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The word "road" probably was derived from the Middle English "rode," which meant a mounted journey. The companion word "highway" is believed to have come from the practice, hundreds of years ago in England, of building main roads higher than the adjacent land by throwing earth from side ditches toward the center, as the ancient Romans had done. Because they were higher, they were called "high wayes."

This is a story of their development in Virginia.

The Virginia settlers who arrived at Jamestown Island aboard three small ships on May 13, 1607, had little need in the beginning for a road system.

Barely more than a hundred in number, their first concerns were disease, hunger, and shelter, and protection from the often hostile Indians who had lived on the land for generations before. In those first rigorous years, survival itself demanded the full energy of the colonists in the wilderness.

And the waterways were there for transportation—the great rivers which emptied into the Bay, and which were to become known as the James, the York, the Rappahannock, the Potomac.

As the colonists hunted for food and cautiously began exploring the forest, they discovered a crude network of trails made long before by Indians and wild animals. The colonists used these, and many of the trails were to shape the Virginia road pattern for years to come.

The settlers also found roughly-built bridges formed by the Indians from tree trunks and limbs (and which the settlers at first believed to be Indian-planted traps, not bridges).

By 1610, with new arrivals from England, the colony numbered some 210.

The "Rhoads along the River Bank," probably a former Indian trail, was used to haul supplies from the ships to the Jamestown Fort.

The "Greate Road" appears to have been Jamestown's main street, and it was of early commercial importance. It crossed the isthmus connecting the island with the mainland at Glass House Point, where in 1608 and for a brief period afterwards glass was manufactured for export. Faint traces of the road are evident today at Glass House Point.

Eventually, the "Greate Road" was extended on the mainland to Middle Plantation, a settlement to become

known as Williamsburg and destined to be the capital of the Virginia colony and the hub of the colonial road system.

The first "bridge" recorded as having been built by the English settlers was constructed in 1611 at Jamestown Island. It wasn't really a bridge, but a wharf about 200 feet long from the bank of the James to the river channel, where the settlers docked their ships.

It was to these ships that the colony's first agricultural crops raised for export would be rolled.

John Rolfe had begun experimenting with cultivation of tobacco in 1612, and two years later exported a shipment to England. In less than 20 years, tobacco exports had reached 500,000 pounds annually; tobacco would remain the foundation for the Virginia economy throughout the colonial period.

Inevitably, it was to influence the colony's transportation, as well.

The tobacco fields spread on the mainland, and a number of the old Indian trails became "tobacco rolling roads." The name came from the practice of packing the harvested tobacco in barrels called hogheads and rolling them to the wharves, frequently a distance of miles. The rollers ordinarily tried to follow the high ground, and avoided the fords, or shallow stream crossings, because water leaking through the barrels would damage the tobacco. This practice of following the old trails and branching off from time to time on higher ground accounted for many of the early meandering country roads.

After two decades, the colony's population was near 5,000 and growing. The frontier had been pushed well beyond its original boundaries, and while much of the settlers' travel was still by boat, an increasing proportion was on land.



Waterways and crude paths met transportation needs of Indians and early settlers.



Traces of Jamestown's "Greate Road" are visible today (above), but the colonists were to carve many other great roads through the Virginia wilderness.



AMERICA'S FIRST ROAD LAW

The need for improving the roads to better serve the social and economic life of the colony was among the matters facing members of the House of Burgesses as they met at Jamestown in September, 1632.

And before adjournment, they had passed the first highway legislation in American history, an act providing, in the language of the day, that, "Highways shall be layd out in such convenient places as are requisite accordinge as the Governor and Counsell or the commissioners for the monthlie corts shall appoynt, or accordinge as the parishioners of every parish shall agree."

This first legislation also required each man in the colony to work on the roads a given number of days each year, a custom dating at least from the feudal period of the Middle Ages in England, or to pay another to work in his place. This labor law, to remain in effect for more than 250 years, provided the main source of workers for road and bridge construction.

Twenty-five years later, probably in March of 1657, the colony's basic road law was broadened to provide, "That surveyors of highwaie and maintenance for bridges be yearly kept and appointed in each countie cort respectively, and that all generall wayes from county to county and all churchwales to be layd out and cleered yearly as each countie cort shall think fit, needfull, and convenient, respect being had to the course used in England to that end."

In 1661, the surveyors were empowered to select locations for roads, choosing "the most convenient wayes to Church, to the Court, to James Towne, and from County to County."

By the end of the seventeenth century, many miles of primitive roads threaded throughout Tidewater

The Sea of China and the Indies



Early map illustrates importance of waterways.

Virginia. The colony's population had reached 70,000. While horseback was the most frequent means of overland travel, horse-drawn carts became more numerous, and some carriages and coaches gradually appeared.

In 1705, the Legislature passed a new road act providing for "making, clearing, and repairing the highways and for clearing the rivers and creeks... for the more convenient traveling and carriage, by land, of tobaccos, merchandise, or other things within this dominion..."

It provided for further extension of the road system and required that the roads "be kept well cleared from woods and bushes, and the roots well grubbed up, at least thirty feet broad." The new law also provided for skilled labor to erect bridges larger than could be built by the local surveyors, and when such a bridge was to cross a county line its cost would be divided "proportionable to the number of tithables in each county."

Other road laws came quickly in the early years of the eighteenth century. Owners of mill dams were required to provide a 10-foot passage on dams and spillways; it became mandatory for a county in which an iron furnace was operated to provide "good roads to be laid out and made from such works to the nearest place upon some navigable river or creek"; establishment of public ferries was authorized by the Legislature.

In 1716, Alexander Spotswood, regarded by many as perhaps the best of the colonial Governors, led his "Knights of the Golden Horseshoe" up the summits of

(Below) Colonial surveyors helped chart the course for Virginia's growth.



the "Great Mountains," the Blue Ridge, and looked down in amazement at the splendor of the Shenandoah Valley. Spotswood, a former soldier, recognized that settlement of the Valley could help protect eastern Virginia from hostile forces.

And it was in the next quarter-century that the Valley and much of Piedmont, the rolling country between the mountains and Tidewater, were settled by pioneers moving inland and by many others who came down into the Valley from Pennsylvania and New Jersey.

Extending north and south through the Valley was a relatively good Indian trail, called by various names including the Appalachian Warriors' Path and the Shenandoah Hunting Path. By the mid-eighteenth century, it had been developed into "The Great Wagon Road" which eventually led from Pennsylvania southward through the Valley and on to Georgia.

Toward the southern end of the Valley, the Great Wagon Road separated into two branches near Big Lick, later to become the site of Roanoke. While one branch left the Valley and went due south, the other continued west and crossed Cumberland Gap through the Allegheny Mountains at what now is the junction of the Virginia, Kentucky, and Tennessee borders. After Daniel Boone and a band of frontiersmen cleared a path into Kentucky about 1775, the western branch became known as the Wilderness Road, and it was to become the main pioneer route along which traveled the first waves of the great migration to the West.

East of the mountains, two principal routes led from the site of Richmond deep into the interior. One was a trail to the settlements which were to become Lynchburg and Roanoke, a course now followed approximately by US Routes 60 and 460. The other was the Three Chopt (or Three Notched) road to Albemarle, where it connected with another trail leading across the mountains at Alton and into the Valley. Its name came from the way it was marked to guide travelers, with notches cut on the trees.

In his "Notes on the State of Virginia" in 1785, Thomas Jefferson described the approach to handling road matters: "The roads are under the government of the county courts, subject to be controlled by the general court. They order new roads to be opened wherever they think them necessary. The inhabitants of the county are by them laid off into precincts, to each of which they allot a convenient portion of the public roads to be kept in repair. Such bridges as may be built without the assistance of artificers (skilled workers or craftsmen), they are to build. If the stream be such as to require a bridge of regular workmanship, the county employs workmen to build it at the expense of the whole county. If it be too great for the county, application is made to the General Assembly, who authorizes individuals to build it, and to take a fixed toll from all passengers, or gives sanction to such other propositions as to them appear reasonable. Ferries are admitted only at such places as are particularly pointed out by law, and the rates of ferriage are fixed."

