00 ⎬ $50.00 ⎥ $5.00 ⎦ $70.00 + $25.00 (lodging) $95.00 [$.079]	Total of 1200 miles averaging 53 miles each day
1819†	Bordentown to New York		$1.00	
1822†	Providence to Boston	4 hrs., 50 mins.	$2.50 [$.0625]	40 miles
1832†	Boston to New York	41 hrs. (nonstop)	$11.00	
1832†	Philadelphia to New York	14 hrs.	$6.00 [$.067]	90 miles[1]
1829‡	Boston to Albany Boston to Worcester Boston to Portland Boston to Providence		$6.00 [$.03] $2.00[2] $8.00 $2.50[2]	200 miles
1812‡	Philadelphia to Pittsburg	6 days	$20.00 (fare) $7.00 (expenses) $27.00 [$.09]	297 miles
1844†	Baltimore to Frederick Frederick to Hagerstown Hagerstown to Cumberland Cumberland to Uniontown Uniontown to Washington Washington to Wheeling		$2.00 $2.00 $5.00 $4.00 $2.25 $2.00	

† Source: Dunbar, Seymour, History of Travel in America, New York, 1937.

‡ Source: A. M. Earle, Stage Coach and Tavern Days, New York, 1900.

[1]Note: in snow, on sleigh.
[2]Note: Railroad opened in 1835.

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TABLE 5 (continued)

Early Travel Information

Year	Destination	Time	Cost [$/mile]	Distance
A. Stagecoach Information				
1846†	Montgomery to Mobile	36 hours	$10.00 [$.05]	200 miles
1848†	Philadelphia to Pittsburg		$15.00 [$.05]	300 miles
	Philadelphia to Baltimore		$3.00 [$.023]	128 miles
	Baltimore to Wheeling		$12.00 [$.044]	271 miles
	Pittsburg to Wheeling		$4.00 [$.068]	59 miles
	Mobile to New Orleans		$12.00 [$.075]	160 miles
B. Steamboat Information				
1821†	Buffalo to Detroit	3 days	$18.00	
1835†	Providence to New York	12 hours		
1848†	Baltimore to Richmond		$10.00 [$.026]	378 miles
C. Railroad Information				
1835†	Boston to Worchester	2 1/2-3 hours	$1.50 [$.034]	44 miles
1839†	New York to Philadelphia		$4.00	

†Source: Dunbar, Seymour, History of Travel in America, New York, 1937.

TABLE 6

Stagecoach Cost Per Mile, 1848

From	Distance (miles)	Cost	Cost per Mile
1. Philadelphia to Pittsburg	300	$15.00	.05
2. Philadelphia to Baltimore	128	3.00	.023
3. Baltimore to Wheeling	271	12.00	.044
4. Pittsburg to Wheeling	59	4.00	.068
5. Wheeling to Columbus	140	8.00	.057
6. Columbus to Cleveland	177	10.50	.059
7. Columbus to Cincinnati	110	6.50	.059
8. Cincinnati to Lexington	76	4.50	.059
9. Indianapolis to Madison	86	4.00	.047
10. Lexington to Louisville	75	4.20	.056
11. Louisville to St. Louis	276	15.50	.056
12. Louisville to Nashville	180	12.00	.067
13. Richmond to Knoxville	444	28.50	.064
14. Baltimore to Richmond	378	10.00	.026
15. Nashville to Memphis	224	15.00	.067
16. Augusta to Montgomery	300	18.50	.062
17. Tuscaloosa to Mobile	676	12.00	.018
18. Montgomery to Mobile	180	12.00	.067
19. Mobile to New Orleans	160	12.00	.075
20. St. Augustine to New Orleans	600	35.00	.058
Average			.054

Source: I. W. Warner, The Immigrant's Guide and Citizen's Manual (New York, 1848).

TABLE 7

Steamboat Cost Per Mile and Miles Per Hour, 1848

From	Distance (miles)	Time Consumed*	Cost*	Cost per Mile	Miles per Hour
1. New York to Utica	255	2.5 days	$1.50	.006	4.25
2. New York to Buffalo	508	7.75 days	3.00	.006	2.70
3. New York to Cleveland	700	9 days	5.50	.008	3.24
4. New York to Zanesville, OH	867	11.25 days	7.62	.009	3.21
5. New York to Portsmouth, OH	1,010	13 days	8.75	.009	3.24
6. New York to Detroit	825	10 days	5.75	.007	3.44
7. New York to Milwaukee	1,480	14 days	9.00	.006	4.41
8. New York to Chicago	1,520	14.5 days	9.00	.006	4.37
9. New York to Pittsburg	480	7.5 days	NA	NA	2.67
10. New York to Cincinnati	937	15 days	8.25	.009	2.60
Average				.0073	3.44

*By Steamboat and Canal.

Source: I. W. Warner, The Immigrant's Guide and Citizen's Manual (New York, 1848).

