

A Tale of Two Visions:

Harland Bartholomew, Robert Moses, and the Development of the American Freeway

by

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Abstract

For sixty years, engineers and planners have debated the freeway's role in the city. Engineers have tended to view freeways strictly in traffic service terms. Planners, on the other hand, have long viewed freeways not only as a means of

facilitating automobile transportation but also as a tool for reshaping the city. This paper uses the plans of Harland Bartholomew and Robert Moses to illustrate these competing visions of the freeway. In the end, the traffic-service vision of the engineers emerged victorious as a result of state and federal highway finance decisions, and this victory has carried with it a high price for many American cities.

Introduction

Freeways are the centerpieces of America's urban transportation system. They enable large volumes of motor vehicles to travel long distances at high speeds, relatively safely, into and through the hearts of our cities. In the largest cities, freeways account for a mere 3 percent of roadway miles yet handle 39 percent of daily motor vehicle traffic.¹

Freeways have had a tremendous influence not only on the urban transportation system, which they dominate, but also on the city itself. The freeway has helped extend the commuting radius of the city and made distant, lower cost land accessible to the urban core (Muller 1995). Millions of Americans have been able to purchase single-family homes in these new suburban tracts. The presence of a nearby freeway has become nearly as important a location advantage for business as access to the port or a location in the central business district was in earlier times. The development of "edge cities" near important interchanges stand as testimony to the location advantages the freeway bestows (Garreau 1991). And in some places freeways, once championed by planners as tools for urban renewal, have created swaths of blight through the inner-city neighborhoods they traverse (Lewis 1997).

Today's urban freeway is the product of the competing visions of engineers and planners. Most early freeway proponents were engineers who regarded the limited access, grade-separated, high-speed freeway as the ultimate engineering response to the long-running problem of urban traffic congestion. A few were planners who appreciated the traffic-service benefits offered by the freeway but also realized that freeways had important non-transportation effects-which could be either positive or negative. While engineers planned freeways to maximize low-cost traffic service for motorists, planners proposed smaller-scale, lower-speed, frequently multi-modal freeways to minimize the automobile's potentially disruptive influence on the city.

This paper uses the plans, speeches, and writings of two famous individuals to illustrate the differences between these two visions and their meaning for the development of the freeways girdling our major cities. Ironically, I chose the work of a famous engineer, Harland Bartholomew, to illustrate the more holistic view of the planners and the work of a famous planner, Robert Moses, to illustrate the traffic-service view of the engineers.² Harland Bartholomew was one of the nation's leading planning consultants, the author of scores of street and highway plans, and a member of the Interregional Highways Committee, the body whose recommendations helped create the Interstate Highway System. Bartholomew pressed for the inclusion of social and land use criteria in freeway planning, and he argued strongly for local-as opposed to state highway department-control over freeway design and planning decisions. Robert Moses was perhaps the most famous planner/builder in the country, a strong believer in the development of freeways to serve motorists and reduce traffic congestion, and a severe critic of the planning profession. Moses spent four decades building freeways and parkways in New York, and he planned freeway systems for many other cities. The urban freeway eventually came to embody the engineering ideals embraced by Moses more than the broader planning concerns championed by Bartholomew. The reason is simple: those who embraced the engineering vision had

access to the money needed to translate their vision into reality while those who embraced the planning vision generally did not.

The Problem of Urban Traffic Congestion

The freeway was developed to address the recurring problem of urban traffic congestion. Traffic congestion is perhaps a problem as old as the city itself, but the age-old problem of congested streets intensified with the arrival of large numbers of automobiles in the 1910s. The automobile took up more space, when measured on a per-person basis, than most other means of conveyance, and its proliferation overwhelmed street systems that had often barely sufficed in the pre-auto age (Brown 1998).

Congestion was worst on the routes in and to the central business districts of US cities. On these narrow streets, autos, streetcars, pedestrians, and sometimes a few horse-drawn vehicles competed for scarce street space. The pace of traffic ground to a halt and accidents were common. In many cities, an abundance of anecdotal evidence stated that speeds in the motorized era were frequently slower than in the horse-drawn era. In some cities, pedestrians were said to move faster than the motorized traffic (Bottles 1987).

City officials turned to engineers and planners for help in the growing crisis, and these experts devised a series of remedies in their quest for a permanent solution to the congestion problem. Engineers, led by Miller McClintock, first sought to bring order to the chaos on city streets. There were few rules to govern the movement of vehicles and pedestrians on city streets. Pedestrians crossed streets wherever they chose to do so, vehicles parked in the middle of streets, and many intersections were clogged in seemingly perpetual gridlock because everyone seemed to have the right-of-way and, therefore, no one could move (McClintock 1925). McClintock and his disciples developed ordinances to regulate the flow of traffic, and early traffic signaling systems were installed in many cities. The regulations and signaling systems unclogged many previously jammed intersections, but congestion returned as the rising tide of automobiles outran the available road capacity. New road capacity was sorely needed. During the 1910s and 1920s, cities spent millions of dollars to build new roads and widen existing ones. Some cities even entertained fanciful, enormously expensive proposals to arcade buildings along busy streets in order to transform sidewalks into new lanes for traffic (McClintock 1931). The reactive, piecemeal widening of isolated street segments eliminated gridlock at some traffic bottlenecks but proved enormously expensive and failed to bring larger-scale traffic relief.

