

In the United Kingdom we have observed the potency of these ideas of privatization sweep policy along at a pace that few would have thought possible. And I suspect that, were Keynes to have lived until his 100th birthday, his judgment would have been good.

Private-Sector Involvement in Virginia's Nineteenth-Century Transportation Improvement Program

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This paper is a discussion of the financing of roads, and to a lesser extent other modes of transportation, in Virginia between 1816 and 1860, a period of major expansion during which a mixed system of private- and public-sector financing was used. The intent was to maximize the benefits and minimize the disadvantages of both systems. The perceived and real costs and benefits of this system are described, and parallels with the present situation are pointed out.

The history of transportation in Virginia during the 19th century is yet to be written. Although published works on transportation per se are few, a number of dissertations and theses, fortunately, have addressed elements of the major issues during limited time periods. Three of the dissertations are most important and have provided the information on which this paper is based. In 1948 Phillip Morrison Rice completed, at the University of North Carolina, a Ph.D. dissertation entitled *Internal Improvements in Virginia, 1775-1860*, which followed his M.A. thesis, *The Virginia Board of Public Works, 1816-1842*, completed the previous year. This dissertation is the best available overview of the policy and political issues involving canals, roads, and railroads before the Civil War. In 1950 Edward G. Roberts completed a Ph.D. dissertation, *The Roads of Virginia 1607-1840*, at the University of Virginia. This was a cartographic study, with supporting text, of the evolution of the roads from settlement through the early years of the 19th century. In 1957 Robert F. Hunter completed a Ph.D. dissertation, *The Turnpike Movement in Virginia, 1816-1860*, at Columbia University. This work was concerned with the turnpikes

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2. A. Walters. Track Costs and Motor Taxation. *Journal of Industrial Economics*, 1954.

constructed by stock companies under the General Turnpike Law of 1817. Other relevant works are Wayland Dunaway's *History of the James River and Kanawha Company*, published by Columbia University Press in 1922, that provides extensive treatment of Virginia's major canal effort and Carter Goodrich's "The Virginia System of Mixed Enterprise: A Study of State Planning of Internal Improvements," published in the *Political Science Quarterly* in September 1949, in which are discussed the funding, policy, and planning aspects of Virginia's internal improvement program. All of these works, as well as many others on specific improvements, draw heavily on the primary source, the records of the Virginia Board of Public Works, which include not only the records of the board but many of the records from the various canal, railroad, and road companies under its jurisdiction. These records, held by the Virginia State Library in Richmond, were made much more accessible than theretofore by the publication in 1978 of the *Board of Public Works Inventory* by John S. Salmon of the Virginia State Library.

No comprehensive thesis on Virginia's railroads has been published, but a number of histories of individual railroads have been, and there also is a Ph.D. dissertation entitled *The Virginia Railroads, 1828-1860* that was completed by Charles W. Turner at the University of Minnesota in 1946.

Further study of the issues would begin with these resources that are rich in detail and information.

INTRODUCTION

Since the first permanent English settlement in America nearly 380 years ago at Jamestown, the Commonwealth of Virginia

has faced the need to construct, maintain, and finance transportation facilities. For almost two centuries, in addition to its present boundaries, Virginia included the areas in six of the present states ceded to the United States in the Northwest Territory in 1784, including all or parts of Ohio, Illinois, Indiana, Michigan, Wisconsin, and Minnesota, as well as Kentucky and West Virginia. From the formation of Kentucky in 1792 until 1863, the period on which this paper is focused, Virginia included the present states of Virginia and West Virginia. This land area was not only large, it also was extremely diverse in topography, materials, climate, density of population, and fiscal resources.

The purpose of this paper is to review the financing of roads, and to a lesser extent other modes of transportation, during the period 1816–1860, for it was during this period of major expansion that Virginia continuously used what Carter Goodrich (1) has designated a “mixed enterprise” funding system of private- and public-sector financing intended to maximize the advantages and minimize the disadvantages of both. During the 19th century Virginia’s internal improvements program was directed toward three modes of transportation: canals, turnpikes, and railroads. The canal era covered the years 1785–1880, the railroads 1828–, and the turnpikes 1785–1854.

Reference, both historically and currently, usually is made to four physiographic regions defined by two north-south axes: the fall line in the east, connecting Alexandria, Richmond, and Petersburg and the Blue Ridge Mountains. The fall line is where the eastward-flowing rivers are interrupted by falls. These major provinces are further subdivided by the James River that runs west to east. The region east of the fall line, including the Eastern Shore and the Chesapeake Bay, is designated “Tidewater.” The “Piedmont” is the area between the fall line on the east and the Blue Ridge Mountains to the west. Piedmont usually refers to the portion north of the James River, and the designation “Southside” is used for the area to the south. The “Valley” runs generally southwestward between the Blue Ridge and the Alleghenies, with the portion south of the James referred to as “Southwestern” Virginia or simply “Southwest.” Extending west of the Alleghenies to the Ohio River is what was once called the “trans-Allegheny” section that is now West Virginia.

Although these regions represent significantly variable demands with regard to construction, materials, and so forth, the focus of this paper is on the methods of financing; the engineering aspects of meeting these demands will be discussed only to the extent that they influenced the funding needs.

EARLY HISTORY

For almost 200 years the provision of funding was not a major consideration because the need was for labor to clear and construct rudimentary roads. This labor was enlisted under the English Road Law of 1515, which the colony adopted and which required that each “laboring male tithable” (males 16 and older, slave or free) annually provide work on the road for a specified period, usually 5 or 6 days. From the initial settlement in 1607 until 1657 the roads were under the jurisdiction of the Anglican Church Vestry. In 1657 jurisdiction was trans-

ferred to the Gentlemen Justices of the County Court, who were for the most part the same individuals. In both cases the work was under the supervision of the “overseer of roads” or the “surveyor of highways,” who was responsible for laying out, constructing, and maintaining the roads, primarily with donated materials and rights-of-way. The limited funds required were provided from local revenues.

The first statewide levy for road construction was authorized by the Virginia General Assembly in 1748. This levy of tobacco was for constructing a road from Pignut Mountain in the Piedmont (present Loudoun County) to the Blue Ridge.

