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### Authors

Klein, Daniel B.  
Fielding, Gordon J.

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**Private Toll Roads: Learning  
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Daniel B. Klein  
Gordon J. Fielding

Department of Economics and  
Institute of Transportation Studies  
University of California, Irvine

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Institute of Transportation Studies  
University of California, Irvine  
Irvine, CA 92697-3600, U.S.A.  
<http://www.its.uci.edu>

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Daniel B. Klein and Gordon J. Fielding

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Abstract: Modern experimentation with privately built and operated toll roads has an enormous precedent in 19th century America. Over 2,000 private companies operated toll roads, financed mainly by voluntary stock subscription. The paper describes the old movement and makes a point-by-point comparison between the old toll roads and the modern toll roads. Proponents of modern toll road can benefit from a knowledge of their predecessors' experience with regulation, concessions based on equity, and the role of local communities in deciding the fate of projects.

## Private Toll Roads: Learning from the 19th Century

by

Daniel B. Klein and Gordon J. Fielding

California has authorized four toll road to be constructed and operated by private groups, and it is considering more. Construction on a similar 14-mile project in Virginia will begin in 1992. Florida, Texas, and Colorado are considering proposals for private toll roads, and there is talk of a 500-mile private connection between Chicago and Kansas City. Outside the United States, private groups are operating toll roads in France and Italy. Indeed, the idea of private toll roads is making a comeback.

We say "comeback" because many regions of the United States were once laced with private toll roads. In the early 1800s turnpiking was the leading form of transportation improvement. At mid-century an elaborate system of short turnpikes and plank roads served as feeders to the canals and railroads. In Colorado and California private toll roads served the early mining camps. By the year 1900 scores of rustic toll roads continued to traverse rural areas nationwide. During the 19th century at least 2,000 private companies operated toll roads.

Modern toll roads are vastly different from the toll roads of the 19th century. Now *horsepower* is only a figure of speech. Construction and toll-taking technology have advanced tremendously, peak-period congestion is a problem today, guidelines established by federal and state highway agencies must be satisfied, potential environmental damage must be mitigated, and the very nature and outlook of urban society has changed. When we think of a modern highway, accomodating 100,000 vehicles a day, and then picture a desolate gravel road where herds of sheep, creaking wagons, or "speedy" stage-coaches passed occasionally, the contrast is like that between a modern home and a sod-hut. Yet several basic features are common to the modern and the old: state standards for quality and financial return, investors who exert pressures to improve efficiency, toll revenue as a stream for servicing securities and paying for maintenance, user fees and pricing strategies to reflect marginal cost, landowners and businesses interested in local growth, the politics of using eminent domain and public land grants to assist a private entity, suspicion toward large private corporations, and equity objections to paying for road services.

In this paper we contrast the modern private toll-road projects (referred to as the "Moderns") with those of the 19th century (referred to as the "Olds"). Regarding the Moderns, we emphasize the Dulles extension project in Virginia and the four projects planned for California. We make only occasional

reference to the new toll road projects run by public authorities and special districts; their organization and objectives are quite different. Although they may use toll collection technology similar to the Moderns, their management is more like that of a public agency than a for-profit firm. Table I provides summary information about the Moderns. Regarding the Olds, note that we are bringing under a single heading over 2,000 toll road companies that were operating in diverse states at disparate time periods. In this paper the term "Olds" refers especially to the private turnpike companies of the northeastern states prior to 1845.

The Moderns are not uniform either. The Dulles project in Virginia will operate much like a regulated private utility. The California projects enjoy more freedom but involve greater risks that must be offset by a higher potential return limit. And the California projects can be further subdivided into two groups: those offering improvements along congested corridors (the Route 91 project that adds median lanes and the Route 57 project that completes a missing link) and those opening up ranching land for urban development (the Mid-State project east of the San Francisco Bay and the Route 125 project that will provide access between San Diego and the Mexican Border). The congestion-relief projects operate more like aggressive private firms, whereas the developmental projects are more likely to seek community

support (such as land donations) in return for the accessibility they will provide. In this respect the behavior of the Moderns is very similar to the Olds.

[Table I here -- info on Moderns]

This paper provides background information on the Olds and then makes several comparisons between the Olds and the Moderns. The purpose is to clarify the objectives of toll road corporations and to show how the business and fiscal environment bring about affect whether such corporations will operate. Just as actions taken in the 1790s greatly influenced a movement lasting over a century, the success or failure of private toll roads in the 1990s may determine the future of American road building. Faulty planning and regulation at this stage could have long-term consequences.

#### THE 19TH CENTURY PRIVATE TOLL-ROAD EXPERIENCE

Once the Constitution was ratified Americans were eager to get on with the business of settlement and expansion. At the time transportation improvement meant, above all, highway improvement. Roads were built and maintained mainly at the town level, and the system was quite ineffective. Towns lacked taxing power to make decisive plans and state budgets were minimal. Pressure for road improvement brought forth a proposal for turnpikes, a pay-as-you-go means of financing. In Virginia, Maryland and Rhode Island the state authorized a few publicly-run toll roads, but because

taxation was fiercely resisted, the public sector lacked the initial capital for even this method of road management. States turned to private initiative. Except for the name of the state, Section 1(b) of the modern California enabling legislation might have been stated verbatim by the eastern states 200 years ago: "Public sources of revenues to provide an efficient transportation system have not kept pace with California's growing transportation needs, and alternative funding sources should be developed to augment or supplement available public sources of revenue."<sup>1</sup>

The turnpikes were legally organized like business corporations of the day. Pennsylvania chartered the first, connecting Philadelphia and Lancaster, in 1792 and it opened in 1794. Improved access to Philadelphia affected trading patterns, and regional rivalries led other states to adopt the new plan. By 1800, 69 companies had been chartered (Table II).

[Table II here -- turnpike incorporations]

Although turnpikes were recognized as an effective means of meeting transportation demands, and most residents supported local turnpikes, some travellers objected to the idea of paying tolls, particularly to a corporate monopoly. Legislators, often suspicious of corporate motives, wrote extensive restrictions into company charters. Charters specified organizing procedures, capitalization, and par value of stock. State officials determined the alignment, and the charters specified eminent domain procedures for taking lands and for



entering adjacent lands for materials (such as earth and gravel). The public sector often granted existing trails or nascent roadbeds to the companies, but these primitive paths were re-aligned and greatly improved. Assurances to the company against new parallel routes were rarely made explicit, for the threat of competition seemed rather idle. Charters specified details for construction, maintenance, state inspection, and the toll rates and toll collection.