Cities turned to Harland Bartholomew, John Nolen, and a host of like-minded planner-engineers who pioneered the development of the major street plan, the latest solution to the congestion problem. Major street plans sought to address traffic congestion through detailed, scientific study of current traffic conditions, more rational classification of existing street systems so as to maximize the efficient use of existing street space, and careful advance planning for new road capacity to meet future transportation needs (Bartholomew 1917). The Major Street Plan for Los Angeles is typical of these early highway plans. The consultants developed a hierarchical street classification scheme based on a street's most prominent usage, segregated traffic types from one another to avoid what they called "the promiscuous mixing" of autos, streetcars, and trucks, and proposed the widening and straightening of major traffic-carrying streets (Olmsted, Bartholomew, and Cheney 1924). They advised the city to acquire right-of-way for new roads in advance and to better coordinate land use and transportation planning to avoid the enormous and, they argued, unnecessary future expense of widening streets in built-up areas. Cities received significant short-term traffic relief with the adoption of the major street plans, but the rising tide of vehicle traffic soon outdistanced the best planning efforts of even the most forward-looking cities.

Parkways and Superhighways: Antecedents of the Freeway

While city planners and engineers waged their battle against urban traffic congestion, a number of their compatriots revolutionized rural and suburban highway construction. During the 1920s, proposals for rural and suburban pleasure drives, or parkways, were implemented in New York and other parts of the country. The parkways were gently curving, park-lined roadways carefully fitted to the surrounding landscape (Figure 1). Parkway designers took great pains over the aesthetics of the roads and the surrounding park strips to provide the motorist with a pleasant driving experience, and the traffic-service capabilities of these roads were secondary to their recreational attributes (Orlin 1992). But many of the ideas employed by parkway designers, including limiting access to adjacent property and grade separation of intersecting roadways, were soon adopted by engineers and planners with a much more utilitarian object in mind.

(Figure 1: Bronx River Parkway)

Planners and engineers in Detroit drew on many parkway ideas when they fashioned their Superhighway proposal in 1923 (Rapid Transit Commission 1924). The plan called for the development of 225 miles of superhighways throughout the Detroit region. The superhighways had a 300-foot right of way including through traffic lanes, rail transit facilities in the median, park-like strips to separate the roadways, and frontage roads to provide property access (Figure 2). All major intersections were grade separated. Although the Detroit superhighway proposal was never fully implemented, the US Bureau of Public Roads, forerunner of the Federal Highway Administration, continued to champion the adaptation of parkway design elements by rural and urban highway engineers in a series of articles in *Public Roads* and *Civil Engineering* in the late 1920s. By the early 1930s a new generation of superhighway proposals had been developed for Chicago, San Francisco, and New York City, and Edward Bassett coined a new word to describe the new traffic artery. He called it a freeway.

(Figure 2: Detroit Superhighway)

Competing Visions of the Freeway

The development of the freeway was the next logical engineering response to the problem of urban traffic congestion. Engineers and planners knew that a limited access, grade-separated roadway could carry larger volumes of traffic at much higher speeds more safely than the typical city street. Limiting access from adjacent property permitted unobstructed high-speed movement without sudden interruptions from slow-moving vehicles turning into and leaving the roadway. Grade separation obviated the necessity of traffic signals at intersections and permitted continuous through-traffic movement. Both features eliminated many of the "frictions of movement" that caused urban traffic accidents (McClintock 1937).

Both planners and engineers embraced the freeway, but they embraced it with different goals in mind. Planners sought to use freeways both as a means of dealing with urban traffic congestion and as a tool for shaping the future development of the city (Lovelace 1993). Planners appreciated the traffic-carrying advantages of the new roadways, and they were quick to include the new roads, variously called superhighways, expressways, limited motorways, and freeways, in their plans. But planners were also concerned about how to integrate freeways into the built landscape, how to coordinate freeway development and land use development, and how to link freeway planning with transit and local street planning. Most planners included lengthy discussions of the potential non-transportation effects of freeways in their plans, but they often lacked the hard data needed to convince politicians and engineers of the soundness of their views.