TURNPIKE ERA

Road-building in the latter stages of the eighteenth century and much of the nineteenth century was marked by the development of many turnpikes, or toll roads. As Jefferson observed, toll financing provided a means of building highway facilities for which there was a need but which were too complex and costly to be constructed by the counties alone.

For the most part, Virginia counties were impoverished and exhausted from their contributions of money, men, supplies, and other resources to the Revolutionary War. The turnpike era offered a new way of meeting road needs.

The turnpike got its name from its toll gate. When first designed, the gate was a turnstile consisting of two crossed bars pointed at their outer ends and turned on a vertical bar or pole.

In 1772, the Virginia Legislature cleared the way for what probably was the first toll road in America, when it authorized Augusta County to build a highway over the mountain between Jennings's Gap and Warm Springs and to establish a toll gate. The road, as provided by the Legislature, was to be financed with 300 pounds advanced by the colony and 900 pounds raised by a lottery. Revenue collected from travelers was to be spent for upkeep of the road and "towards building... housing for the reception of the poor sick resorting to the said springs."

In 1785, the Legislature appointed a commission to erect toll gates on existing roads in the Alexandria area to increase road revenue. The Fairfax and Loudoun Turnpike Road Company was chartered in 1795 to construct an improved road between Alexandria and Little River in Fairfax County. It accomplished little, however, and was followed in 1802 by the Little River Turnpike Company which, in 1811, completed a 20-foot-wide turnpike extending west from Alexandria for a distance of about 34 miles. It was to be operated as a toll road

Population Growth

Year	Population
1800	880,200
1820	1,065,366
1840	1,239,797
1860	1,896,318
1880	1,512,565*
1900	1,854,184
1920	2,809,187
1940	2,677,773
1960	3,954,429
1970	4,651,448

* (Area now constituting West Virginia formed part of Virginia in 1860 and prior years.)

for nearly a century, and its completion touched off construction of many turnpikes in Virginia by the time of the Civil War.

Virginia's population by 1800 had climbed to 880,200, with settlers in most of the major regions which make up the present state. This growth and expansion led the General Assembly in February, 1816, to establish the nation's first state board of public works and to create a fund for internal improvement. The board, with the Governor serving as president, was empowered to appoint a "principal engineer" for the state, and it was to remain in existence until 1902. Its formation coincided with the beginning of the nation's "canal era."

The board was responsible for chartering, funding, and supervising internal improvements. The fund, amounting to more than a million dollars, was created by transfer of shares owned by the state in the stock of the Little River Turnpike Company; the Dismal Swamp, Appomattox, Potomac, and James River Canal Companies, and in two banks. Money in the fund was to be used to match private capital in financing improvements.

The office of the principal engineer provided important technology for the location, design, and construction of transportation facilities in Virginia for many years.

The first principal engineer, Laommi Baldwin, Jr., held the office from 1816 to 1818, when he resigned. Baldwin was succeeded by Thomas Moore, who served until his death in 1822. Moore then was followed by Claudius Crozet, an engineer who was to have deep influence on Virginia transportation.

Crozet had been a French artillery officer under Napoleon Bonaparte before coming to America, and then had been a distinguished teacher at the United States Military Academy at West Point.

In Virginia, he served two terms as principal engineer, 1823-31 and 1838-43. The break in his service reflects the continuing dilemma of those faced with responsibility for applying the results of rapidly changing technology to large-scale public works.

One of the major efforts supported by the board of public works was the James River and Kanawha Canal, which was intended to improve communication and trade between the populous and politically powerful eastern Virginia and the comparatively isolated western regions of the state. Development of the canal had started in 1785, but it had not advanced as rapidly as its promoters had hoped.

A new and serious obstacle to its success appeared in 1829, when the "Stourbridge Lion," an early locomotive, was imported to the United States from England. A year later, Crozet suggested that in view of this exciting new invention, a steam railroad would be preferable to the canal to link east and west. It was a bold idea, indeed, because until then no railroad using steam locomotives had been operated in this country. Moreover, it was a controversial idea; powerful forces in the state wanted completion of the canal.

Largely as an outgrowth of the controversy, the board of public works was reorganized by the Legislature in 1831 with a requirement for annual legislative approval of the principal engineer. In addition, Crozet's salary was reduced from \$3,500 to \$2,500. Crozet resigned, and spent the next six years in Louisiana.

He returned to his former position in Virginia at the beginning of 1838, and although his position favoring railroads over canals was ultimately proved correct, the controversy remained. It ended in 1843 with an act stating "that the office of chief engineer of the state be and the same is hereby abolished."

Shortly afterwards, Crozet became principal of the Richmond Academy in downtown Richmond, but in



Many roads were built as toll facilities in late 18th, 19th centuries.

1849 he responded to the pleas of his former opponents and returned to the practice of engineering to direct construction of a railroad through the mountains. The present community of Crozet in Albemarle County is named for him.

During calmer days as state engineer, Crozet also had been responsible for building highways through the mountains, as well as in other regions. One of the principal roads was the Northwestern Turnpike, which emerged in 1827 as Virginia's bid for the profitable trade of the territory northwest of the Ohio River.

Legislation incorporating the turnpike authorized subscriptions from the townspeople of Winchester, where the road was to begin, and of the other communities along the way, but its authors chose a route to serve the most populous towns without much regard for the difficult terrain. Little progress was made.

In 1831, the Legislature provided for a company, with the Governor as president of its board of directors, to borrow money and construct the turnpike with a minimum width of 12 feet "from Winchester to some point on the Ohio River to be situated by the principal engineer."

The turnpike eventually reached the Ohio River, and its gentle grades and alignment developed largely under Crozet's direction made it one of the good roads of its day. The course it followed is largely that utilized today by US Route 50.

The Valley Turnpike was another important nineteenth century road developed during this period. Incorporated in 1834, the Valley Turnpike Company was authorized by the Legislature to improve the route between Winchester and Harrisonburg—part of the ancient Indian warriors' path and of the Great Wagon Road followed by the early pioneers. The improvements were financed largely with \$25 shares sold to private citizens, and were completed in 1840.



Logs and earth were used in construction of corduroy roads.

EARLY PAVING METHODS

While most roads remained dirt and in miserable condition, the turnpikes—relying on income from travelers for their existence—were provided in most instances with surfaces of gravel, broken stone, wood, or macadam.

The old Manchester Pike near Richmond had been surfaced with gravel in 1808, and was recognized as the first "artificial" or paved road in the state.

The widely used macadam surface was named after its developer, John Loudon McAdam, a Scottish-born engineer who had begun building roads in England in the early nineteenth century. He is regarded as the first to recognize that dry soil itself generally would support the weight of traffic, and that pavement was necessary only to provide a smooth riding surface and to insure dryness.

The macadam pavement consisted of crushed rock packed tightly into thin layers, with a top surface of sand or finely crushed stone rolled to provide a well-bound surface which resisted the penetrating damage of rain, ice, and snow. McAdam generally specified a uniform thickness of seven to 10 inches for the finished road, although some ranged at least to 18 inches in thickness.

The specifications for one macadam road provided for the first layer of stone to be "cast on with a shovel to a depth of six inches, after the manner of sowing grain." It was to be compacted with a cast-iron roller "prepared with a box, or cart bed, to carry two or three tons of sand" and rolled until "sufficiently solid and compact to receive the second layer." After dressing of the surface "with a rake or otherwise," the second layer, three to four inches thick, was to be "put on, rolled, and prepared in all respects as the first stratum was, until in a state of firmness and solidity, proper to admit

the third or last stratum, which can then be put on, and the surface raked and dressed to such shape and form as may be required, and also rolled until satisfactorily compacted."

Part of the Lynchburg-Salem Turnpike was the first segment of road to be macadamized in Virginia. The Valley Turnpike and the Southwestern Turnpike, between Salem and Seven Mile Fork near Marion, were others.