In New England, New York, New Jersey, and Maryland the state made almost no purchase of turnpike stock.<sup>2</sup> Pennsylvania by contrast began subsidizing turnpikes in 1806 by purchasing stock and by 1822 it held about thirty percent of the turnpike stock in the state. Virginia from the beginning took a portion of its turnpike stock, and after 1816 standardized the state contribution to 40 percent. In Ohio in 1837 the state began making contributions of 50 percent to turnpikes, but the subsidization program did not last long.<sup>3</sup>

Table II shows the progress of turnpike chartering in the states mentioned. Many companies, as many as half in some states, failed to raise the necessary capital and aborted their projects. Sometimes two or three companies would be chartered before succeeding. In Connecticut, for example, 13 percent of the incorporations were unsuccessful, while in New York the percentage was as high as 65.<sup>4</sup> Also, turnpikes were built in states throughout

the South and Midwest. Like Ohio and Virginia the turnpikes in these states tended to mix public and private funds.

Maps of New York State illustrate the changing role of the toll roads. Figure 1 shows the New York turnpikes in 1830, just five years after the opening of the Erie Canal. The turnpikes were mainly either routes to the Hudson Valley or major arteries reaching into the western counties. Once the canals and railroads came, toll roads were used as short feeders. Especially fitted to serve an auxiliary role were the plank roads. Plank roads were organized like the turnpikes except that they were surfaced with wooden planks. Plank road fever struck the country in the late 1840s and thousands of miles of plank road were constructed. Figure II shows the plank road system in New York in 1860. A nodal system had developed focused on the major cities with access to canals and railroads.

[Figures 1 & 2 here -- New York state maps.]

Civil engineers and enthusiasts predicted that plank roads would last eight years before needing to be resurfaced.<sup>5</sup> Beginning in 1847 rural Americans financed and constructed plank road projects in massive numbers. Table III shows total incorporation figures for several states. For this new burst of toll-road construction a high percentage were successfully constructed (perhaps 80 percent), and, since states were facing fiscal retrenchment, always strictly with private funds. To the chagrin of the original proponents, the

planking wore out after three or four years, and the movement ended in the mid-1850s as suddenly as it began.<sup>6</sup> Although people continued to build toll roads after the plank road boom, the numbers were small in comparison. Although Table I and Table III do not cover all toll-road incorporations, they cover the vast majority of the privately run toll roads of the 19th century.

[Table III here -- plank road incorporations]

### COMPARISONS BETWEEN THE MODERNS AND THE OLDS

Since transportation projects are built to meet social needs, some general differences between society today and society say in 1830 need to be discussed. Today people get in their cars and travel ten miles one way to go to work, twenty miles another way to meet with friends, and thirty miles yet another way to see a show or a basketball game. Meanwhile, the people who live two doors down remain strangers. Modern urban society is a set of what Webber has called "communities without propinquity."<sup>7</sup> Community is no longer locally based and people often travel long distances to interact.

In 1830 society was different. Farmers and merchants in cities like Springfield (Massachusetts), Utica (New York), or Frederick (Maryland) faced few choices regarding company and activities. Even the largest cities were bereft of cultural activity, by modern standards or by contemporary European

standards. The resident of the typical turnpike town lived among two or three thousand people in a few square miles that were surrounded by wilderness. Each town was a pocket of human association that seldom interacted with other towns, and then primarily for trade purposes. Townspeople worked together, more or less willingly, to maintain the common roads, to construct bridges, to built the town commons, and to fund schools, and they would strike neighborly bargains to clear fields, roll logs, raise barns and share equipment. They would see each other at church, at town meetings, and at the meetings of various voluntary societies. The social mentality was not diffuse and personal, like today, but common and collective.

This is not to say that life in early Americans was languid. To the contrary the early Americans were so industrious that they staggered European observers with their buzzing lifesyle. Both Alexis de Tocqueville and Michel Chevalier from France and Harriet Martineau from England described at length the single-minded zeal Americans had for the pursuit of prosperity.<sup>8</sup> Only church-going interrupted their forward march.

Individual fortunes were intimately connected to town fortunes, and individuals took a keen interest in town improvement projects. Will our town develop into the region's major trading center, or will it be the next town "down the pike"? Townspeople were vigilant to keep ahead of competing towns. Avoiding competition was not a viable option, because the forwardness

of neighboring towns would imply, both psychologically and materially, a falling behind.

Toll roads were a crucial implement in the competition for trade and the contest of land values. When a local turnpike project was initiated every farmer, merchant and landowner had a stake in it quite beyond the matter of dividends paid on turnpike stock.

### Investment Motivations

On paper the Olds were business corporations, raising money by private stock subscription and authorized to pay dividends. But to think of the Olds as private monopolies, like the telephone company or the cable television company, would be a mistake. There is no modern institution that really parallels the character of the Olds. They were a combination of the telephone company and the town Chamber of Commerce.

Of the Middle Atlantic states, Durrenberger (1931, 112) says that "[c]onsidered from the standpoint of dividends, turnpike stocks were exceedingly poor investments." Kirkland (1948, 45) says of New England: "the turnpikes did not make money. As a whole this was true; as a rule it was clear from the beginning." Although there were rare exceptions to the rule, it is clear that townspeople were motivated to build turnpikes primarily by the local benefits

that would result. While advocating federal aid to internal improvements, Henry Clay said in Congress in 1817:

I think it very possible that the capitalist who should invest his money in these objects [turnpikes] might not be reimbursed three percent annually upon it; and yet society in various forms, might actually reap fifteen or twenty per cent. The benefit resulting from a turnpike road made by private association is divided between the capitalist, who receives his toll, the land through which it passes and which is augmented in its value, and the commodities whose value is enhanced by the diminished expense of transportation.<sup>9</sup>

Because of the far-reaching benefits from highway improvement, it was difficult to persuade individuals to invest. This is the classic "free rider" problem in economics, where an individual stands to benefit even if he does not chip in. So could the community achieve these benefits by individual stock subscription? In a day where the average laborer earned a dollar a day, turnpikes cost about \$1,500 per mile and were usually 15 to 40 miles in length. Why would an individual put up money for turnpike stock, since his contribution would hardly make a difference?