By the time of the American Revolution, it was recognized that the county court system and the use of compulsory labor were not meeting the increasing needs. Following the revolution, a number of recommended modifications were placed before the governor and the general assembly. These included the financing of road repairs through tolls and increases in county taxes, the use of general state tax revenues for road work, lotteries, and the very innovative, if foolhardy, proposal in 1805 for a tax of 1 percent to be levied on all debts (i.e., bad debts) registered at the county courts to raise revenue for road construction.

There was not widespread support for any of these proposals for a variety of reasons. Chief among these was that improving river navigation was viewed as having much greater commercial significance and was given much higher priority by Jefferson, Madison, Washington, and Henry. There was little support for routes that did not lie near the taxpayer’s residence, and a powerful group in Virginia, including Jefferson, believed that state control of transportation meant poor management and waste of public money.

Thus, for approximately 200 years, the financing of road construction was essentially a function of local government, with the general assembly authorizing a few projects for roads and canals, but the period of expansion was dawning and other experimental efforts came into being. In 1785 the general assembly enacted legislation enabling creation of the Little River Turnpike Company as a private venture on the assumption that the receipts from tolls would provide an attractive opportunity for private investment. This apparently was the first private toll road authorized in the United States, and apparently its attractiveness to private investors was not as great as had been thought because funding was not forthcoming. The Little River Company was rechartered in 1795 but again was not successful in attracting funds. Finally, in 1802, chartered for the third time, the company was successful in attracting investment and successfully completed 33 $\frac{3}{4}$ mi of road from the port of Alexandria westward toward the Blue Ridge (currently US-50). This road operated into the early years of the 20th century.

Between 1802 and 1816, 10 turnpike companies were successful in building and operating a total of 222 $\frac{3}{4}$ mi of roads. Seven were in the Northern Piedmont and connected Alexandria and the Valley. One was between Fredericksburg and Orange, the first step in connecting the Rappahannock River with the Valley, and another was between Manchester (South Richmond) and Petersburg and connected the falls of the James with the falls of the Appomattox. The remaining road was in what is now West Virginia.

The significant characteristics of these turnpikes are sum-

TABLE 1 TURNPIKES SUCCESSFULLY OPENED BEFORE 1817

Name	Date Chartered	Date Opened	Length (mi)	Authorized Capitalization (\$)	State's Proportion of Total Subscription (\$)	Income, Repair Costs, and Dividends Through 1848			
						Average Tolls per Mile per Year (\$)	Average Repair Costs per Mile per Year (\$)	Years Paid	Average Yield (%)
Little River	1802 ^a	1806	33 ³ / ₄	150,000	8	425	180	27	2.02
Faquier and Alexandria	1808	1819 ^b	28 ¹ / ₂	100,000	30	66	59	None	
Ashby's Gap	1809	1827	20 ¹ / ₂	133,050	11	217	147	17	1.23
Leesburg	1809	1820	14	84,000	40	129	77	6	0.314
Snicker's Gap	1810	1823	33 ³ / ₄	85,275	23	41	22	None	
Swift Run Gap	1810	1813	36 ¹ / ₂	119,800	39	100	42	23	1.24
Fairfax	1813	— ^b	3	13,750	40	— ^c	— ^d	None	
Falls Bridge	1813	1823	13	80,521	40	20	57	None	
Shepherdstown and Smithfield, W.Va.	1816	1826	13 ³ / ₄	46,687	40	40	10	None	
Manchester and Petersburg	1816	1824	20	75,900	11	154	79	None	

^aChartered but unsuccessful in 1785 and 1795.

^bData not certain.

^cReceipts given to toll collector (apparently to cover his costs).

^dUnknown.

marized in Table 1, and several interesting observations can be made about these data. First, the delay between authorization by the general assembly and the opening of a facility as reflected by the initial collection of tolls generally was about 10 years; the Little River and Swift Run facilities were exceptions. It should be noted, however, that the Little River Turnpike had been authorized twice previously.

Perhaps most significant is that major support from state revenues in the form of stock subscriptions was required for all but four of the turnpikes. As would be expected, the four were in the major corridors and, as is the case today, were most attractive to private investors. The Little River, Ashby's Gap, and Snicker's Gap routes connected the port at Alexandria with the Valley of Virginia, and the Manchester and Petersburg connected two of Virginia's major industrial and commercial centers. (Significantly, the section of Interstate 95 between Richmond and Petersburg was built and has operated as a toll facility since its construction in the 1950s.) The legislation authorizing these facilities recognized that state support would be needed, and this was provided in the form of authorization to purchase stock on behalf of the commonwealth, up to a specified maximum, in the event that private subscription did not provide the required funding. These individual authorizations formed the basis on which the creation of the Internal Improvement Fund was established in 1816.

The final point to be made is that the turnpike companies did not prove to be very productive investments. Other available investment opportunities—land, agriculture, slaves, iron—along with a greater emphasis on water transportation in Virginia and nationwide simply made private investment hard to come by.

The final break with England at the end of the War of 1812 increased the recognition that the survival of the nation lay with developing its westward resources. The greater distances between the navigable rivers to the west, compared with those in the Tidewater, along with increasing westward migration demanded more roads and canal connections. This was

addressed by the general assembly in 1816 and 1817 by passage of legislation under which these demands would be addressed for the remainder of the 19th century.

Virginia, of course, was not the only state facing funding problems, and these were also the focus of considerable debate at the federal level. Although Virginia had patterned its road-building efforts after British antecedents, it did not adopt the "turnpike trust" approach used in England. Under this system, a committee of citizens in each of the towns and cities was authorized to borrow money, have turnpikes constructed, and collect tolls for their maintenance and for the amortization of the debt. When the debt was paid, the committee was supposed to cease and desist from the collection of tolls and to surrender the road to the public. This system did not work well in practice, and Parliament was often forced to intervene in what became vested interests and to deal with trustees who pocketed the proceeds as if these were indeed private enterprises.

In New England the principle of user support through tolls was adopted, but the companies were chartered as strictly private enterprises with no state participation. Ironically, because the private enterprise system in New England returned virtually no profits, the roads, such as they were, reverted to the public within a few decades thus unintentionally achieving the goal of the British system.

Even as transportation was being addressed at the state level the role of the federal government was being debated. In 1808 Albert Gallatin presented his landmark report on roads and canals to the U.S. Senate. He noted that in some countries roads and canals could be built by private enterprise. He did not think that this could be done in the United States because (a) capital was relatively scarce and (b) the needs were in a vast expanse of thinly populated territory. Gallatin further stated that "some works already executed are unprofitable; many more remain unattempted, because their ultimate productiveness depends on other improvements, too expensive or too distant to be embraced by the same individual."