Wooden pavements also were used widely in the turnpike era, perhaps naturally since standing timber was abundant over much of the state.

"Corduroy" roads were built by placing small logs side by side along a cleared path, and covering them with dirt for smoothness. The "plank" road was introduced in America from Canada, where some 500 miles had been laid between 1834 and 1850. A typical plank road had a single track about eight feet wide, with the planks placed crosswise. Later, they were inclined slightly to allow rainwater to drain.

By the mid-nineteenth century, the railroads Crozet had favored were handling much of the long-distance movement of passengers and freight. This posed a new problem for the turnpikes, many of them already financially troubled. The railroads gained such great popularity that apathy developed toward road improvements. For the turnpikes, it meant reduced use and revenue. For other roads, it meant that many remained little more than dirt paths, impassable after heavy rains or during winter thaws and rising choking clouds of dust at other times.

With the outbreak of the Civil War in 1861, roads and railroads became immensely important to both the Confederate and Union armies, however. The transportation arteries often governed the outcome of battles. The



Plank roads were introduced from Canada in 19th century.

armies fought over them, guarded them, rebuilt them, constructed new ones. Food, clothing, medical supplies, guns, ammunition, and men moved by road and by rail.

In September, 1861, General Robert E. Lee, writing from a mountain encampment to Governor John Letcher, said that, "Our greatest difficulty is the roads. It has been raining in these mountains about six weeks. It is impossible to get along. It is that which has paralyzed all our efforts."

Two years later, then commander of the Army of Northern Virginia, Lee wrote, "It has been raining a great deal . . . making the roads horrid and embarrassing our operations." Some wagons simply broke down on the road from the mud and rocks.

Other military commanders on both sides could tell similar stories of how road conditions often hindered their operations. Poor to begin with, the roads and bridges were damaged and destroyed as the armies fought over them repeatedly. The company which operated the Valley Turnpike reported that its revenue collections were negligible because "of the army destroying bridges, injuring toll houses, and we are getting very little tolls."

For most of the turnpike companies, the war was the final stroke from which they could not recover, and many passed from private to county ownership. Toll collections on most of the turnpikes never had been enough to pay operating and maintenance costs or to do much toward retiring the indebtedness, and the extensive but financially weak turnpike era was nearing an end.

A few toll facilities, the Little River and Valley Turnpikes among them, somehow managed to recover sufficiently from the rages of war to remain in operation into the early twentieth century. But a constitutional amendment in 1874 decreed that the state government could no longer invest in turnpike company stock. The risk was too great.

After the war, the state's board of public works turned mainly to matters other than roads, and in the counties there developed a widely-varying patchwork of road development practices. Twenty-five years after the war, Virginia's roads were far worse than when the war began.

This was true despite the fact that in the Reconstruction period the General Assembly enacted much road legislation. The problem was that much of it was confusing and meaningless and, sometimes, humorous. One law made it illegal to drive or lead a bear on a public highway, and another set a fine of \$5 for a pedestrian who crossed a bridge at a pace greater than a walk.

But a series of events late in the nineteenth century and early in the twentieth century was about to revolutionize man's mode of travel.

A group of bicyclists, the League of American Wheelmen, helped to point up the problem. The league was organized in 1880, and almost immediately its members began pleading for improved roads.

And in Springfield, Mass., in September, 1893, what



The horse and buggy and muddy roads were common in the late 1890s (above), but the village blacksmith was about to become the village mechanic.



generally is accepted as the first American gasoline-powered automobile was given a short road test by its builders, the brothers Charles E. and J. Frank Duryea.

That same year in Washington, the Congress established the United States Office of Road Inquiry, directing the Secretary of Agriculture "to make inquiries in regard to the system of road management throughout the United States," to investigate methods of road-building, and to assist in disseminating information about the nation's roads.

Good roads societies were organized in many states, and in Virginia this movement dates at least to 1894, when the Young Business Men's League of Roanoke took the leadership in forming the Virginia Good Roads Association. Local meetings and statewide conventions were held, and enthusiasm grew swiftly.

In September, 1895, the Duryea brothers established the first American company to manufacture gasoline-driven cars, the Duryea Motor Wagon Company. In 1904, the Ford Motor Company produced 1,695 cars, and by 1907 had increased its production to 14,887.

They called the last decade of the nineteenth century the Gay '90s, and the daring new mobility was a part of the mood. What is believed to have been the first automobile of any kind operated in Virginia was driven along Norfolk's streets in 1899, powered by kerosene. Eleven years before that significant event, the world's first commercially successful streetcar system had begun operations in Richmond. The state's population had grown to 1,854,184, and while it was about 85 per cent rural, the capital of Richmond could count a total of 85,000 residents. Throughout Virginia, as throughout the nation, the public's delight with the automobile was mounting by leaps and bounds. But in most places the roads weren't ready for this "horseless carriage."

GETTING ORGANIZED

Two Governors in this period gave strong support to the mushrooming good roads movement. They were Andrew Jackson Montague, the state's chief executive from 1902 to 1906, and his successor, Claude A. Swanson, who served until 1910. Their recommendations to the General Assembly in 1906 helped set the state government's course for the years ahead in road development.

Meeting in Richmond, which since 1780 had been the state's capital city, the Legislature created the first State Highway Commission. Final approval was given to the legislation on March 6, 1906. There was to be a State Highway Commissioner, to be appointed by the Governor with General Assembly confirmation and to be a Virginia citizen and "a civil engineer and a person well-versed in road-building."

The Commission also was to include three professors of civil engineering, one each from the University of Virginia, Virginia Military Institute, and what then was the Virgin Agricultural and Mechanical College and Polytechnic Institute at Blacksburg. They were to be chosen by the boards of visitors at the respective institutions.

Governor Swanson appointed Phillip St. Julien Wilson, a Powhatan County native and a civil engineering graduate in the Class of 1886 at Virginia Military Institute, as the first Commissioner. Wilson was 38, and was serving as assistant city engineer for Richmond at the time of his appointment.

Joining him on the first Commission were William M. Thornton, dean of the engineering department at the University of Virginia; Col. T. A. Jones, civil engineering professor at Virginia Military Institute, and Col. R. A. Marr, dean of engineering at Virginia Agricultural and Mechanical College and Polytechnic Institute.

The law provided that the Commissioner "shall have a general supervision of the construction and repair of the main traveled roads of the state; the Commissioner may recommend to the local road authorities of any county, and to the Governor, needed improvements in the public roads; he shall supply technical information on road-building to any citizen or officer in the state, and from time to time publish for public use such information as will be generally useful for road improvement."

While the counties kept responsibility for actually making the improvements, they had a new state agency to which they could turn for help. For example, they could apply to the Commissioner for civil engineering advice, and if he concluded that a proposed project would be permanent and on a main road and that it was practical, his office would prepare detailed plans and specifications and, at the county's expense, assign a civil engineer to supervise construction.

The 1906 Legislature also established the state convict road force as a source of labor. "All prisoners convicted of a crime and sentenced either to hard labor on the public roads or to imprisonment in jail, and all per-

sons imprisoned in jail for the non-payment of fine and costs, shall, when delivered upon order of the superintendent of the penitentiary for such purpose, constitute the state convict road force," the statute said.

For some years before, convict labor had been available to the counties for road work, but not more than half of the counties used it. After the 1906 legislation, the convict labor was channeled to roads which would benefit the whole state.

The Commissioner also encouraged county officials to look beyond their own borders to the importance of working toward a coordinated, statewide highway system. Because still, to the frustration of the early motorist, an improved road in one county might shrink to a rutted trail or disappear entirely in another. Boat or train remained the most certain means of traveling long distances in reasonable comfort.

In the Commission's first annual report to the Governor and General Assembly in October, 1907, Wilson shed light on that first year's operation:

"This department being newly established, some time was necessarily required for organization and preparation for carrying out the provisions of the law to the best advantage," he said. "Efforts along this line proved that men in the state who were familiar with the work of permanent road improvement were difficult to secure. Competent engineers and foremen are obtainable, but comparatively few with any experience in modern highway construction, and without the services of such men road work cannot be carried on to the best advantage."