In many respects the Olds operated like charities, relying on public spirit and social pressure. Turnpike organizers asked for stock pledges at town meetings, they wrote spirited articles for the local newspapers, they appointed committees to go door-to-door soliciting support, they wrote letters to individuals who stood to gain from the project. Turnpikes and plank roads were one event in a stream of town booster projects. Calling on the familiarity, common purpose, and self-reliance of community life, booster tactics often proved effective. The free-rider problem was a grave one and it buried many projects, but others succeeded in spite of it.

Turning to the 1990s, the roles of local benefits and social pressure are much less prominent. The bondholders of the Moderns will expect the bonds to pay interest, not increase their land values, and the consortia running the Moderns will try to earn a healthy profit. Nonetheless, the lure of local benefits from the project does play a role.

First, landowners along the right-of-way have cooperated with the organizers *and with each other* to assist construction. The Dulles road will be receiving land or enjoying an easement from about 29 landowners. Some of them are large developers who have been enthusiastic supporters of the project. As yet the Dulles road has not encountered serious holdout problems and has secured its route without the power of condemnation. In California the right-of-way is not an issue for the Route 57 project or the Route 91 project since

these will run down public corridors. Land contributions, however, will be sought for the Mid-State and the Route 125 toll roads. Both are located in suburban fringe areas where improved access will allow land developers to gain planning approval. The new *public* toll-road projects in Orange County provide a similar example: large landowners have donated land to help these three projects succeed. Just as prospective beneficiaries along the Olds chipped in by buying turnpike stock, we see the major beneficiaries lend their support to the Moderns by donating land and lobbying local and state agencies to speed up design and planning approval.

Local benefits figure into the Moderns in another way: The California private toll roads will enjoy the right to develop of airspace and concession facilities. The consortia will profit by leasing out their rights to providers of various auxilliary services, such as gas stations, restaurants, and hotels. The return from such rights is not included in the calculation of base return; whatever the corsortia receive in this regard is above and beyond their earning caps. These sources of revenue are more significant for the Mid-State and the Route 125 project, but even here they are unlikely to be substantial. This sort of value capture did not play a role for the Olds; there were no incidental powers or grants. The 19th century does, however, provide a strong parallel in the railroads. The authorization to build a railroad, particularly in the West, was coupled with enormous grants of state and especially federal land. The



land provided the owners with a motivation to build railroads that otherwise would not pay their costs.

### Suspicion toward Corporations

In 1796 a turnpike advocate in New York expressed the appeal of highway user fees:

no tax can operate so fair and so easy, as that of paying a turnpike toll, since every person is taxed in proportion to the benefit he derives from a good road, and all strangers and travellers are made equally tributary to its support -- What can be more just?<sup>10</sup>

Yet some people opposed turnpikes, believing them to be another evil manifestation of corporate monopoly. One turnpike opponent said that turnpiking is "hostile to sound republican maxims," that it "evinces a transition ... from freedom toward despotism," that turnpikes "encourage unfair speculation," that turnpikes "tend to make the rich richer and the poor poorer ... [and] divide the community into two orders of opposite interests, payers and receivers." In using private corporations to run highways, this critic says Americans "follow the monarchical monopolizing plan of Britain."<sup>11</sup> These

samples are typical of the then popular Republican philosophy that loathed grants of exclusive privilege to private corporations, and there is some evidence that Federalists were friendlier to the idea of turnpikes than Republicans.<sup>12</sup> But before long, people realized that turnpikes were not rapacious monopolies but community improvements initiated at the local level and looking to the legislature merely for authorization. The suspicion toward private corporations did, however, leave its mark on how turnpikes were regulated.

Today we live in a more commercial society. Many people work for large corporations and all of us depend on large corporations for comforts and pleasures. Most people understand that the prosperity of a corporation does not imply a corresponding impoverishment for some other portion of society, and that the profit motive does not, ipso facto, implicate an organization of foul play or social harm. Nevertheless, there is a residual concern over allowing a private corporation to control a vital transportation artery.

Some opposition to modern toll roads comes from the belief that highways ought to be funded by the state and operated as freeways. The Southern California Automobile Club has been a vehement opponent of toll roads. They dropped their opposition in 1989 only after the Governor agreed to support a five cent increase in the gasoline tax for highway and transit construction.

### Equity Concerns

A significant difference between the Olds and the Moderns is that the Moderns are limited-access superhighways, whereas the Olds provided the *sole route* for much local traffic. Farmers and commoners objected when toll gates were placed so as to capture short local trips rather than the longer commercial trips on which toll rates were based. Petitions to state representatives to resolve such inequities were marked by egalitarian tones.

Discontent resulted in various concessions made to local traffic. Many travellers were made toll exempt. In New York, toll exemptions covered those residing within one mile of a turnpike gate, or those travelling to or from public worship, a funeral, a grist-mill or blacksmith for family needs, a physician or midwife, jury duty, a poll or town meeting, or military service. In Massachusetts some of the same trips were exempt and also anyone residing in the town where the gate is placed and anyone "on the common and ordinary business of family concerns." Needless to say, this last was the subject of some controversy. Besides outright exemptions, many travellers passed toll free simply because the gates were spaced at such great distances. Sometimes they were five miles apart, but more often ten. These concessions and others helped to diffuse local resistance to a particular turnpike, as well as general opposition to the very idea of turnpiking.

Equity concerns have also arisen with the Moderns. California Assemblyman Bill Lockyer has introduced legislation that will ban public funds from two of the California projects and all future highway privatization projects. In defending his bill, Lockyer writes: "toll roads are fundamentally inequalitarian. Such roads create a two-tier system, where people of ordinary means drive on roads that are falling apart while the affluent pay tolls and drive on new or improved highways."<sup>13</sup> His charge is that highway privatization was approved on the premise that no public funds would be used, apart from that used to purchase the right-of-way. But as soon as the agreements were made, the private corporations sought assistance from local authorities for planning and environmental studies. The charge of inequity is one toll roads will continue to face, but it is one that they have strong counter-arguments to, especially when they are *new* facilities built strictly with private funds. Assemblyman Lockyer has a point when he says that it is not fair to make people who do not use toll roads "subsidize them through their tax dollars." Politics has always had a powerful influence over transportation and it will be fascinating to observe how the equity concerns are resolved. Concessions reduced the returns earned by the Olds; will concessions ruin the Moderns or will the travellers recognize the time savings in congested corridors and defend private initiative?