Gallatin was convinced that the federal government was the

only agency competent to accomplish the task, and he proposed a comprehensive system of roads and canals linking the population and commercial centers of the eastern United States with Detroit, St. Louis, and New Orleans, as well as improvements to connections between Lakes Erie, Ontario, and Champlain. He also recommended the expenditure of federal money on local projects that were not directly benefited by the larger system. His estimate for accomplishing his 10-year plan was \$20 million, which he proposed to fund without additional taxation by using existing revenues and those from the sale of public lands. He suggested establishing a revolving fund; there would be continuous sale of the facilities to private entrepreneurs as they became profitable (the exact reverse of the British trust principle) and the proceeds would be applied to fund new projects. Although the War of 1812 caused the abandonment of any attempts to address transportation needs, it dramatically emphasized that a poor transportation system was a handicap to the country's military establishment. After the war congressional leaders supported something like the Gallatin plan but on a much more modest scale. The most visible of these efforts was the Calhoun Bonus Bill of 1817, which called for accomplishing internal improvements with funds to accrue to the federal government from a bonus declared by the banks. As ultimately passed, the bill required that the funds be distributed to the states on the basis of population. President Madison vetoed the bill on the ground that it was in excess of federal powers.

When Virginia committed itself to a coordinated statewide transportation effort, it found itself confronted with the necessity of choosing among a variety of theories and practices concerning the type of financial aid to be given, the agent for the distribution of that aid, and the method for raising the funds. In the first case, the question revolved around whether state funds should be used for stock subscriptions to private companies or be expended for actual construction controlled and supervised by the state. On the second point, the differing opinions centered on whether the capital should come from federal or state sources, from a combination of both, from private sources, or from a combination of private and state sources. On the third point, the question was the source of the supporting funds; that is, whether they should be tax monies, income derived from dividends and bank bonuses, or revenue gained from borrowing against the credit of the state. Obviously, these are the same questions that are faced today.

BOARD OF PUBLIC WORKS

Virginia's response to these questions was embodied in two legislative enactments of the general assembly. These two acts guided Virginia's turnpike, canal, and railroad efforts throughout the remainder of the 19th century. The first, passed on February 5, 1816, was titled "An Act to Create a Fund for Internal Improvement." It also created the Board of Public Works. The board included the governor as president. He was assisted by directors who were the treasurer, the attorney general, and 10 other citizens to be chosen annually by joint ballot of the senate and the house of delegates. Of these 10 citizens, the act stated that "three shall reside westward of the Allegheny mountain; two between the Allegheny and the Blue

Ridge; three between the Blue Ridge and the great post road (along the fall line) . . . and the residue, between that road and the coast." This distribution reflected the four physiographic regions previously described.

A majority of the board (seven members) were required to do business and the members received the same pay and allowances as the members of the legislature. The board was responsible for funding by subscribing to stock, overseeing, and providing technical assistance to private companies chartered by the legislature. Technical assistance associated with the location, design, and construction of the transportation facilities would come from the Office of the Principal Engineer. During the period 1816–1843 four individuals filled this office: Laommi Baldwin, Jr., Thomas Moore, Isaac Briggs, and Claud Crozet. Baldwin and Crozet were of international stature, and Moore and Briggs performed significant engineering assignments in the United States. It was intended that the board be reimbursed for engineering services, but such was seldom the case.

Of most significance for the present discussion is the Internal Improvement Fund itself and the way it was intended to be used. The fund was created by transfer to it of shares held by the state in the stock of the Little River Turnpike Company, the Dismal Swamp, Appomattox, Potomac, and James River canal companies, the Bank of Virginia, and the Farmer's Bank of Virginia.

The inclusion of the bank stocks deserves some explanation. In 1816 banks had existed in Virginia for only a few years and demands for more were increasingly heard. Bank dividends and bonuses were seen (and proved for several years) to be significant sources of revenues, as would be fees collected and put into the fund when new banks were established. Calhoun's Bonus Bill, previously discussed, was based on the same rationale. In this connection it is of interest to note that during this period the state of Tennessee created a fund supported by bank stock, stipulating that the proceeds were to be used for internal improvements and education.

The initial value of Virginia's fund was between \$1.2 million and \$1.3 million. The exact figure varies depending on which source is consulted, because of differences between par and market values. Because data compiled by Goodrich (1) will be used later in this paper, his figure of \$1,251,761 will be used for consistency. It was envisioned and intended that the fund be self-perpetuating, and although the income from the fund, about \$100,000, would be less than needed, the anticipated increasing income from bank stocks and the "profits" from the initial projects would soon provide sufficient monies to meet the needs.

Reduced to its essentials, use of the fund was based on four principles: first, financial aid for actual improvements was to be granted only in the form of stock subscriptions to companies duly incorporated by the legislature; second, only those works that could not be undertaken completely by private capital were to receive such aid; third, the state's stock subscriptions were designed primarily to place particular companies on a sound financial footing and were to be withdrawn when profits enabled the company to become self-sustaining; and, fourth, the revenue for improvements was to be derived from the profits accruing to the state in the form of dividends and bonuses and not from taxes and loans. Modifications occurred

apart from administration of the fund, but these principles remained essentially intact between 1816 and 1831.

Subscription was limited to two-fifths (40 percent) of the stock and could be made only after presentation to the board of documentation that the remaining three-fifths had been subscribed by private sources and that 20 percent of the private portion had actually been paid for. All turnpike stock was offered in small denominations compared with the stock of companies in New England, which often sold for \$1,000 a share. For instance, the costs for individual shares in Virginia were small, from \$25 to \$50, apparently in hopes of making the stock attractive to many small investors. Issues were common stock; no preferred stock or bonds were used. The board designated an individual to represent and vote its interest on the boards of the specific companies. It should be noted that the creation of the fund and the board occurred during a time of prosperity, but unfortunately depressed economic conditions were soon to follow.