Moreover, he added, "Much preliminary work had to be done by the county authorities before they were actually ready to begin work. The problem of raising the necessary funds to defray the counties' portion of the expense was, in most instances, a difficult one, and met with many obstacles and delays. The machinery and



This bridge, constructed in the 1870s, was typical of many in rural Virginia at the turn of the century.

equipment furnished by the counties has been, in several instances, very inadequate for the proper handling of the work."

For some months, he said, "great difficulty was experienced in securing prisoners from jails for service in the state convict road force, and the number of convicts in the state penitentiary who, under the law, were available for road work was very limited. As a consequence, the organization of the first force was not completed until October, 1906, and it was not until well on in December, 1906, that we were able to put to work as many as five forces of about 50 men each."

Wilson observed that while criticism had been voiced



A traveler slowly winds his way home (above); below, road maintenance was crude, often neglected.



in several quarters "about the undesirability, even inhumanity, of using convict labor on public works, all of which may have been justified," the fact was that "the men in the road camps seem satisfied, and many have expressed to me a preference for this work to remaining in jail."

The Commissioner, after barely more than a year on the job and engaged in what had become largely a mission of public education, also commented on the inadequacy of funds available for road maintenance. It was a problem which had plagued the turnpikes a century before, and it would continue for another decade.

"This is a matter of the greatest importance, as even the best constructed roads require frequent, though not expensive, attention to keep them in good condition and to prevent the extensive and costly repairs that the lack of such attention will necessitate," he said. "I would suggest that an amendment to the law be made to the effect that state aid will be extended to the construction of a road only upon condition that the county applying for such aid agree to make suitable provision for the up-keep of the improved road."

Ironically, the first improvement project completed with help of the Commission was the road between Williamsburg and Jamestown Island. Most of the road was surfaced with gravel and with a mixture of sand and clay; about two miles were macadamized.

The General Assembly in 1906 had appropriated \$16,000 to support the fledgling road program for the period from July 1, 1906, when the legislation became effective, to February 28, 1908. It was to pay the salaries of the small staff—the Commissioner, his assistant, a bridge engineer, a draftsman, a clerk, and a stenographer—and to furnish the offices and to purchase supplies.

FIRST CONSTRUCTION APPROPRIATION

By 1908, the need for better roads had reached the point that the Legislature made its first appropriation for construction purposes under the new state program—\$250,000 annually, beginning March 1, 1909, "out of any money in the state treasury not otherwise appropriated." It was intended mainly for use in counties where convict labor was not available, and was to be matched equally by the counties in paying for road improvements.

"This law does more than provide a very considerable additional fund for road improvement, as its requirement that a county shall raise an amount equal to its share of the fund before it can be obtained arouses the people to the importance of making extra efforts to provide money for improving the roads," Wilson said.

During this period, state law directed the counties to levy a road tax of up to 40 cents for each \$100 in value



on real estate and personal property, with the revenue to cover the counties' share of improvements and to buy road equipment. In addition, the counties were authorized to issue bonds "for the purpose of macadamizing or otherwise permanently improving the public roads . . . or building bridges . . ."

By 1910, Virginians owned 2,705 motor vehicles, and the General Assembly decided the time had come to regulate their use. It was in this year that the state's first registration and licensing of motor vehicles was required, with registration fees of \$5 for autos of 20 horsepower or less, \$10 for those with 20 to 45 horsepower, and \$20 for vehicles with more than 45 horsepower. A \$2 registration fee was set for motorcycles (and 235 were registered in 1910). The fees were to be paid into the state treasury as a special fund to be spent for improving main roads. Total revenue amounted to \$21,656 from the first year's collections.

In 1910 the General Assembly also enacted the first controls on motor vehicle speeds in Virginia—20 miles an hour in open country, eight miles an hour in towns,



The original "horsepower" pulled snow plows and school buses—and often was called upon to tug a stuck auto from the mud.

around curves, and at key intersections.

Three years later, with more than 10,000 motor vehicles in the state and the road program continuing to grow, Wilson left Virginia to become chief engineer for the United States Office of Public Roads and Rural Engineering in Washington, an agency which had followed the Office of Road Inquiry. He was succeeded by George P. Coleman, who had been his assistant since 1906.

Even as the changeover in administration was occurring, Wilson again cited the nagging problem of inadequate road maintenance.

"The expenditure of considerable amounts of money derived from long-term bonds by the various counties in the state for the construction of roads, and the evident lack of care of these roads after they have been constructed, demonstrates that unless some more adequate means for the maintenance of these roads is provided than has yet been provided by the several counties in which they have been constructed, there will be a time when the counties will have little left but the debt



Workmen and neighbors celebrated the completion of a new bridge across the Shenandoah River in 1912, but there were still serious problems for motorists crossing from one county or state into another.



which they have incurred," Wilson said.

He declared that unless stringent maintenance requirements were imposed, "the expenditures made and the work of this department during the past seven years will have been as naught."

By that time, the counties had issued approximately \$7 million in bonds. And the new Commissioner, George Coleman, agreed with his predecessor that this investment wasn't being protected.

Increasing use of the roads made the problem even more urgent. By 1916, more than 37,000 motor vehicles were registered in the state. It would be a pivotal year for the road program in Virginia and nationally.

In Richmond, the General Assembly passed what was called the automobile maintenance law, providing that income from vehicle license fees was to be placed in a special maintenance fund to be administered by the Commission in cooperation with county authorities, and with expenditures to be matched equally by the counties.

The Legislature also began curing the headache of

the state's disjointed roads, those that were smooth and hard-surfaced in one county and rutted dirt in the next. A study committee consisting of three members from the State Senate, four from the House of Delegates, and the Highway Commissioner was appointed to develop a plan for a state highway system to include the main roads between population centers.

In Washington, meanwhile, increasing attention was being focused on the problems of improving roads which connected the various states. Virginia's George Coleman had been a chief organizer of the American Association of State Highway Officials in 1914. The group was formed by highway administrators in the states to provide a forum for discussion of technical, legislative and economic matters and to strengthen the state-federal relationship in roads.

One of the association's first moves was to designate a committee to prepare proposed legislation for the Congress authorizing federal participation in construction of highways and encouraging better state-to-state coordination. Coleman was chairman of that legislation-drafting

committee.

Its proposals were submitted to the Congress in 1916, and were approved that year largely as presented. The new law provided for construction of rural public roads, and defined them as "any public road over which the United States mails now are or may hereafter be transported." Federal funds were not to exceed 50 per cent of the cost of constructing improvements, and the states were to have responsibility for maintaining the completed facilities.

President Woodrow Wilson signed the Federal Aid Road Act on July 11, 1916. It was the federal government's first comprehensive law aimed at establishing a nationwide highway system. When it was passed, America had 2,578,078 miles of public roads; 294,569 miles, or 11.4 per cent, were surfaced.

For the 1916-17 fiscal year, Virginia received approximately \$100,000 in federal funds. The road between Hansonville and the Washington-Russell County line at Moccasin Gap, now US Route 19, was the first road in the state to be improved with federal aid.

STATE SYSTEM APPROVED

During its 1918 session in Richmond, the General Assembly approved the establishment of the first state highway system, a network of 4,002 miles for which construction and maintenance was to be the direct responsibility of the Highway Commissioner and his staff.

Among the roads to be included was the old Valley Turnpike between Winchester and Staunton, which was still being operated as a toll road in 1918. As late as 1926, it remained the only hard-surfaced road of much distance.

The so-called Richmond-Washington highway, often muddy predecessor of US Route 1 and Interstate 95, also was included in the system. At the time, it was gravel and soil except for a short section of concrete south of Alexandria and a short macadamized segment north of Richmond. As on many roads, cars frequently had to be pulled by other vehicles or by horses through swamp-like areas in rainy weather and in winter thaws. A fully paved Route 1 was not completed until 1927.