### Eminent Domain

The organizers of the Olds would petition the legislature for a charter to build a turnpike from Town A to Town B, but it was state-appointed commissioners that laid out the road. Once the alignment was decided the company used condemnation procedures as needed. Frequently the turnpike followed the course of a pre-existing roadbed, but additional land was required to widen and straighten the route. Landowner cooperation was elicited by the fact that, as one 1797 newspaper writer put it, they "will receive an equivalent to their damages, in the appreciate value of their farms and situations."<sup>14</sup> Turnpikes companies frequently convinced landowners to accept turnpike stock as compensation.<sup>15</sup>

When disagreement persisted, or when the landowner was "feme covert [married woman], insane, under age, or out of the county,"<sup>16</sup> the company resorted to specified procedures for condemnation. In New York the company would appeal to a common-pleas judge, who would appoint three disinterested county residents to make an appraisal and the business was done. Similar procedures were specified for entry on to nearby lands for the appropriation of materials used in road construction.

For the Moderns condemnation powers vary. The Dulles Road, which cuts a new corridor through undeveloped lands, does not have powers of eminent domain. It has acquired its route by voluntary agreements with landowners. It is thought, however, that if negotiations had come to a impasse,

Loudon County, Virginia would have thrown *its* condemnation powers behind the project.

The Route 91 and Route 57 projects in California will be located on public corridors, so eminent domain is a small matter. The Mid-State and the Route 125 will need to acquire private lands. Most will be acquired by donations or purchase, but where necessary the projects will turn to Caltrans to exercise its power of eminent domain to secure the route.

Eminent domain was expeditious for the Olds, and has been of secondary importance for the Moderns. Far more important for the Moderns has been issues associated with environmental clearance.

#### Environmental Clearance and Opposition to Growth

American attitudes toward growth and the environment have changed drastically since 1830. Alexis de Tocqueville wrote then that Europeans "talk a great deal of the wilds of America, but Americans themselves never think about them." He continues:

[Americans] are insensible to the wonders of inanimate nature and they may be said not to perceive the mighty forests that surround them till they fall beneath the hatchet. Their eyes are fixed upon another sight: the American people views its own march across

these wilds, draining swamps, turning the course of rivers, peopling solitudes, and subduing nature.<sup>17</sup>

Progress is no longer equated with the conversion of wilderness into usable land; natural landscapes are treasured especially when they adjoin congested urban areas. Conflict between growth advocates and environmentalist is apparent in the public hearings and environmental impact documents that are required for all highway projects.

Environmental clearance poses the greatest threat to the Moderns, and indeed to any new highway project. The California Moderns must submit environmental impact statements that satisfy the requirements of both the California Environmental Quality Act and the National Environmental Protection Act. Proposers of toll roads must not only document adverse impacts, but also show how damage will be ameliorated. Both review processes are undertaken subject to agency approval after numerous public hearings. Even if the Moderns are approved at public hearings, they are likely to be beset by local suits challenging whether they have fully complied with the laws.

If the *public* toll-road projects in Orange County are any indication, and no doubt they are, the California privates will face a battle in satisfying environmental demands. The Transportation Corridor Agency has been trying to advance the first of its three proposed highways to open up rangeland for

development. The environmental politics have been nasty. The decision by local elected officials to let the projects proceed has been challenged in the state and federal courts. Although the toll roads impinge on Indian burial sites and wetlands, and disrupt the habitats of some local fauna, a unifying motive is the blocking of development and the preservation of the rangeland as open space. A small group concerned with environmental conservation is backed by a much larger group of residents desiring to block additional development.

Consider the Route 57 project. The plan is to run an elevated highway down the Santa Ana riverbed that has been converted into a concrete channel by the Army Corps of Engineers. Many people who now enjoy access to the riverbed will have to share their recreational area with four lanes of high-speed traffic. Adjoining neighborhoods in the cities of Santa Ana, Garden Grove, and Fountain Valley will suffer increased noise pollution, air pollution, and congestion on local streets. Some of these people will try to block the project and will voice their objections in a larger panoply of environmental concerns. If they do not succeed in persuading their elected officials, they will try to block the project in the courts.

Although the clearance battles in California look formidable, the Dulles project in Virginia has met with little resistance. Perhaps the difference is the community outreach that Ralph Stanley, the Executive Officer, has achieved. Stanley says that "[a]ll projects are local. ... You must stay close to your



customer." Stanley's operation stays in close contact with all local groups, such as the newspaper, the chamber of commerce, environmental groups, and the Northern Virginia Builders Industry Association. The operation is very attentive to the concerns of all parties. Stanley himself has spoken at more than 70 local events in the last three years. In some respects, then, toll roads are still community projects.<sup>18</sup>

### Congestion and Marginal Cost Pricing

Congestion is a double-edged issue for the Moderns. The Moderns are new highways -- highways that would not otherwise be built in the foreseeable future -- and will relieve congestion on other highways. But as new highways they will encourage development that will increase congestion on local streets, and local congestion is a tangible reason why people oppose growth.

For the Olds, congestion was not an issue, but the basic desire for speedier and more reliable highway travel motivated the Olds as much as they do the Moderns. The Olds laid more direct routes and kept the roads in better repair, delivering the desired relief.

Another reason why highway congestion works in favor of the Moderns is that congestion on the facility can be controlled by varying the tolls. Transportation economists have long advocated charging more at peak time, but it is seldom used by public operators of toll facilities.<sup>19</sup> Airline and telephone

companies wisely use time-of-day and day-of-week differentials to smooth out demand, but the principle is unpopular in highway management. It is feared that variable tolls will cause bunching immediately before and after the rate changes, but with electronic toll collection, charges can be adjusted gradually.

Two of the California Moderns are planning to use congestion pricing. Higher tolls will be charged at peak travel times to reflect the higher marginal social cost. The aim is to avoid congestion by encouraging travellers to use the facility during hours when it is not crowded. The Route 91 project, in addition to using congestion pricing, has been given an incentive to control congestion in that they will receive rewards based on their peak hour throughput.<sup>20</sup> Neither the Dulles project nor the Orange County public toll roads are planning to use congestion pricing. A decision has not been made for the Mid-State and the Route 125 projects. All are in uncongested corridors (excepting the Dulles project to some extent), so they will not need to dampen usage. This may change, however, as development occurs on adjoining land. Congestion pricing could then be adopted by granting off-peak "discounts."