Before the results of this legislation are presented, brief mention should be made of the law designed to guide the Board of Public Works in dealing with the turnpike companies. This law, passed February 7, 1817, was lengthy and detailed. Although it survived throughout the 19th century with only minor modifications, interpretations of its provisions varied from time to time and its provisions were sometimes ignored with relative impunity. The law required that companies apply to the legislature for a charter that included the amount of capital stock authorized and the denominations to be issued. It specified that after one-half of the authorized stock had been subscribed (but not necessarily paid for) a president and five directors should be elected. The law set forth widths of turnpikes, their surfacing, the construction of "summer roads," the erection of tollgates, the weight of loads and width of wheels, rates of tolls, remedies against nonpayers, and persons exempted. It, in effect, granted the company the state's power of eminent domain and the right to use materials adjacent to the road with provisions for settling disputes and assessing damages in the county court with the aid of five "discreet, intelligent, disinterested and impartial freeholders." It is of some interest to note that this law prohibited the cutting, without the owner's consent, of any "fruit tree, preserved in any field or lot, for shade or ornament . . ." or the taking of any material constituting a fence or building.

An important provision of the law was the portion that dealt with procedures relating to roads "out-of-repair." When a complaint was presented to a justice of the peace, three "discreet and disinterested freeholders" would be directed to inspect the road. If they found that the road was indeed "out-of-repair," the judge was empowered to suspend the collection of tolls until the road met the approval of the court. This was known as "throwing open the gates," and was rather commonly cited in reports submitted to the board. Obviously, failure to maintain the road made it less attractive to users willing to pay, and in many cases the lack of maintenance reflected the fact that there were not sufficient people using the road to generate the funds necessary for maintenance and operation—conditions similar to those faced by public transit today.

It would be gratifying if it were possible to conclude that the Board of Public Works was able to meet the needs with the

self-sustaining fund that appeared so logical and sound. Such success was not to be. Only the briefest summary of results can be presented here and the bottom-line figures would label this experiment a failure. In 1851 the board reported that the state possessed 872 mi of "the most capacious and substantially constructed canals in the Union" and about 3,000 mi of turnpikes. The effect of obsolescence had been heavy, and the subsequent emergence of the railroads was destined to magnify this situation. The board calculated the return on the state's investment as 7/1000 of 1 percent. They cited the Snicker's Gap Turnpike Company as "having a good road but not much used" since the traffic had been diverted to canals and railroads serving the same area.

Despite their lack of economic success, the transportation facilities were in place. There is evidence that the continued commitment to the mixed enterprise system reflected the fact that the motivation for internal improvement was not entirely economic and that no other system was deemed to be better. More likely, the commitment was based more on sentiments such as that expressed by the board in its 1839 annual report:

The enlarged results of roads and canals can no more be confined to these whose toil, enterprise and capital first opened them, than the blessings of freedom and good government be restricted to the patriotic band who risked their lives and properties in its establishment.

Although the bottom line, narrowly viewed in terms of direct economic return to the state and other stock holders, was disastrous, many of the roads that were built during this period continue to serve the commonwealth in upgraded form, and at least one of the bridges built in the 1820s still carries a primary route. It is against this background that the performance of the Internal Improvement Fund and the mixed enterprise approach for 45 years (1816–1860) will be discussed.

According to Rice (2), before the creation of the fund in 1816, the state had made separate cash payments for the construction of western roads. Of the \$204,147.01 expended from the fund by the state on all internal improvements, \$154,933.33 (76 percent) was in the form of stock subscription and the balance in irredeemable expenditures for surveys and construction not connected with private companies.

The state's investment and turnpike mileage between 1805 and 1860 as presented by Hunter (3) are summarized in Table 2.

TABLE 2 STATE INVESTMENT AND TURNPIKE MILEAGE

Year	State's Investment (\$)	Total Turnpike Mileage
1805	12,550	34
1810	168,100	173
1815	205,500	189
1820	278,475	321
1825	305,546	371
1830	386,331	541
1835	958,718	1,203
1840	1,824,166	2,148
1845	1,824,166	2,148
1850	4,066,493	4,827
1855	4,640,077	6,379
1860	4,643,077	6,390

As the data in this table indicate, the accretion of investment in turnpikes between 1805 and 1840 was slow but steady. Between 1840 and 1845, the worst years of depression, investment ceased. Then followed a period of spectacular increase and another period of no growth. No new companies were subscribed to between 1840 and 1845 and after 1854 only one 10-mi road was supported. Tables 3 and 4 are taken from Goodrich (1). As indicated in the notes, there are some slight discrepancies between the figures in the two tables, and these figures are not directly comparable with those in Table 2 because Tables 3 and 4 relate to all improvements and Table 2 is limited to turnpikes.

As the data in Table 3 indicate, between 1816 and 1824 the fund operated as anticipated. The total net revenue from all investments was \$706,771, of which \$62,385 (88 percent) came from "profits" of the companies. For the same period, as given in Table 4, the value of the bank holdings increased to \$1,337,200, which added to the holdings in improvements of \$608,661 provided a net worth of \$1,945,861, an increase of 55 percent during the 8-year period.

As the data in Table 3 indicate, an item for payment of interest first appeared in 1825 and an item for state contribution in 1836. As the data in Table 4 indicate, for the remainder of the period the value of the principal that created the fund was protected, but the stock did not appreciate as anticipated. By the end of the period the net revenue from all investments was a deficit of the same order of magnitude as the interest payments. Although the entire story of these entries is extremely complex, a brief outline of some of the major causes is necessary.

As has been noted, the Internal Improvement Fund was to be

applied to all modes of transportation, which at the time of its creation were roads and canals, including a few major bridge projects. The fund was created just at the time when interest in canals increased nationwide, which reinforced Virginia's resolve to canalize the Potomac and the James and their important tributaries.

In 1828 the Baltimore and Ohio Railroad began construction to connect the port of Baltimore with the Ohio River. This railroad began operation as a horse-drawn line in 1829, was converted to steam in 1831, and the entire connection was completed in 1852. Not only did the line pass through Virginia, it also portended a significant economic threat to Virginia's ports at Norfolk and Alexandria, which were dependent on the successful completion of canal projects on the James and Potomac rivers.

In addition to competing demands from canal and railroad interests, demands from the trans-Allegheny region for connections of any kind, including roads, were increasing greatly, a condition made even more complex because these facilities needed to be built in mountainous terrain and would traverse substantial distances through sparsely settled areas.

Compounding the difficulties posed by the greatly expanded needs were diminished resources reflecting the recession of 1819, which greatly decreased the productivity of the bank investments and available capital.