In 1918, the Legislature also continued the convict road force, but limited its use to the new state system. In 1922, a law authorized the Commission to expand the system each year by an amount of mileage equal to two and one-half per cent of the original system. Subsequent additions also were made by other legislative action.



An early work force took time to pose for a group photograph.

In an extra session in 1919, the General Assembly made a significant change in Commission organization. It was expanded from four to five members, and was to be appointed by the Governor with the advice and consent of the Senate. More importantly, members in the future were to be private citizens chosen to represent major geographical regions of the state, with one of the five serving as chairman. In addition, the Governor was to appoint the Commissioner who would administer day-to-day operations but who would not sit as a member of the Commission.

Virginia's road development was about to be interrupted, however, by circumstances far beyond the state's borders with the outbreak of World War I. Coleman spoke of it this way:

"The year opened up with orders from the federal government restricting the use of all cars and the practical confiscation of all road materials for war purposes. The declaration of war by this country was followed immediately by a serious labor shortage and a consequent increase in the cost of labor and materials. These restrictions and increased costs were largely on such road materials as steel, cement, stone, gravel, sand, bitumens, and so forth . . . Approximately 80 per cent of the engineers and specially trained men of the department entered the service of their country . . . We are making every effort to meet this condition with the funds at hand."

The state's population had exceeded 2,300,000, and more than 145,000 motor vehicles were registered.



This is how it was in 1919 for travelers between Richmond and Washington along what later was to become US Route 1. Shown is the Dumfries area in Prince William County . . .



...And it was a scene repeated over and over throughout Virginia and the nation.



By the late 1920s, conditions had improved enough for tourists to gather for excursion trips (above) and motorists could travel between Richmond and Washington on a hard-surfaced road.



FINANCING THE ROADS

After the war, the road development program regained momentum, and sought to keep up with the growing popularity of the auto. More than 25,000 vehicles would be added to the state's roads in a year's time. Inevitably, questions persisted about how to raise additional highway revenue to meet the mounting needs.

The State Constitution of 1869 had prohibited any state debt except to meet casual deficits in the revenue, to redeem previous liabilities, or to protect the state in event of insurrection or war. The same restriction remained in a revised Constitution of 1902, but a later amendment, pushed by the Good Roads Association and approved by 61,000 votes in a referendum in 1920, had permitted the Legislature to issue bonds to build or repair roads. Statewide political debate developed about using that permissive borrowing power, however.

State Senator Harry F. Byrd, Sr., of Winchester, chairman of the Roads Committee in the Virginia Senate, opposed bonds, and urged the levying of a three-cents-a-gallon gasoline tax to produce the needed revenue.

Early in 1923, Governor E. Lee Trinkle called an extra "roads" session of the General Assembly to decide a course of action. He recommended a temporary "pay as you go" policy until the question of bonds could be considered again by the voters in a referendum.

The Legislature approved the Byrd gasoline tax proposal, and ordered that a suggested \$50 million bond issue be submitted to referendum in November.

By a margin of some 46,000 votes, the citizens this time rejected the bond issue idea, in what was considered in many ways a victory for rural voters. Only 19 counties voted for the bond issue, while it won approval in 17 of the state's cities. The gasoline tax was destined to become the largest single source of revenue for road-building and maintenance, and was to be increased gradually over the years. At the national level, a gasoline tax approved by the Congress was to become the principal revenue source for the federally-aided road program, as well.

During debate about financing, Virginia's highway organization continued to be refined. In 1922, the Legislature directed that the state be divided geographically into eight highway districts, and that available funds be distributed among them in equal shares.

Other organizational changes in the Commission led to appointment of Henry G. Shirley, who had been Maryland's highway administrator, as chairman. George Coleman stayed as Highway Commissioner until his resignation in 1923, and later the positions of chairman and Commissioner were combined.

In 1927, as part of a reorganization of state government, the Department of Highways was formally established as a state agency, although the Commission staff had been popularly called the "highway department" since the outset.

As disconnected sections of improved roads were linked into continuous long-distance routes crossing



Into the 20th century, the historic Valley Pike was a vital artery in Virginia's road system . . .

many states, travelers found themselves steadily more bewildered by a confusing array of directional and informational signs. There was little continuity or standardization from state to state, and it was easy for motorists to get lost in unfamiliar territory.

At the request of the American Association of State Highway Officials, the United States Secretary of Agriculture appointed a committee in March, 1925, "to undertake immediately the selection and designation of a comprehensive system of through . . . routes and to devise a comprehensive and uniform scheme for designating such routes in such manner as to give them a conspicuous place among the highways of the country as roads of inter-state and national significance."



It was this move which led to the beginning of route numbers and to uniform signs for the convenience of motorists throughout the nation, and which produced greater continuity in marking Virginia's roads. The basic plan provided generally for assigning even numbers to east-west routes and odd numbers to north-south roads.

By 1930, a total of 386,664 motor vehicles were registered in the state. The license tax produced \$6,564,000 in revenue, and the gasoline tax produced \$7,251,000. The state highway system had been increased to 7,191 miles.

But the counties still were plagued by problems of improving and maintaining the local roads for which they were responsible. Most of those roads remained in extremely poor condition. Few counties had engineers

on their staffs, and not many had the necessary equipment.

And yet about two-thirds of the state's workers earned their livelihoods from the land, and faced the continuing need of hauling farm products to market. The Depression which swept the nation brought more serious problems, and most rural Virginians had little money to pay the property taxes which had continued as the main source of income for the county roads.

In Richmond and in the district highway offices which had been established around the state, adjustments were made in road operations to aid as many families as possible during the economic crisis of Depression years.

During the fall of 1931, the Commission found that under normal work schedules it could provide employment and wages for only a few additional workers. But a "stagger system," providing jobs for one force of men one week and another force the next week, and alternating the procedure through the construction season, permitted jobs and income to be made available for 8,000 additional workers. The Commission kept this system in effect throughout the Depression.

MOTOR VEHICLE REGISTRATION

YEAR	NUMBER
1910	2,705
1920	145,340
1930	386,664
1940	525,877
1950	983,561
1960	1,533,887
1970	2,576,593

THE SECONDARY SYSTEM



It was against this background that the General Assembly in 1932 approved a means by which the counties could be relieved of road construction and maintenance responsibility. The "Byrd Road Act," inspired by the former Winchester senator who two years before had completed a term as Governor, authorized establishment of the state secondary road system. It permitted each county, if it wished, to give its road responsibility to the Highway Commission. One economist estimated that this action would reduce rural taxes by \$2,895,102 annually.

Four counties—Arlington, Henrico, Nottoway, and Warwick—chose to keep the responsibility; the other counties joined the new secondary system. In 1933, Nottoway reversed its earlier decision and joined the system, and, many years afterwards, Warwick gave up its county status to become a city and, still later, merged with Newport News. Arlington and Henrico continue to operate their own local roads.



. . . But off the beaten path, and sometimes on it as well, travel still could be a disheartening experience.

When the secondary system was established, it totaled 35,900 miles. It included 2,000 miles hard-surfaced, 8,900 miles with soil or gravel surfaces, and more than 25,000 miles, or almost 70 per cent, of largely unimproved dirt roads. Some counties had no hard-surfaced roads.

Within a decade, the amount of hard-surfaced roads had tripled, the mileage of soil and gravel roads had doubled, and the unimproved roads had been reduced almost by half.

With the arrival of the secondary system, the main roads for which the state had been responsible became the primary highway system.

In August, 1939, with motor vehicle registration approaching a half-million, Commissioner Henry Shirley reported that, "The demand for a road that can be used throughout the year is becoming greater and greater, and such a road has become a necessity. Practically all horse-drawn equipment has vanished from the highways, and motor equipment taken its place, requiring a road that can be traveled the year-round."