The Moderns will price to reflect marginal cost by vehicle type. Trucks, which have a higher marginal cost in terms of pavement wear-and-tear, will be charged by weight and axle, similar to how they pay highway fees today. The Olds employed, with state authorization, a similar form of differential pricing. Narrow-wheeled vehicles cut ruts in the road, while broad-wheeled vehicles

helped to pack the road and form a smooth surface. Accordingly, the wider the wheel the less the vehicle had to pay in toll. In New York vehicles with wheels of six-inch width paid half toll, nine-inch width paid quarter toll, and 12-inch width paid no toll.<sup>21</sup>

### Toll Collection and Evasion

Through the ages tollgates have been about as popular as the dentist's drill. New technologies in tolling, however, will break this inglorious status, and make the payment of highway charges only as unpleasant as paying the phone bill or credit-card bill. Electronic tolling already exists on the Dallas North Tollway, the Oklahoma turnpikes, the Denver Toll Road, and several U.S. Bridges. Cars need only slow down when entering the system, and even this inconvenience may soon be eliminated. The lack of public money provides the main impetus for the resurgent interest in toll roads, but the possibility of eliminating tollgates helps persuade wary elected officials that the public might accept user-fees for roads if the charges are made more convenient. All the Moderns are planning to use some form of electronic tolling.

The Olds faced far more serious toll collection problems. Toll evasion was rampant; it was quite easy for carts or wagons to take a small excursion through farmland or the wilderness to circumvent the tollgate. The practice was called "shunpiking." One company estimated that "from one-half to two-

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thirds of travel ... have passed around the gate." Former Federalist Congressman Fisher Ames, while president of a Massachusetts turnpike company, estimated that his company's earnings would be almost sixty percent greater if not for shunpiking. Turnpikes would have enjoyed more financial health if they were permitted to multiply and relocate tollgates to combat shunpiking, and if the penalty against shunpiking were higher. But the states were rather unresponsive to the plight of the companies.<sup>22</sup>

#### Regulation of Toll Rates and Financial Return

The toll rates on the Olds were set by their charter and could be changed only by a special act of the legislature. Rates were quite uniform across the states and were rarely changed over time. Table IV shows the typical schedule for a ten-mile gate. Also, the financial return on stock was usually officially capped at 10, 12, or 15 percent, but these ceilings were never reached.

[Table IV here -- Olds toll schedule]

The California Moderns will be free to set their toll rates, but their financial returns are capped. The Route 91 project -- the least risky -- has the lowest base return, at 17 percent, and the Mid-State project has the highest, at 21.25 percent. The Route 125, Route 57, and the Mid-State projects will have bonus incentives for mean vehicle occupancy. The Route 57 and the Mid-State

projects also have incentives for the accident rate and the operating cost per vehicle.

The Dulles project will be governed more like a public utility. The company submits proposed toll rates to the Virginia State Corporation Commission for approval. Already the Commission has approved the rates through 1997. The rate for passenger vehicles will be 12 cents per mile as of January 1, 1994 when the road is scheduled to open and can increase to 13.5 cents as of January 1, 1996. The caps on return descend from 30 to 14 percent during the life of the 40 year franchise. The difference in regulatory structures between the Dulles project and the California projects -- the one being handled like a utility corporation and the others like contractors bound by initial agreements with the state -- provides an opportunity to learn how best to arrange for private sector involvement in highway development.

#### Design and Construction Standards

The agreements between Caltrans and the California Moderns name 33 Caltrans manuals that project design and construction must conform to. The state, as the owner of the facility, is subject to tort liability and must certify that safety standards are met.

For the Olds there was no refined science of road building and no state manuals to follow. A paragraph or two in the turnpike laws gave all the

official guidance the company would get. In New York turnpikes were to be 28 feet wide with a foundation of "stone, gravel, sound wood, or other hard substance" and surfaced with nine inches of gravel.<sup>23</sup> Specifications were made for convexity, grading, ditching, guard rails, and guideposts. Although these specifications are brief by modern standards, they were not trifling. Building highways to meet the specifications was quite expensive and resulted in a vast improvement over the "common roads" of the day. It is doubtful, though, that many turnpikes lived up to specifications, and maybe it is just as well.

Turnpikes were unprofitable and demands for better roadway often resulted in no roadway at all. Turnpikes had a sense of what the public and the turnpike inspectors would accept as travel-worthy, and they maintained their road accordingly. What was then customarily thought of as a good road was probably a far cry from nine inches of gravel upon a firm foundation 28 feet wide.

Both the Moderns and the Olds represent franchise monopoly, for which performance specifications are in order. But since the Moderns are for-profit, not just in letter but in fact, the chartering state has an obligation to specify performance. It should be kept in mind, however, that the higher the performance demanded by the state, the harder it will be to entice the private sector to invest its resources in public infrastructure projects. It took three

months of heavy negotiation for Caltrans officials to work out final agreements with the consortia running the California Moderns.

### LESSONS FROM THE OLDS

In 1992, as in 1792, the private sector is being recruited to design, build, and operate highways because the public alternatives are fiscally constrained or less efficient. In 1792 a movement lasting more than a century got underway, a movement involving over 2,000 private toll road companies across the country. The possibility of a similar expansion of private operations in the decades to come must be considered. With the development in tolling technology, private management of highways, when wisely arranged, makes good sense. The Dulles project and the California projects, particularly the Route 91, will serve as prototypes. Their experiences may shape a new era in transportation management.

The most valuable lesson to be learned from the Olds is that from the beginning the regulatory state hemmed in turnpike powers and favored the rights of the travelling public: equity claims were favored over the right of the corporations to make a fair return on investment. The turnpikes were hamstrung by generous state-granted toll exemptions, rigid toll rates, and severe toll evasion problems. *In the long run* the public was not well served by these



restrictions, which damaged the financial health of the turnpikes. Because turnpikes were unprofitable, roughly 35 percent of those chartered through 1845 were never built, and those that were built operated in a dilapidated condition that reflected their precarious financial state. Although many turnpikes were located in sparsely settled regions, and although even under the most favorable regulation turnpikes would have been plagued with considerable toll evasion, unresponsiveness, even enmity, by state officials to the turnpikes partially undermined the effectiveness of the old toll roads.