In 1820, in response to dissatisfaction with progress of the James River Company on its canal, legislation was passed under which the state assumed the responsibility of improving the waterway and management of the project. Under this transfer, stockholders in the original corporation were guaranteed an

TABLE 3 CURRENT REVENUE, EXPENDITURES, AND INVESTMENTS—VIRGINIA FUND FOR INTERNAL IMPROVEMENTS, 1816–1861

Year	Revenue from Bank Investments	Gross Revenue from Improvement Investments	Interest Payments	Net Revenue from Improvement Investments	Net Revenue from All Investments	State Contribution	Board Expenses	Investment from Current Revenue	Investment from Loan Proceeds	Investment from other Sources	Disinvestment	Net Investment
1816	32,429	.....	.....	.....	32,429	.....	3,721	.....	.....	1,251,761 ^h	.....	1,251,761
1817	74,987	8,000	.....	8,000	82,987	.....	6,572	51,605	.....	.....	.....	51,605
1818	111,810	7,000	.....	7,000	118,810	.....	8,508	158,679	.....	112,500	.....	271,179
1819	65,529	4,914	.....	4,914	70,443	.....	24,656	45,750	.....	.....	6,500	39,250
1820	81,579	3,408	.....	3,408	84,987	.....	23,199	46,650	.....	.....	.....	46,650
1821	64,354	11,997	.....	11,997	76,352	.....	15,783	67,650	.....	4,700	.....	72,350
1822	77,984	11,878	.....	11,878	89,862	.....	16,056	72,070	.....	.....	23,370	48,699
1823	68,984 ^b	7,318	.....	7,318	76,302	.....	8,936	77,400	.....	.....	.....	77,400
1824	71,729 ^b	7,870	.....	7,870	78,599	.....	13,199	49,280	.....	.....	.....	77,400
1825	77,173	38,345	45,558	- 7,212	69,960	.....	15,957	47,280	.....	.....	.....	47,280
1826	79,005	32,505	62,450	- 29,934	49,070	.....	8,868	43,225	.....	.....	.....	43,225
1827	71,274	40,895	70,370	- 29,474	41,799	.....	9,656	35,383	.....	.....	40,300 ^k	-4,917
1828	69,215	47,611	71,673	- 24,061	45,153	.....	8,738	38,077	.....	.....	.....	38,077
1829	76,080	45,624	71,673	- 26,049	50,031	.....	6,669	31,064	.....	.....	.....	31,064
1830	76,178	62,484	71,898	- 9,414	66,764	.....	10,945	15,866	.....	.....	.....	15,866
1831	72,160	59,410	72,376	- 12,965	59,195	.....	13,528	18,641	.....	.....	.....	18,641
1832	80,163	58,898	74,883	- 15,984	64,178	.....	8,994	81,140	80,000	.....	.....	161,140
1833	87,099	72,245	80,361	- 8,116	78,983	.....	13,009	35,112	65,000	.....	22,000	78,112
1834	105,218	43,384	80,630	- 37,245	67,972	.....	18,419	47,753	395,000	.....	.....	442,753
1835	125,930	67,732	94,445	- 26,713	99,216	.....	15,267	25,459	253,800	.....	15,173	274,086
1836	131,959 ^b	62,459	99,769	- 35,310	96,649	.....	13,012	75,681 ^e	118,008	1,000,000 ^h	11,700 ^l	1,181,981
1837	119,715 ^b	61,191	101,337	- 40,146	79,569	.....	9,962	26,771	137,428 ^e	965,969	.....	123,996 ^l
1838	92,748 ^b	62,711	184,693	- 121,981	- 29,233	100,052	26,364	10,550 ^e	1,298,834	.....	.....	1,309,384
1839	144,305 ^b	87,198	265,092	- 177,893	- 33,58 ⁿ	85,000	21,259	19,097 ^e	948,574	.....	.....	967,671
1840	92,002 ^b	69,446	356,292	- 286,846	- 194,843	201,200	16,412	20,000 ^e	203,792	.....	.....	223,792
1841	79,072 ^b	48,738	338,771	- 290,032	- 210,960	239,600	10,231	20,900 ^e	229,282	.....	.....	250,182
1842	72,779 ^b	21,695	325,024	- 303,328	- 230,549	238,500	9,226	13,100 ^e	366,124	.....	.....	379,224
1843	107,852 ^b	22,619	368,136	- 345,516	- 237,664	241,000	6,028	.....^e	42,820	.....	10,100 ^m	32,720
1844	123,773 ^b	67,826	372,418	- 304,592	- 180,819	186,000	3,070	8,000 ^e	8,808	105,540 ^t	.....	122,348

TABLE 3 *continued*

Year	Revenue from Bank Investments	Gross Revenue from Improvement Investments	Interest Payments	Net Revenue from Improvement Investments	Net Revenue from All Investments	State Contribution	Board Expenses	Investment from Current Revenue	Investment from Loan Proceeds	Investment from other Sources	Disinvestment	Net Investment
1845	118,400 ^b	72,414	386,489	- 314,074	- 195,673	190,080	3,750	4,000 ^e	16,469	.....	.....	20,469
1846	119,202 ^b	97,107	353,426	- 256,318	- 137,115	195,676	3,810	3,500 ^e	23,358	.....	697,592 ^m	-670,734
1847	126,943	97,775	346,407	- 248,631	- 131,688	150,000	6,471	5,102 ^f	530,446 ^f	27,520 ⁱ	260,000 ^k	303,069
1848	128,006	106,126	409,092	- 309,965	- 176,959	200,000	6,985	19,430 ^f	454,527 ^f	52,308 ⁱ	.....	526,266
1849	126,370	150,251	406,691	- 256,440	- 130,070	175,000	7,709	6,430 ^f	724,742 ^f	4,000 ⁱ	338,100 ⁿ	397,072
1850	130,114	133,738	477,858	- 344,120	- 214,005	197,000	8,016	25,922	1,664,527	698,971 ^h	187,266 ^m	2,202,155
1851	139,442	151,772	570,662	- 418,889	- 279,447	245,000	17,061	2,410	2,118,639	339,131 ^j	31,001 ^o	2,429,179
1852	139,373	183,744	737,521	- 553,777	- 414,403	145,305 ^d	21,554	256,688	2,616,070	.....	1,500	2,871,258
1853	145,520	121,503	748,156 ^c	- 626,652	- 481,132	832,715	6,007	150,000	3,849,552	.....	43,524	3,956,028
1854	152,211	320,615	1,842,855	-1,522,239	-1,370,028	1,351,880	5,069	389,131	3,997,946	.....	100,000	4,287,077
1855	155,860	97,582	1,798,304	-1,700,721	-1,544,861	1,600,027	5,449	140,000	1,654,010	.....	64,600 ^p	1,729,409
1856	157,349	140,348	1,986,947	-1,846,599	-1,689,250	1,655,895	6,564	.....	2,194,599	.....	4,000	2,190,599
1857	148,380	98,922	2,328,090	-2,229,168	-2,808,788	2,098,737	6,093	.....	1,041,596	.....	143,996 ^q	897,600
1858	150,139	135,616	2,632,515	-2,496,898	-2,346,759	2,353,998	11,772	.....	1,568,951	.....	.....	1,568,951
1859	162,954	319,648	2,934,797	-2,615,148	-2,452,193	2,451,842	6,387	.....	1,589,343	300,000	.....	1,889,313
1860	166,971	341,463	2,703,748	-2,362,285	-2,195,314	2,200,019	10,475	.....	6,394,447 ^B	.....	.....	6,394,447
1861	154,505	174,521	2,478,266	-2,303,744	-2,149,239	2,158,191	8,163	.....	1,297,205	.....	.....	1,297,205
Total ^a	4,942,845	3,878,565	26,347,691	-22,468,817	-17,526,268	19,502,599	574,390	2,295,453	36,712,438	3,896,431	2,114,718	40,789,596