A year later, he reported another development which was to become a major part of road operations in Virginia and elsewhere. "All the main highways are being marked with traffic lines, and the system adopted we hope will be the means of saving many lives. Under no

State Secondary System Mileage

Year	Hard Surfaced	Soil or Gravel	Unsurfaced	Total
1932*	2,000	8,900	25,000	35,900
1940	6,093	17,742	43,825	67,660
1950	12,092	22,906	4,191	39,189
1960	20,615	19,324	1,784	41,823
1970	25,808	16,074	421	42,303

* (The state secondary system was established in 1932.)



Highways and road signs were vastly improved by the 1930s.

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Safety problems continued to trouble highway engineers as autos grew in number.

Brig. Gen. James A. Anderson, who had taught civil engineering and been dean of the faculty at Virginia Military Institute, was on furlough from the academic world and was serving as coordinator of the State Defense Council at the time of Shirley's death in July, 1941. Anderson was appointed Highway Commissioner, a position in which he was to serve until his retirement in 1957.

"Accidents on the highways are increasing daily, and every care and precaution within the power of the Commission is being taken to reduce this heavy toll of life," Anderson said shortly after his appointment. "It is imperative that something be done to reduce the speed of automobiles on the highways, and to educate the drivers to the courtesy of the road."

Within months, the thoughts of Virginians and other citizens throughout the land were to be diverted by the entry of the United States into World War II.

"The war emergency has multiplied our responsibilities. Today as never before in history, the highways of the nation must be adequate at all times of the year to handle the modern mechanized army, and at the same time keep civilian transportation, involving largely, as it does, the marketing of farm and food supplies and the carrying of defense workers to industrial plants, on the move without delay," the Commission told Virginians.

"Under ordinary circumstances, these would not have been serious problems for us to handle. The foresightedness of previous years had modernized our major trunk highways to such a degree that they are equipped to handle their normal traffic load. The problem that has confronted us the most has been the need for rapid development and newly created feeder and access roads to the defense areas."

As had occurred a quarter-century before, employees left to join the armed forces and, in some instances, to take jobs in defense industries. Materials and supplies were in short supply. Rationing of tires and gasoline reduced travel, but also cut the accompanying revenue from road-user taxes. "All but the most urgent and important work . . . has been postponed until conditions improve," the Commission said.

Its members sought to bring "our highways through the war winters without undue interruption to traffic or serious loss of capital investment" and to aid as best they could in the nation's defense efforts. At one point, 3,000 pieces of federal equipment were repaired or overhauled at the Department of Highways equipment depot in Richmond.

Farm labor was hired to help with road maintenance, and students were employed and trained during the summers to assist in drafting rooms.

In 1942, the General Assembly expanded the Commission from five to nine members—one from each of the eight highway districts, with the fulltime Commissioner serving as chairman—and the enlarged group set about planning for the future.

"Under the heavy pounding of war-time traffic and inadequate maintenance, some of the older highway surfaces and bridges are failing and cannot endure for any length of time without costly failure," the Commission said. "The reconditioning or replacement of these will furnish one of the most important salvage jobs in post-war activities."

The winter of 1945-46 was described as "the worst experienced during the history of the department . . . 20,000 miles of low-type road went to pieces. The continued shortage of labor, equipment and materials had greatly handicapped efforts to make these roads serviceable throughout the year." The winter added to the post-war recovery woes, which were about to be tackled.

NOT A SCHOOL DAY LOST . . .

Just after the war, Anderson set a new objective for the state's regrouping highway forces: Not a school day lost because of mud. Muddy roads remained a problem in many areas, particularly in winter thaws, and Anderson's idea was to solve that dilemma while at the same time providing a solid goal toward which maintenance forces could work.

Moving in other new directions, the Commission began implementing a 20-year plan for upgrading all road systems, and embarked on a new program intended to replace most of the state's remaining ferries.

As authorized by a revenue bond act passed earlier by the General Assembly, the Commission decided during the 1946-47 fiscal year to construct toll bridges to replace ferry crossings on the York River at Yorktown and the Rappahannock River at Grey's Point, and to acquire from private owners the ferries which carried vehicles across Hampton Roads between the Norfolk and Lower Peninsula areas. Later, the Commission was to construct a modern bridge-tunnel to replace the Hampton Roads ferries and, through separate legislation, the General Assembly would establish a special authority to replace the Chesapeake Bay ferries between the mainland and the Eastern Shore with a 17.6-mile toll bridge-tunnel facility, and would authorize toll financing for a few other facilities which were considered essential but for which other funds were not available.

Unlike the turnpike era a century and a half earlier, however, there was not to be another period of widespread toll financing for roads. Those constructed in the twentieth century were to be relatively few in number.

By mid-1948, the state's road program generally had recovered from the wartime slowdown. A few deferred construction projects had been completed, and many others had been started. The Commission said the secondary roads were in better condition than ever before, and proudly announced that "for the second consecutive winter, not one school bus day was lost because of mud on the roads!"

With that objective producing dividends, another goal

was soon set: "A reasonably passable year-round road to every reasonably located farm and rural dwelling in Virginia." It reflected the Commission's belief that "there is no comfortable living in rural Virginia without a motor vehicle and a passable year-round road."

Progress truly was remarkable in those immediate post-war years. From 1945 to 1947 alone, the unsurfaced secondary system mileage was reduced by more than half—from 11,151 miles to 5,184 miles. And as the state entered the second half of the century, its road development program was about to enter its busiest times.

Virginia in 1950 had a population of 3,318,680. Motor vehicle registration was approaching a million. The United States census that year would be the last showing a majority of the state's citizens living in rural areas. Urban dwellers had grown from 35.3 per cent to 47 per cent of the total between 1940 and 1950. By the time of the 1960 census, 56 per cent of all Virginians would be in urban areas.

Traffic volumes were exceeding estimates, and in August of 1950 the Commission said that many "roads designed 10, 15 and 20 years ago were incapable of handling the growing mass of heavy, fast-moving traffic. Throughout the Commonwealth, the demand for road improvement was intensified . . . In most instances, no immediate relief is in sight."

"Funds simply are not available for the overnight modernization of the entire highway system . . . In the municipalities, the problem of providing free movement for traffic became increasingly acute. Huge sums will be required to alleviate traffic congestion in Virginia towns and cities," the Commission said.

Five years later, the Commission said again that it felt "a growing concern regarding Virginia's highway needs. People who use our highways are continuing to pay a big price in lives and money because of inadequacies on our roads. Statistics prove that the better road is the safer road. Highways with controlled intersections, with entrances and exits only at designated points, have fewer fatalities in relation to traffic volumes than do highways that lack such controls."

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Year	Interstate	Primary	Secondary	Urban	Total
1918*		4,002			4,002
1930		7,191			7,191
1940		9,404	37,860	228	47,292
1950		8,645	39,189	2,527	50,359
1960	154	7,926	41,823	4,337	54,240
1970	825	7,781	42,303	6,954	57,863

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In 1923, a Delaware business executive named T. Coleman DuPont had built a three-mile stretch of divided highway with his personal funds, and had given it to the state of Delaware. Road historians generally regard that segment of road as representing the origin of the concept of the superhighway. But Depression and war, and catching up on other basic needs, had slowed the spread of the concept.

Before his death in 1941, Henry Shirley had seen the need for such a facility in the rapidly urbanizing Northern Virginia suburbs of the District of Columbia. Active planning got under way in the mid-1940s, and the road was built in the late '40s and early 1950s. It was Virginia's first superhighway, and the Commission named it for Shirley.

Development of a nationwide system of such highways was first seriously considered in 1938, when the Congress asked the federal highway agency, by then called the Bureau of Public Roads, to study the feasibility of a toll-financed system of three east-west and three north-south superhighways. The study report encouraged the concept of a superhighway system, but said that it would be far from self-supporting if built on a toll-road basis. It proposed, instead, a network of toll-free roads for which the federal government would pay more than the normal 50 per cent federal aid rate.

The idea was studied further, and in the Federal Aid Highway Act of 1944 the Congress called for the designation of a national system of interstate highways



In the late 1940s, construction workers built Virginia's first expressway—the Shirley Highway in the northern part of the state.