The lesson for modern considerations is clear: if states place unreasonable restrictions on the Moderns to satisfy objectors, or jeopardize them by revising agreements, private investors will become wary before a movement even gets under way. And if the lure of profits is destroyed, community spirit is unlikely to help fill the gap the way it did for the Olds. The financing of new improvements will remain the task of the public sector, which is already struggling to maintain the existing system.

Another important lesson drawn from the Olds concerns developmental clearance. Once the Olds had state authorization and funding they were in motion. Today the Moderns face the possibility of being blocked by environmental regulations and local objections to additional development. Perhaps it would be more effective to have the state obtain all the local and environmental clearance before signing up private parties.

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#### Endnotes

1. Assembly Bill No. 680, Chapter 107, Laws of California (1989).
2. There were four minor cases of state aid made in New Jersey, New York, and Maryland, which combined amounted to \$42,500, a miniscule sum relative to private investment (see Joseph A. Durrenberger, *Turnpikes; a Study of the Toll Road Movement in the Middle Atlantic States and Maryland*, (Valdosta, Georgia: Southern Stationery and Printing Co. , 1931), p. 98. There were scattered but uncommon instances of town aid to turnpike projects.
3. On Pennsylvania see Durrenberger, *Turnpikes*, p. 55; on Virginia see Robert F. Hunter, "The Turnpike Movement in Virginia, 1816-1860" (Ph.D. thesis,

Department of Political Science, Columbia University, 1957); On Ohio and other states outside the Northeast see George R. Taylor, *The Transportation Revolution, 1815-1860* (New York: Rinehart and Co., 1951), pp. 15-31.

4. For the Connecticut figure see note 3 of Daniel B. Klein, "The Voluntary Provision of Public Goods? The Turnpike Companies of Early America," *Economic Inquiry* 28, (October 1990): 788-812; for the New York figure see Daniel B. Klein and John Majewski, "Economy, Community and Law: The Turnpike Movement in New York, 1797-1845," (Irvine Economics Papers, No. 90-91-22).

5. The most important handbooks and engineering manuals were: George Geddes, *Observations Upon Plank Roads* (Syracuse: L.W. Hall, 1850); W. M. Gillespie, *A Manual of the Principles and Practice of Roadmaking*, Third Edition (New York: A. S. Barnes, 1850); Robert Dale Owen, *A Brief Practical Treatise on the Construction and Management of Plank Roads* (New Albany: Kent and Norman, 1850); William Kingsford, *History, Structure, and Statistics of Plank Roads in the United States and Canada* (Philadelphia: A. Hart, 1851).

6. See John Majewski, Christopher T. Baer, and Daniel B. Klein, "Market and Community in Antebellum America: The Plank Roads of New York," Irvine Economics Paper 90-91-25; Daniel B. Klein and John Majewski, "Promoters and

Investors in Antebellum America: The Spread of Plank Road Fever," Institute of Transportation Studies, UC-Irvine, paper no. 91-1.

7. Melvin M. Webber, "Technics and Ethics in Transport Decisions," in *Transportation and Land Development* (Washington, D.C.: Transportation Research Board, National Academy of Sciences, Speceial Report 183, 1978), pp. 20-22.

8. Alexis de Tocqueville, *Democracy in America*, two volumes, (New York: Vintage Books, 1945 [1835/1840]), vol. II, pp. 78-79; Michel Chevalier, *Society, Manners, and Politics in the United States*, J. W. Ward, ed., (1961 [1836]), pp. 271ff; Harriet Martineau, *Society in America*, S. M. Lipset, ed., (1962 [1837]), pp. 246ff.

9. *Annals of Congress* (1817-18), p. 1377.

10. [Elkanah Watson], "Turnpike Roads," Albany Register, (June 13, 1796), p.2. This piece and many others are pasted into Watson's Commonplace Book, manuscripts division, New York State Library.

11. These quotes are from the articles by "Civis," which are pasted into Elkanah Watson's Commonplace Book, Manuscripts Div., New York State Library.

12. For a fuller discussion see Klein & Majewski, "Economy, Community and Law."

13. "Public Funds Should Not Be Used to Build Toll Roads," *Los Angeles Times*, (March 19, 1991).
14. A Philanthropist, "Roads and Turnpikes," no. III, *Connecticut Courant* (Hartford), May 22, 1797, p. 1.
15. Philip E. Taylor, "The Turnpike Era in New England" (Ph.D. thesis, Department of Economics, Yale University, 1934), p. 165.
16. Chapter 38, *Laws of New York* (1807), p. 52.
17. *Democracy in America*, vol. II, p. 78.
18. Carlo Salzano, "Report on the 23rd Annual Joint Conference of the Eno Foundation Board of Directors and Board of Consultants," *Transportation Quarterly*, 1991, p. 17.
19. W. Vickery, "Some Implications of Marginal Cost Pricing for Public Utilities," *American Economic Review* (1955), 45, pp. 605-620.
20. The California Private Transportation Corporation will enjoy adjustment upward of its base return rate by 0.2% for each one percent increase in peak occupant volume, with a maximum annual adjustment of 6 percent. See Development Franchise Agreement for the State Route 91 Median Improvements, California Department of Transportation, December 31, 1990, p. 51.

21. Chapter 38, *Laws of New York* (1807), p. 56.

22. On these matters and the source of the quotations, see Klein & Majewski, "Economy, Community and Law," pp. 46ff.

23. Chapter 38, *Laws of New York* (1807), p. 53.

Table I  
 "The Moderns" -- Private Toll Road Projects in Virginia and California