Notes to Table 3

This and the following table have been prepared by Naomi Waxman from the Reports of the Second Auditor on the State of the Fund for Internal Improvements.

^aThe totals will show a slight discrepancy since the cents columns have been omitted in printing.

^bIncludes bank bonus.

^cFrom this point on, payments made by the Board and the state to the sinking fund for interest and redemption are included as well as interest payments made directly by the Board.

^dReduced by \$150,000 loan from Board to treasury.

^eIncludes bank bonus paid in stock.

^fPart of this was for state works not at the time listed as assets of the Fund: \$37,958 in 1848; \$192,788 in 1849.

^gOf this, \$5,052,000 represents acquisition of \$7,400,000 stock in James River and Kanawha Company in return for a subscription of \$200,000, the conversion of a loan of \$2,386,000, and the assumption by the state of the company's guaranteed bonds and of the annuity to the stock of the old James River Company.

^hTransfer of state's interest to Board.

ⁱConversion of debt for interest or current dividends into company bonds or stock.

^jOf this, \$85,200 represents revaluation of old James River Company stock; \$43,950 represents conversion of company debt into bonds or stock; \$210,000 represents excess of book value over cash paid for improvement sold to Board by city of Petersburg.

^kNo receipts to Fund. Proceeds appear to have gone to state treasury or sinking fund.

^l\$5,600 represents loss on sale of assets.

^mAssets written off or written down.

ⁿ\$323,500 represents the value of the state holdings in the Petersburg Railroad which were transferred to the city of Petersburg; \$10,600 represents sale of assets for which no receipts to the Fund are shown.

^o\$11,413 represents loss involved in sale of improvement to city of Petersburg.

^p\$50,000 represents assets written off.

^q\$40,000 sale of bank stock; \$103,000 assets written off; no receipts to Fund.

annual return of 12 percent on their investment for the first 12 years and 15 percent thereafter. Significantly, the company was not placed under the Board of Public Works but rather under a state corporation of which the governor was president. The company was authorized to borrow \$200,000 a year to complete the project, with the state guaranteeing the interest. Fortunately, if there was a deficit, no more than \$18,000 could come from the Internal Improvement Fund. As Goodrich and others have observed, this was the beginning of reduced authority of the board to plan and optimize its commitment of

resources, but it increasingly faced the problem of responding to the dictates of powerful forces in the general assembly committed to the canal even after its obsolescence was recognized. Improvements did accelerate, but between 1820 and 1823 the costs of the work exceeded by almost three times those estimated. Obviously, the use of \$18,000, which did not entirely pay the interest, was not popular with those demanding improvements in other areas. The situation worsened. According to Rice (2), between 1823 and 1831 work on the canal progressed slowly but payment of interest on the loans required