"...so located as to connect by routes, as direct as practicable, the principal metropolitan areas, cities, and industrial centers, to serve the national defense, and to connect at suitable border points with routes of continental importance..."

It was not until the passage of Congressional legislation more than a decade later, in 1956, that sufficient funding was provided for development of the system to begin in earnest. Eventually, the system was to total 42,500 miles. It would represent little more than 1 per cent of the nation's total road and street mileage, but it would carry 20 per cent of the traffic. It was to be financed with 90 per cent federal and 10 per cent state funds.

Virginia's share was more than 1,070 miles, and the Highway Commission in 1956 assessed what development of the interstate system would mean to Virginia:

"Construction of this modern road network... involves many problems and radical changes in thought. Under the new program, interstate highways will be insulated from marginal traffic generated by motels, service stations, other types of businesses, and dwellings. Traffic entering and leaving these highways will do so at designated points. Cross movements of traffic, with which we are so familiar, will be eliminated.

"The benefits of controlled-access construction are numerous. A modern, controlled-access road transforms, in many ways, the area through which it passes. Land values increase. This type of road promotes safety, saves travel time, reduces the strain on drivers, and aids the economic development of the area. Controlled-access standards also protect the state's investment in its highways," the Commission observed, even before the first mile of the interstate system had been built. But it recognized, as well, the size of the job:

"We are now embarked on the most accelerated road program in the state's history. Unprecedented sums of money will be spent... to provide Virginia with modern, adequate highways. Present traffic patterns will be changed; new areas will be opened for business, residential, and recreational development. The future will present a challenge greater than any we have faced in our highway development. What we accomplish will depend largely on public understanding, acceptance, and support."

An extensive series of public hearings was undertaken around the state to discuss plans for interstate system projects with citizens and local governing officials.

The first interstate system hearing in Virginia was held by the Department of Highways February 20, 1957. It concerned a 10-mile segment of Interstate 95 south of Petersburg. Within the next four months, 10 more hearings were conducted on interstate projects, and construction began on the state's first project on the new system—the six-mile Interstate 95 bypass of Emporia. Early emphasis was focused on the Route 95 facility because it was to parallel US Route 1, which by the mid-1950s had become the most heavily traveled through road in Virginia and one of the nation's busiest highways.

The Emporia bypass also was the first interstate project to be completed in the Commonwealth. It was opened to traffic September 8, 1959. The first major interstate route to be completed fully was Interstate 495, the Virginia portion of a beltway circling the District of Columbia, with its final section being opened on April 2, 1964.

By the early 1970s, the interstate system was about 80 per cent finished, and it was fulfilling to a large degree the expectations expressed by the Commission at the outset of the program. Accident rates on the new superhighways were only about one-half the rates on the older conventional roads; travel time was reduced by an hour or more on cross-state auto trips; the new roads stimulated extensive commercial, industrial, and residential growth, and this, in turn, provided broader tax bases for local governments.

A new generation of Virginians, growing up with the interstate system, could hardly remember what travel was like without it.



By the 1970s, expressways built as part of the interstate system served much of Virginia. Interstate 64 threaded its way through the foothills of the Blue Ridge (above), and Interstate 77 was tunneled through the massive Big Walker Mountain north of Wytheville.



It soon became evident, however, that the interstate routes alone would not adequately serve the burgeoning population and the increasing desire for mobility by Virginians in the second half of the twentieth century. The spreading suburban growth which marked Virginia and other states in the years after World War II was induced in large part by the flexible mobility permitted by the family auto. Suburban housing development was followed by suburban shopping centers and office buildings. It all placed new demands on the state's roads and streets. The 20-year improvement plan which had been implemented by the Commission in the immediate post-war years had to be revised and updated frequently to keep pace with changing needs and growth patterns.

In 1962, the General Assembly established a new study commission to examine and evaluate highway needs, revenue, fund distribution procedures, and organization of the Department of Highways. It was to consist of one member from each of the eight construction districts and two citizens at large. They were appointed by Governor Albert S. Harrison, Jr., in May, 1962, with State Senator William F. Stone of Martinsville, a tall, experienced legislator who had been a chief patron of the act calling for the study, chosen as chairman.

For more than a year, the study commission went about its assignment, reviewing nearly every aspect of the highway program. The commission itself probably was the most important highway study group since the 1916 committee which recommended establishment of the first state highway system.

The Stone commission submitted its report to the Governor and the General Assembly in December, 1963, in time for its recommendations to be considered at the legislative session beginning the following month.

Among its points: "One of the prime factors in inducing business management to select a state for expansion or a new location is a good highway system which not only is needed for transportation of goods and raw materials but enables employees to be drawn from a wide radius. Some other states have moved ahead of Virginia in expanding their highway systems; we cannot afford to be left behind."

The study commission also described the motor vehicle as "an essential and integral part of our everyday life. Its impact upon our economy and way of life has reached dimensions which have exceeded all forecasts."

In an effort to keep up, the commission said, a new arterial network should be developed to supplement the interstate system.

Douglas B. Fugate, who had joined the department shortly after his graduation from Virginia Military Institute with a degree in civil engineering in 1927, was serving as assistant chief engineer at the time, and in

1964 was to be appointed Commissioner by Governor Harrison. Fugate proposed the arterial network concept to the study commission, and thus became chief architect of the network.

"The arterial road program, when completed, will in conjunction with the interstate system connect every city within the Commonwealth of 5,000 or more and nearly every town having a population of 3,500 to 5,000. When completed, there will be an arterial route or interstate route within a 40-mile radius of every town in Virginia," the study commission said.

Development of the network was authorized by the 1964 General Assembly, which also provided additional revenue through increases in the state's motor vehicle registration and operator's license fees. As approved, it totaled more than 1,700 miles, and was to be developed chiefly by building new two-lane roadways parallel to existing two-lane primary routes to create four-lane, divided facilities. More than 70 bypasses of cities and towns were to be constructed, to free local streets for local traffic, and many of the bypasses would be constructed virtually to interstate system standards.

The arterial network, half finished within seven years after it began, was expected to be completed in the early 1980s, at about the same time completion of the interstate program was anticipated. In some quarters, the network was described as a "model for the nation" because of the orderly way in which it insured upgrading of older primary roads while the interstate system development was still under way.

In the mid-1950s, when the interstate program was beginning, Virginia had about 300 miles of multi-lane divided highways. With interstate and arterial completion, it would have slightly more than 3,000 miles of such roads.



The arterial network provided additional four-lane divided roads...

STRENGTHENING THE ORGANIZATION

Other Stone commission recommendations led in 1964 to steps aimed at equipping the Department of Highways to better meet the growing challenge.

The General Assembly established the urban street system as a separate entity for the first time for distribution of highway funds, and directed that it receive a minimum of 14 per cent of all revenue exclusive of federal interstate funds. Total allocations to the urban system generally have exceeded the 14 per cent level, however.

The urban system was to include extensions of the state's primary routes within cities and towns, and other local streets of adequate width and surface. Eighty-five per cent of the cost of building improvements on this system was to be paid by state highway funds or by a combination of state and federal funds, with the local governments providing the remaining 15 per cent. In addition, millions of dollars in state road-user revenue were to be returned to the cities and towns each year for the maintenance of local streets.

As another result of the study commission, the Department of Highways was reorganized to reduce the number of individuals reporting directly to the Commissioner, giving him more hours a day to concentrate on broad policy and administrative issues.

The new organizational structure, which remains in effect today, provided for the Commissioner to carry out his assignment largely through the delegation of responsibility to two persons—a deputy commissioner-chief engineer and a director of administration. The deputy commissioner-chief engineer, in turn, exercised control over the department's engineering divisions and the eight construction districts through directors of engi-



...for a state whose population, urban areas, and travel all were growing steadily.

neering, programming and planning, and operations. The director of administration, as the title implies, was to supervise activities of the departmental divisions engaged primarily in administrative affairs.