<u>Subject</u>	<u>Dulles Road</u>	<u>State Rt. 91</u>	<u>Rt. 57 Extension</u>	<u>State Rt. 125</u>	<u>Mid-State</u>
Operator	Toll Road Corporation of Virginia	California Private Transportation Corp.	National Tollroad Authority Corp.	California Transportation Ventures	California Toll Road Company
Length	14 miles	10 miles, with possible extensions.	11 miles	10 miles	85 miles
Counties and Terminations	In Loudon County, connecting Dulles Airport and Leesburg.	In Orange County, connecting Riverside County and Rt. 55.	In Orange County, linking Rt. 57 with Rt. 73.	In San Diego County, connecting San Diego and the Mexican border.	Alignment undecided; the Franchise Zone includes portions of Alameda, Contra Costa, Solano, Yolo and Sacramento Counties.
Estimated Costs	\$300 million	\$88.3 million	\$700 million	\$400 million	\$1.2 billion
Description	New route through undeveloped public and private land.	New lanes on the median of an existing highway.	Elevated ("viaduct") highway running down a seasonal riverbed.	New route through undeveloped private lands.	New route through various developed and undeveloped lands.
Franchise Term	40 years	35 years (lease)	35 years (lease)	35 years (lease)	Two overlapping 35 year leases
Base Rate of Return	30% to 14% according to time structure approved by the Virginia State Corporation Commission (VSCC).	17 %	20.25 %	18.5 %	21.25%
Toll Rates	Initially 12 cents/mile, rates approved by VSCC. No congestion pricing in initial years.	Rates unregulated, congestion pricing planned.	Rates unregulated, congestion pricing planned.	Rates unregulated, congestion pricing planned.	Rates unregulated, congestion pricing unlikely.
Environmental obstacles	Few. Local population receptive.	Few, since no new highway corridor.	Likely problems; wildlife, wetlands, and growth issues.	Likely problems; wildlife, wetlands, and growth issues.	Sierra Club has filed an environmental suit. Serious problems likely.
Local Public Agency Receptiveness	Very receptive.	Orange County supportive, Riverside County raising objections.	Receptive, so far.	Cities of Chula Vista and San Diego suing for concessions.	Too soon to know.

Table II

## TURNPIKE INCORPORATION, 1792-1845

State	1792-1800	1801-10	1811-20	1821-30	1831-40	1841-45	Total
NH	4	45	5	1	4	0	59
VT	9	19	15	7	4	3	57
MA	9	80	8	16	1	1	115
RI	3	13	8	13	3	1	41
CT	23	37	16	24	13	0	113
NY	13	126	133	75	83	27	457
PA	5	39	101	59	101	37	342
NJ	0	22	22	3	3	0	50
VA	0	6	7	8	25	0	46
MD	3	9	33	12	14	7	78
OH	0	2	14	12	114	62	204
Total	69	398	362	230	365	138	1562

Sources: For all states through 1800, Joseph Stancliffe Davis, Essays in the Earlier History of American Corporations (Cambridge, Massachusetts, 1948), II, pp.22-27, 216; for NH, VT, MA, and RI, 1801-1845, Philip E. Taylor, "The Turnpike Era in New England," (Ph.D. thesis, Yale University, 1934), pp. 339-344, 346; for CT, 1801-1821, Nathaniel Reed, "The Role of the Connecticut State Government in the Development and Operation of the Inland Transportation Facilities from 1784 to 1821," (Ph.D. diss., Yale University, 1964), p. 75; for CT, 1822-1845, Taylor, pp. 338-339; for NY, NJ, MD, and OH, 1801-1845, George Herberton Evans, Jr., Business Incorporation in the United States, 1800-1943 (New York, 1948), pp. 12-17; for PA, 1801-1845, William Miller, "A Note on the History of Business Incorporation in Pennsylvania, 1800-1860," Quarterly Journal of Economics 55 (November, 1940), pp. 158-159; for Virginia, Robert F. Hunter, "The Turnpike Movement in Virginia, 1816-1860," (Ph.D. thesis, Columbia University, 1957), pp. 313-315.



**Table III**

Plank Road Incorporation by State

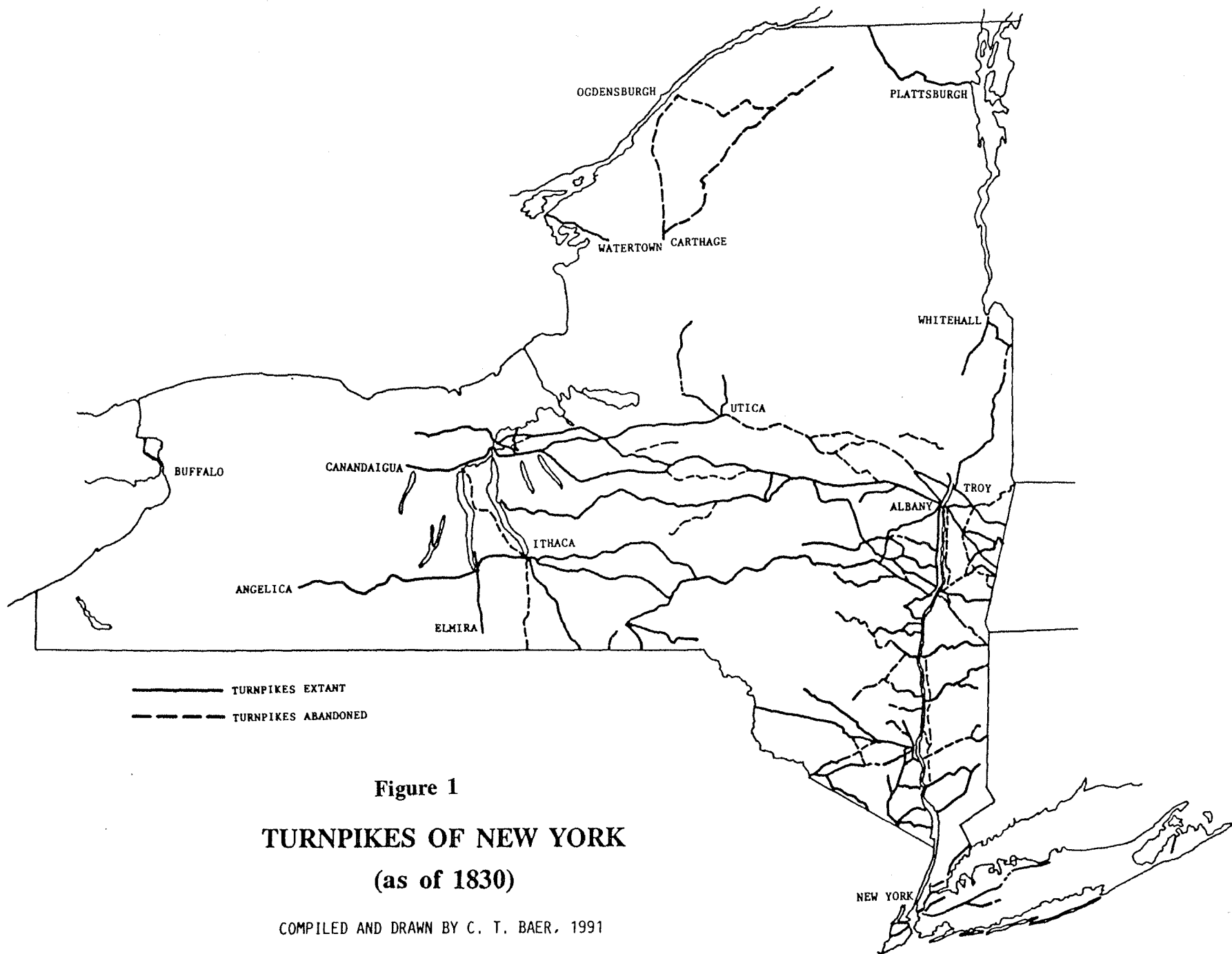
<u>State</u>	<u>Number</u>
New York	335
Pennsylvania	315
Ohio	205
Michigan	122
Illinois	88
North Carolina	54
Missouri	49
New Jersey	25
Georgia	16
Iowa	14
Vermont	14
Maryland	13
Connecticut	7
Massachusetts	1
Rhode Island, Maine	0