TABLE 4 CAPITAL ACCOUNT—VIRGINIA FUND FOR INTERNAL IMPROVEMENTS, 1816–1861

Year	Bank Holdings	Holdings in State Works	Holdings in Other Improvements	Total Holdings in Improvements	Total Holdings ^b	Debt Outstanding	Net Worth
1816	1,128,000		123,661	123,661	1,251,761		1,251,761
1817	1,164,300		139,161	139,161	1,303,461		1,303,461
1818	1,364,100		173,461	173,461	1,537,561		1,537,561
1819	1,357,600		219,211	219,211	1,576,811		1,576,811
1820	1,357,600		265,861	265,861	1,623,461		1,623,461
1821	1,358,200		337,611	337,611	1,696,811		1,696,811
1822	1,337,200		433,051	433,051	1,770,251		1,770,251
1823	1,337,200		509,381	509,381	1,846,581		1,846,581
1824	1,337,200		608,661	608,661	1,945,861		1,945,861
1825	1,337,200		655,941	655,941	1,993,141		1,993,141
1826	1,337,220		699,166	699,166	2,036,366		2,036,366
1827	1,337,200		694,249	694,249	2,031,449		2,031,449
1828	1,337,200		732,326	732,326	2,060,526		2,060,526
1829	1,337,200		763,391	763,391	2,100,591		2,100,591
1830	1,337,200		779,257	779,257	2,116,457		2,116,457
1831	1,337,200		797,899	797,899	2,135,099		2,135,099
1832	1,371,600		920,923	920,923	2,292,523	50,000	2,242,523
1833	1,396,473		994,035	994,035	2,390,508	80,000	2,310,508
1834	1,396,473		1,436,789	1,436,789	2,833,262	135,000	2,698,262
1835	1,391,300		1,716,049	1,716,049	3,117,349	440,000	2,677,349
1836	1,392,500		2,898,813	2,898,813	4,291,313	521,500	3,769,813
1837	1,345,800	6,469	3,889,919	3,896,389	5,242,189	1,735,900	3,490,289
1838	1,349,800	19,520	5,186,040	5,205,561	6,555,360	2,695,400	3,859,960
1839	1,363,700	44,492	6,114,839	6,159,332	7,453,031	3,672,113	3,780,917
1840	1,383,700	63,754	6,299,364	6,363,119	7,746,824	3,802,680	3,944,143
1841	1,404,600	103,982	6,472,442	6,576,424	7,981,024	4,026,960	3,954,107
1842	1,417,700	190,385	6,751,756	6,942,141	8,359,824	4,377,376	3,982,448
1843	1,417,700	226,385	6,747,752	6,974,137	8,391,837	4,414,917	3,976,920
1844	1,388,200	230,522	6,910,153	7,140,676	8,528,876	4,660,671	3,982,448
1845	1,392,200	244,008	6,841,701	7,085,710	8,467,910	4,394,660	4,073,250
1846	1,143,850	187,213	6,478,998	6,666,211	7,810,061	4,288,585	3,521,476
1847	1,143,850	187,358	6,850,123	7,037,481	8,181,331	4,885,735	3,295,596
1848	1,143,850	194,136	7,331,653	7,525,790	8,669,640	5,359,550	3,310,080
1849	1,143,850	235,409	7,518,402	7,753,811	8,897,661	5,985,432	2,912,229
1850	1,143,850	1,193,676	8,747,290	9,940,967	11,099,817	8,063,039	3,036,777
1851	1,143,850	1,554,595	10,939,560	12,494,156	13,638,006	10,139,630	3,498,376
1852	1,143,850	1,975,901	13,373,334	15,350,236	16,494,086	13,679,447 ^c	2,814,639
1853	1,143,850	2,363,673	16,781,939	19,145,612	20,289,462	17,591,668	2,697,794
1843-55 ^a	1,143,850	3,688,984	21,457,068	25,146,053	26,289,903	24,255,372	2,034,530
1856-57 ^a	1,103,850	4,390,129	23,893,169	28,283,299	29,387,159	27,032,808	2,354,915
1858-59 ^a	1,103,850	5,285,346	26,456,528	31,741,874	32,845,724	29,740,209	3,105,515
1860-61 ^a	1,103,850	6,530,531	32,813,277	39,343,808	40,452,292	34,359,418 ^d	6,092,873

^aBiennial reports only.

^bYear-to-year changes in this column correspond substantially with the figures of Net Investment in Table 3, but the nature of the data and changes in the accounting methods of the Fund cause minor discrepancies.

^cFrom this point on, the figure represents all improvement debt outstanding in the hands of the public and therefore may overstate the Fund's obligation by including debt for improvement projects not listed as assets of the Fund.

^dDoes not include obligation to pay annuity on old James River stock.

20.8 percent of the total disbursements from the fund in 1823, 54.0 percent in 1826, and 68.9 percent in 1831. Obviously, this created a major political controversy during the entire period. According to even the most conservative estimates made in 1816, the value of public works that should have been constructed by the beginning of 1830 was more than \$5.7 million. The actual value amounted to just over \$500,000 in stock subscriptions, \$190,000 in loans to companies, and \$50,000 in the form of the state's purchase of James River stock.

In 1831 the board was reorganized to divest the administra-

tive body of its 10 elective members and place their duties in the hands of ex officio directors (the governor, the lieutenant-governor, the treasurer, and the second auditor). This legislation also reduced the salary of the principal engineer, Claud Crozet, and the following year his job was abolished. At least part of the dissatisfaction with Crozet was due to his advocacy of abandonment of the proposed extension of the canal across the mountains in favor of building a rail connection to the Ohio River.

Crozet's recognition of the impact of the railroad was

obviously prophetic of the other major impact on the "self-perpetuating" fund. The first state subscription to railroads from the fund apparently occurred in 1831. Although most of the railroads before 1850 were local in nature, after 1850 the Board of Public Works exercised a major influence in integrating the east-west routes into a compatible system, often over the opposition of the canal interests. The ultimate effect of the addition of railroad needs to those of canals and roads was that, during the period 1785-1860, approximately \$37 million was appropriated for public works, approximately two-thirds of which went to railroad projects, and most of that after 1847.

The Civil War and massive floods in 1870 and 1877, coupled with the ascension of the railroads, ended Virginia's canal system. In 1880 the Richmond & Alleghany Railroad Company purchased the assets of the James River Company and constructed its James River line on the towpath on which it runs today. This line became a part of the Chesapeake & Ohio Railway Company in 1888.

In addition to the reorganization of the board and the initial subscription to railroad stock in 1831, the state at the same time responded to the trans-Allegheny needs by chartering companies in which the state was the major, if not sole, stockholder to construct the turnpikes of great length that represented Virginia's reach for the westward trade. Four of these were the Kanawha, the Northwestern, the Staunton and Parkersburg, and the Southwestern. The roads were 208, 237, 234, and 175 mi long and required state subscriptions of \$249,393, \$425,280, \$368,278, and \$562,100. Facilities of this length through sparsely settled country were of little interest to private investors but today remain as primary routes in upgraded form. Their construction covered the period 1825-1846, largely a period of nationwide economic depression.

During the period 1802-1861, the legislature chartered 647 toll roads of which only 190 (29 percent) became operating enterprises. Of the 37 chartered between 1802 and 1848, only 14 paid any dividends to the shareholders. Statistical information on the 190 companies is presented in the Appendix in which the companies are arranged by physiographic regions.

SUMMARY

Extrapolation of 19th-century experience to current issues obviously must be done with significant reservations. There are, however, certain lessons to be learned and certain general

factors that should at least be recognized when considering the funding needs and sources necessary to protect the investment in America's transportation infrastructure and expand it to meet projected needs.

The most obvious lesson is that current issues differ from those of the 19th century more in degree than in kind. The provision of a balanced and integrated statewide, multimodal transportation system must take into account complex technical, economic, and political factors as well as needs that usually exceed the available resources even when subsidized by public funds.

The major questions addressed during the formulation of Virginia's improvement efforts in the early part of the 19th century were (a) whether state funds should be used for stock subscriptions to private companies or be expended for actual construction by the state; (b) whether the capital should come from federal or state funds or from a combination of both; and (c) whether the funds should come from taxation, general revenues, or borrowing. Obviously, these continue to be important questions.