Later, the division organization was to be changed somewhat to more effectively meet the public's highway needs. Its landscape division, organized in 1930 to deal mainly with erosion control, beautification, and outdoor advertising control, was expanded into an environmental quality division to coordinate the increasing ecological considerations. A metropolitan transportation planning division was established to prepare long-range, comprehensive plans for more than 45 cities and towns, and to aid in development of urban mass transit improvements. A data processing division was formed to take maximum advantage of the remarkable time savings permitted through electronic computers. And a management services division became responsible for insuring thorough implementation of internal policies and procedures.

As a result of these various organizational refinements, departmental divisions now are bridge, construction, fiscal, location and design, maintenance, management services, materials, metropolitan transportation planning, personnel, planning and scheduling, purchase and stores, research, right-of-way, Richmond-Petersburg Turnpike, secondary roads, toll facilities, traffic and safety, and urban. The organization also includes a legal section headed by an assistant attorney general and an office of public relations.

The districts remain as established originally in 1922. They are the Bristol, Culpeper, Fredericksburg, Lynchburg, Richmond, Salem, Staunton, and Suffolk Districts, and are further divided into 45 residencies, each generally responsible for day-to-day operations in



The 1970s brought increasing concern about the problems of urban mobility...

an average of three or four counties.

Through the 1960s and into the '70s, the emphasis of this extensive organization continued largely on the interstate and arterial programs, and on upgrading the older routes by elimination of obsolete bridges, poor alignment, and curves. The factor of "need" was added to others such as population, land area, miles of road, and vehicular miles of travel, which long had been considered in apportioning funds.

Improvements also continued on the secondary road system. By 1972, four decades after it was established, 27,000 miles were hard-surfaced, compared to 2,000 miles at the outset. Only 400 miles remained unsurfaced, and most of them served fewer than a dozen vehicles daily.

The public's investment in Virginia's highways was valued at more than \$5 billion. With nearly 12,000 employees, the Department of Highways was the largest agency in state government, and was among the half-dozen largest employers in the Commonwealth.

The convict road force remained and worked on maintenance and small construction projects. But there was an expanded emphasis on rehabilitation for the convicts.

A strong corps of private contractors had developed, and major construction projects were built under contracts awarded on a low-bid basis. Prospective bidders on this work were required to be "pre-qualified" on the basis of their experience, manpower, equipment, and financial resources, to insure satisfactory completion of contracts.

Questions about the importance of road and bridge maintenance had vanished long before, and millions of dollars were spent annually to protect the public's investment and to keep the facilities in safe condition.



...and a continuing emphasis on upgrading the older rural highways.



High standards for maintenance now keep Virginia's roads open throughout the year.

Some 5,000 department employees were assigned to maintenance operations—snow and ice control in winter, roadside mowing in summer, and resurfacing, clearing side ditches, collecting litter, and a multitude of other jobs. The road system which they maintained had become the nation's third largest, covering about 51,000 miles.

But for maintenance personnel, the demands sometimes were far from routine. The night of August 19, 1969, was an example.

It was then that rains from Hurricane Camille touched off flooding which swept across large portions of western and central Virginia, striking while the people slept. The United States Weather Bureau said later that 27 inches of rain had fallen in about eight hours near the little community of Massies Mill in Nelson County. Great torrents of water streamed down the mountainsides, uprooting trees which became battering rams against houses below. Ordinarily tranquil rivers and creeks poured out of their banks and rushed ahead with massive destruction. Some said it was the worst storm in

America's history, and it struck hard at much of the nation's East Coast. In Virginia, 114 persons were known killed, 37 others were missing, more than 100 were injured.

Two hundred miles of the state's roads were destroyed, and nearly 100 bridges were wrecked. The cost of repairing these facilities alone would exceed \$20 million.

Less than three years later, on the night of June 19, 1972, rain from a new hurricane—one called Agnes and considered a tropical storm by the time it reached Virginia—caused similar destruction over a wider area from the western regions to the coast.

Road maintenance men hadn't seen problems of these proportions before. They worked around the clock, and traffic was moving again within hours in many of the flood-wrecked areas and within a few days in most other places. The urgency was underscored by the fact that frequently other emergency and rescue operations could not proceed until roads were reopened and river and creek crossings were restored.

CHANGING CONCEPTS

By the 1970s, Virginia was a rapidly urbanizing state. Its population had grown to more than 4,600,000, with two-thirds living in the cities, towns, and suburbs. Motor vehicle registration had risen to more than 2,500,000. Between 1960 and 1970, travel on the state's highway system had increased by more than 65 per cent, and on an average weekday motorists drove some 75 million miles on Virginia's highways and streets. The two-car family had become commonplace, and driving was described as the nation's leading form of outdoor recreation.

Years before, agriculture had begun its decline as the principal foundation for the state's economy, although it remained of major importance. New and expanding industries occupied an increasingly vital role in the economic base.

In a December, 1971, report to the Virginia Advisory Legislative Council, the General Assembly's continuing study arm, the Highway Commission said that "much remains to be done in order to provide Virginians with what truly may be considered an adequate, statewide highway transportation system."

"In every county, city, and town, there are substandard facilities. Throughout Virginia, there remain thousands of miles of roads and hundreds of bridges

constructed more than 40 years ago. They were satisfactory for the uses they were built to serve; they are far from satisfactory for demands of the 1970s, and for those of the years beyond," the Commission said.

Commissioner Douglas Fugate, writing in the April, 1970, issue of the Eno Foundation's "Traffic Quarterly," had discussed the changing highway concepts involved in solving such problems.

"We should not be particularly surprised that transportation planning requirements differ from those of even a decade ago," he wrote. "For in many respects the nation's people differ—there are far more of them, they tend in growing numbers to congregate in and around the cities, they tend to be more affluent, and they have a new concern for all aspects of the environment in which they live. Thus, it is no longer sufficient to examine highway proposals solely from such standpoints as traffic service, economics, and engineering feasibility. An entirely new range of considerations has developed, and must be accepted by those responsible for the highway program.

"Such matters as the social impact of highways, environmental enhancement, and pollution are becoming integral elements in the highway planning process. Similarly, in urban regions, attention must be focused more extensively on utilizing the highway as an artery for mass transportation, and on fresh concepts con-



Urban expressways increasingly became arteries for public mass transportation in the early 1970s, as illustrated by these reserved bus lanes on the Shirley Highway.

Virginia's Highway Commissioners

cerned more with moving people than with moving vehicles. Any notions of a comfortable philosophy based on the belief that every problem has a formula for solution and that every decision can be made in conformity with established policy must be forsaken, if indeed they still exist," the Commissioner wrote. ". . . We must greatly broaden our concepts of the highway's role in an increasingly urban society."

In the heavily-populated Northern Virginia suburbs of the District of Columbia, a special lane of Interstate 95, the old Shirley Highway, was reserved for express buses. Commuters were encouraged to leave their cars behind and use the bus to reduce congestion. It represented the nation's first experience with setting aside a lane of an interstate highway for buses, and its results were impressive. In barely more than three years, more commuters were riding the buses than were driving their personal cars during the morning peak traffic period.

The success of the Shirley "busway" was to lead to similar projects in other urban areas.

Increasingly, the planning function of highway administrators and engineers was changing vastly as society itself sought to adjust to the needs and desires of the expanding, more urbanized population.

More and more, highway planning was related to total community goals.

The days of muddy roads, of inadequate technology and equipment, and of neglected maintenance had passed. A modern highway system permitted improved mobility and traffic safety. But there were new challenges to replace the old ones.



Another new concept in the '70s: fringe parking lots for bus-riding urban commuters.



Phillip St. Julien Wilson
1906-1913



George P. Coleman
1913-1922



Henry G. Shirley
1922-1941



James A. Anderson
1941-1957



Francis A. Davis
Acting Commissioner
1958 and 1963-64



Samuel D. May
1958-1960



Howard H. Harris
1960-1963



Douglas B. Fugate
1964-