Notes: The figure for Ohio is through 1851; Pennsylvania, New Jersey, and Maryland are through 1857. Few plank roads were incorporated after 1857. For a complete description of the sources for this table, see Daniel B. Klein & John Majewski, "Promoters and Investors in Antebellum America: The Spread of Plank Road Fever," UC-Irvine ITS WP 91-1.

## Table IV

### Standard Toll Rate Schedule for a Ten Mile Gate on the Turnpikes of New York

	cents
Chariot, coach, or phaeton (Sometimes referred to as "pleasure carriages drawn by two horses")	25
Sulkey, chair, or chaise (Sometimes referred to as "pleasure carriages drawn by one horse")	12.5
Wagons and all other four wheeled carriages drawn by two draft animals (three cents for each additional animal; sometimes carts drawn by two animals were rated separately and at a lower rate.)	12.5
Cart (drawn by one draft animal)	6
Sleigh (drawn by two draft animals) (two cents for each additional animal)	4-6
Horse led or ridden	4
Score of cattle ( <i>pro rata</i> )	12-20
Score of sheep or hogs ( <i>pro rata</i> )	6-8



**Figure 1**  
**TURNPIKES OF NEW YORK**  
**(as of 1830)**

COMPILED AND DRAWN BY C. T. BAER, 1991

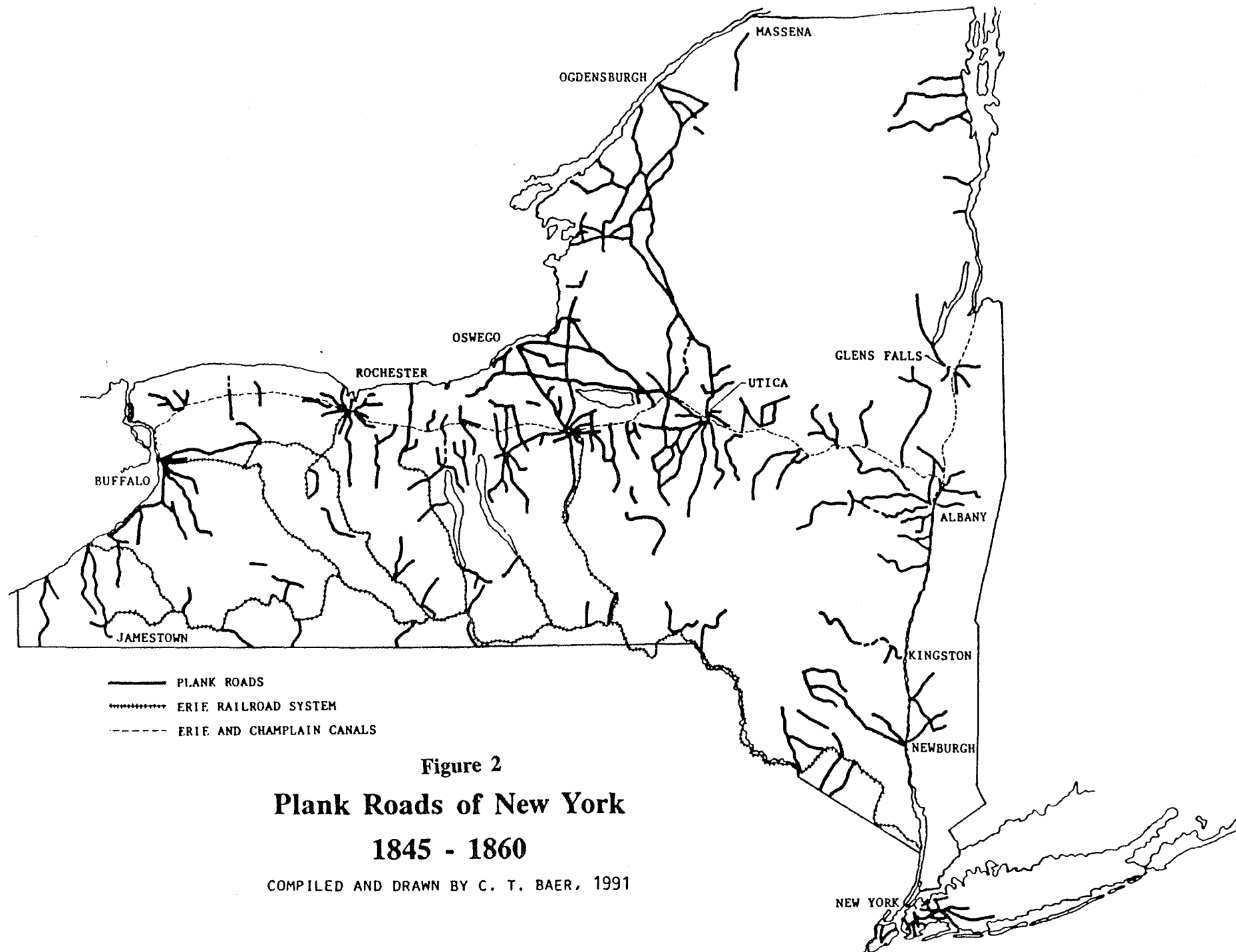


Figure 2  
**Plank Roads of New York**  
**1845 - 1860**

COMPILED AND DRAWN BY C. T. BAER, 1991