In addition to the obsolescence of a major element (canals) and the emergence of an unanticipated mode (railroads), Virginia's 19th-century experience illustrates that a comparatively small portion of the overall transportation system carries its own cost and, in effect, subsidizes the remainder, particularly when a significant portion of the system serves the needs of areas with low population densities. Involvement of the private sector in only those facilities that return a profit would make the remainder of the system even more dependent on public funding.

Viewed strictly in economic terms and as a closed system, Virginia's "mixed enterprise" approach to funding internal improvements was a failure. Viewed from a broader perspective of benefits to the citizens and commercial enterprises of the commonwealth, it provided the basis of the current road system, which is the third largest state system in the nation.

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1. C. Goodrich. *The Virginia System of Mixed Enterprise: A Study of Planning of Internal Improvements*. *Political Science Quarterly*, Sept. 1949.
2. P. M. Rice. *Internal Improvements in Virginia, 1775-1860*. Ph.D. dissertation. University of North Carolina, Chapel Hill, 1948.
3. R. F. Hunter. *The Turnpike Movement in Virginia, 1816-1860*. Ph.D. dissertation. Columbia University, New York, 1957.

APPENDIX: DATA ON EARLY VIRGINIA TURNPIKES

TABLE A-1 INTERREGIONAL ROUTES BY REGION

Name	Date Chartered	Date Opened	Length, Miles	Authorized Capitalization	State's Proportion of Total Subscription	Income, Repair Costs, and Dividends Through 1848			
						Average Tolls, Mile/Year	Average Repair Costs, Mile/Year	Dividends Years Average Paid	Dividends Yield
TIDEWATER, PIEDMONT & SOUTHSIDE									
Little River	1802 ^(a)	1806	33 3/4	\$150,000	8%	\$425	\$180	27	2.02%
Fauquier & Alexandria	1808	1819?	28 1/2	100,000	30%	66	59	none	--
Leesburg	1809	1820 (1859)	14 20	84,000	40%	129	77	6	0.314%
Swift Run Gap	1810	1813	36 1/2	119,800	39%	100	42	23	1.24%
Fairfax	1813	(b)	3	13,750	40%	(c)	(b)	--	(b)
Falls Bridge	1813	1823	13	80,521	40%	20	57	none	--
Manchester & Petersburg	1816	1824	20	75,900	11%	154	79	none	--
Middle	1818	1832	16 1/2	60,000	40%	41	22	none	--
Leesburg & Summer's Gap	1831	1834	10	50,000	40%	83	144	none	--
Pittsylvania & Lynchburg	1834	1837	25 3/4	17,500	40%	60	79	none ^(d)	--
Lynchburg & Buffalo Springs	1837	1839?	41 3/4	25,000	40%	28	10	none	--
THE VALLEY									
Shepherdstown & Smithfield	1816	1826	13 3/4	46,687	40%	\$40	10	none	--
Jackson's River	1829	1833	26	20,000	40%	50	34	7	(b)
Lexington & Covington	1829	1833	41 1/4	36,000	40%	24	25	none	--
Berryville	1830	1833	15 1/2	16,700	38%	46	9	11	(b)
Smithfield, Charleston & Harper's Ferry	1830	1832	14	35,750	39%	99	44	none	--
Warm Springs & Harrisonburg	1830	1833	59 3/4	30,000	40%	31	16	6	(b)
Natural Bridge	1836	1839	35	16,000	40%	6	7	none	--
Valley	1838	1840	92	400,000	60%	140	108	none	(e)
SOUTHWEST VIRGINIA									
Lafayette & English Ferry	1838	1843	24	15,000	40%	472	20	9	2.43%
Salem Pepper's Ferry	1838	1842	36	17,540	35%	475	23	9	none
TRANS-ALLEGHENY									
Wellsburg & Washington	1822	1835?	6	18,783	27%	\$127	\$67	2	0.364%
White & Salt Sulphur Springs	1831	1837	20 1/2	10,000	40%	44	19	10	5.12%
Lewisburg & Blue Sulphur Springs	1834	1838	15 1/4	12,500	40%	41	6	none	--
Charleston & Point Pleasant	1835	1839	56	52,800	40%	17	9	none	--
Red & Blue Sulphur Springs	1836	1839	32 3/4	12,500	40%	6	5	none	--
Capapon & North Branch	1838	1846?	45	30,000	40%	12	4	none	--
Holiday's Cove	1838	1840	6	12,250	39%	47	53	2	0.274%

Source: Hunter, R. F., "The Turnpike Movement in Virginia, 1816-1860," Unpublished Ph.D. dissertation, Columbia University, 1957.

^a Unsuccessfully chartered in 1785 and 1795.

^b Unknown.

^c Receipts given to toll collector (apparently to cover his costs).

^d Paid \$5,425 in dividends by 1860.

^e Paid \$34,000 in dividends by 1860.

TABLE A-2 INTERREGIONAL ROUTES BY CORRIDOR

Name	Date Chartered	Date Opened	Length	Authorized Capitalization	State's Proportion of Total Subscription	Income, Repair Costs, and Dividends Through 1848			
						Average Tolls Mile/Year	Average Repair Costs Mile/Year	Dividends Years Paid	Average Yield
VALLEY -- PIEDMONT									
Ashby's Gap	1809	1827	20 1/2	133,050	11%	\$217	\$147	17	1.23%
Snicker's Gap	1810	1823	33 3/4	85,275	23%	41	22	none	--
Tye River & Blue Ridge	1819	1827	22 1/4	6,000	40	5	6	none	--
Staunton & James River	1824	1827	43 1/2	50,000 ^(a)	40	89	56	14	(b)
SOUTHWEST -- SOUTHEAST									
Lynchburg & Salem	1818	1824	59 1/2	103,700	29	102	24	24	2.27%
Fincastle & Blue Ridge	1830	1834	14	8,000	40	40	17	13	(b)
Pittsylvania, Franklin & Botetourt	1830	1841	93	27,825	40	8 (to 1843)	(b)	none	--
TRANS-ALLEGHENY -- VALLEY									
Huntersville & Warm Springs	1832	1837	27	16,000	40	\$5	\$17	none	--
TRANS-ALLEGHENY -- SOUTHWEST									
Giles, Fayette & Kanawha	1837	(b)	118	42,600	35	(b)	(b)	none	--

Source: Hunter, R. F., "The Turnpike Movement in Virginia, 1816-1860," Unpublished Ph.D. dissertation, Columbia University, 1957.

^a Increased by \$120,000 in 1859.