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TABLE 8

Railroad Cost Per Mile and Miles Per Hour, 1853

From	Distance (miles)	Time Consumed	Cost	Cost per Mile	Miles per Hour
1. Cincinnati to Cleveland	254	11 hours	$ 7.00	.028	23.1
2. Cincinnati to Chicago	571	30 hours	11.00	.019	19.0
3. Cincinnati to Indianapolis	177	9 hours	4.00	.023	19.67
4. Cincinnati to Springfield, IL	399	about 30 hours	14.00	.036	13.13
5. Cincinnati to Charleston, SC	919	5 or 6 days	35.20	.038	6.96
6. Chicago to St. Louis	407	24 hours	7.00	.017	16.96
7. Indianapolis to Cleveland	431	about 30 hours	11.00	.026	14.37
8. Louisville to St. Louis	570	[by steamboat]	18.00	.032	NA
9. Louisville to Chicago	977	3 days	17.00	.017	13.57
10. Nashville to Chicago	844	3 1/2 days	17.00	.020	10.05
11. Lafayette to Indianapolis	63	4 hours	3.85	.060	15.75
12. Detroit to Chicago	277	12 hours	7.00	.025	23.08
13. Atlanta to Chattanooga	140	10 hours	4.20	.03	14.0
14. Macon, GA to Atlanta	101	8 hours	4.00	.04	12.63
15. Savannah, GA to Macon	191	16 hours	5.75	.03	11.94
Average				.029	15.3

Source: James' Rail-Road and Route Book for the Western and Southern States, compiled by J. Griswold (Cincinnati, 1853).

7.45.1

TABLE 9

1862 Travel Information

Destination	Distance (miles)	Cost*	¢ per mile	Time	Miles per Hour
1. New York to Buffalo	290	$6.00	.021	12 1/2 hrs.	23.2
New York to Corning	142	$3.50	.025	7 hrs.	20.3
Corning to Buffalo	76	$1.65	.03	2 hrs., 50 min.	26.9
2. New York to New Haven	230	N/A	--	8 hrs., 50 min.	26
3. New York to Boston	87				
4. New York to Philadelphia					
Express	87	$3.00	.034	4 hrs.	21.75
Local	87	$2.00	.023	6 hrs.	14.5
5. Boston to Providence	43	--	--	1 1/2 hrs.	28.7
6. Philadelphia to Pittsburg	356	$10.00	.03	14 hrs.	25.4
7. Philadelphia to Lancaster	70	N/A	--	2 hrs., 45 min.	25.4
8. Philadelphia to Harrisburg	107	N/A	--	4 hrs., 10 min.	25.7
9. Philadelphia to Baltimore	98	$3.00	.03	3 hrs., 45 min.	26.33
10. Philadelphia to Wilmington	28	$.50	.02	1 hr.	28.0
11. Albany to Buffalo	298	N/A	--	12 1/2 hrs.	23.8
12. Springfield to New Haven	62	$1.80	.03	2 hrs.	31.0
13. New Haven to Hartford	26	$.75	.03	1 hr., 10 min.	23.29
14. Boston to Portland	111	$2.50	.022	5 hrs.	22.2
15. Hartford to Providence	90	$2.75	.031	4 1/2 hrs.	20.0
16. Boston to Concord	70	$2.35	.034	3 hrs.	23.33
17. Baltimore to Washington	40	$1.50	.0375	1 hr., 50 min.	21.8
18. Pittsburg to Chicago	467	$14.00	.03	19 1/2 hrs.	23.95
19. Detroit to Chicago	284	$8.25	.029	12 1/4 hrs.	23.18
20. Cincinatti to Indianapolis	110	$3.50	.032	4 1/2 hrs.	24.44
21. Philadelphia to Memphis (first class)	N/A	$33.50	--	N/A	--
22. Philadelphia to New Orleans (first class)	N/A	$45.00	--	N/A	--
23. Philadelphia to Indianapolis (first class)	N/A	$19.50	--	N/A	--
24. Charleston to Savannah	104	$4.00	.05	N/A	--
25. Washington to Richmond	130	$5.20	.04	8 hrs.	16.25

*All transportation by railroad.

Source: <u>Appleton's Illustrated Railway and Steam Navigation Guide</u> (D. Appleton Co., New York; July, 1862).

TABLE 10

Miles per Hour and Cost per Mile

Mode	Year		
	1839	1849	1862
Miles per Hour			
Stagecoach	3.0	5.0	6.0
Steamboat	8.0	9.0	10.0
Railroad	12.5	16.5	22.5
Costs per Mile ($)			
Stagecoach	0.07	0.06	0.06
Steamboat	0.03	0.03	0.03
Railroad (North & East)	0.036	0.035	0.031
Railroad (South & West)	0.05	0.045	0.04

Source: See discussion in text.

TABLE 11
Indice Correlations[1,2]

1836			
	DIST	COST	TIME
DIST	1.00 0.00 270	0.96 0.00 239	0.95 0.00 239
COST		1.00 0.00 288	1.00 0.00 288
TIME			1.00 0.00 288
1849			
DIST	1.00 0.00 312	0.95 0.00 276	0.93 0.00 276
COST		1.00 0.00 276	0.98 0.00 288
TIME			1.00 0.00 288

[1] DIST ≡ Distance in miles according to Rand-McNally's Motor Carriers'
      Road Atlas (1988).
   COST ≡ Cost of the trip using Disturnell and cost data from Table 10.
   TIME ≡ Duration of the trip using Disturnell and data from Table 10.
[2]Pearson correlation coefficients; probability of zero correlation; number
 of observations.

TABLE 11 (continued)
Indice Correlations[1,2]

1862			
	DIST	COST	TIME
DIST	1.00 0.00 265	0.96 0.00 229	0.93 0.00 229
COST		1.00 0.00 288	0.97 0.00 288
TIME			1.00 0.00 288
All Three Years			
DIST	1.00 0.00 847	0.94 0.00 744	0.78 0.00 744
COST		1.00 0.00 864	0.89 0.00 864
TIME			1.00 0.00 864

[1] DIST ≡ Distance in miles according to Rand-McNally's Motor Carriers'
        Road Atlas (1988).
    COST ≡ Cost of the trip using Disturnell and cost data from Table 10.
    TIME ≡ Duration of the trip using Disturnell and data from Table 10.
[2]Pearson correlation coefficients; probability of zero correlation; number
    of observations.