Engineers defined the problem of urban transportation as the need to maximize the throughput of motor vehicles, at a low a cost, and they embraced freeways because they were more efficient conduits for the movement of motorized traffic than other roads. The engineers in the Bureau of Public Roads emphasized that

"the service efficiency of a traffic lane on an express highway is from eight to ten times that of a traffic lane on ordinary city streets" (Barnett 1945). This was impressive traffic service indeed. And while the engineers at the Bureau of Public Roads occasionally endorsed the use of freeways to achieve non-transportation objectives, they still placed a premium on providing low-cost freeways to carry large numbers of cars. Unfortunately, this led some engineers to route freeways in such a way that they caused the invasion of parks, the demolition of scarce low-cost housing units, and the loss of other amenities (Ellis 1990).

Traffic service was something that could be quantified and measured. It was easy to survey motorists and plot their travel desire lines on maps to route freeways. By contrast, the social concerns voiced by planners could not be so easily quantified, and planners had little data to offer. In any case, many engineers questioned the track record of the planning profession for implementing plans. After all, a generation of city plans lay collecting dust on archive shelves. Planners were dreamers, while engineers were doers.

Harland Bartholomew and the Planning Vision

"City planning is neither extravagant nor grandiose; it is nothing more than practicality, avoidance of needless future expense by exercise of wise forethought."

Harland Bartholomew (quoted in Lovelace 1993:4)

The planning vision of the freeway, with its focus on integrating transportation and land use planning, taming the automobile, and using the freeway as a tool for building a better city, is exemplified in the work of Harland Bartholomew. For more than four decades, Bartholomew was one of the foremost planner-engineers in the country, and he was the principal partner at one of the most prestigious consulting firms (Lovelace 1993). Bartholomew was a product of the city practical era of planning, with its faith in rationality, science, and the ability of trained experts to diagnose a problem and devise the best remedy. He developed his scientific approach to city planning through his consulting work in the 1920s and 1930s, during which time his firm prepared everything from comprehensive general plans to modest plans for individual public facilities. But like most planning consultants of the time Bartholomew devoted most of his attention to traffic and other transportation-related issues.

Bartholomew's street and highway planning was driven by three principles (Bartholomew 1927). First, all streets are not the same. He developed a hierarchy of road types with each designed to serve its appropriate traffic function. Second, highways must be designed to accommodate many different kinds of traffic movements, including radial, crosstown, and bypass traffic. He argued that traffic should not be funneled through already-congested areas unless those areas were its intended destination. Third, and most importantly, streets and highways must be provided in relation to population density and land use density. Bartholomew believed that the transportation system must be designed to best serve the needs of the city and its residents, and this was achieved by explicitly linking transportation planning with land use planning.

Bartholomew's Early Urban Highway Plans

His major street plans of the late 1910s and 1920s unveiled what became the standard Bartholomew planning formula: the collection of voluminous survey data, the careful assessment of current and future street capacity and traffic conditions based on the survey data, the classification of streets according to their functions, the emphasis on integrating street planning with transit and land use planning, and the focus on long-term, comprehensive planning as opposed to short-term patchwork (Bartholomew 1928). In several of these plans, including Los Angeles (1924) and Vancouver (1928), he recommended the development of higher-speed facilities, variously referred to as industrial/commercial

thoroughfares, parkways, or speedways, which look like forerunners of the freeway (Figure 3).

(Figure 3: Major Street Plan: Vancouver 1928)

By the beginning of the 1930s, Bartholomew announced that "the increased efficiency and high speed of motor vehicles have produced a distinct need for the creation of express vehicular lanes to carry the through traffic, while the need for local vehicular services must be provided by a separate right of way" (Bartholomew 1930:95). From this time forward, "superhighways" became a principal component of his transportation plans. In his 1930 plan for St. Louis County, Missouri, Bartholomew spoke of the reason for his embrace of the superhighway:

In addition to increasing the radius of growth in metropolitan areas, the automobile has created a distinct demand for safe facilities for rapid individual or unit transportation. This increased radius of growth has vastly enlarged the area available for metropolitan development. The volume of traffic, originating in the enlarged area, has increased enormously and has become concentrated on certain dominant routes, thus intensifying the demand for highways adaptable for fast traffic. The continually increasing use and efficiency of the automobile have further accentuated this condition. The demand can be adequately answered only by the creation of express or superhighways (1930:95).

Inspired by earlier plans for Detroit and Milwaukee, Bartholomew unveiled his St. Louis plan, which called for the development of 42 miles of suburban superhighways. The superhighways had a 150-foot right-of-way, included separate roadways for express and local traffic, and featured a rail rapid transit line in the center median that linked the suburbs to the St. Louis CBD.³ All road crossings were grade separated and access to adjacent property was limited. But Bartholomew decided to limit the vehicle capacity of the facility to that of a major city street. He worried that, "if the capacity is increased beyond that of a city major street, congestion and confusion will result at the points of junction with major streets of the city" (Bartholomew 1930). Bartholomew selected the routes for his system after a detailed analysis of current and projected traffic, vehicle ownership, population, and land use data.

Bartholomew revisited his St. Louis County proposal in 1942 during which time he was serving on President Roosevelt's Interregional Highways Committee (Bartholomew 1942). But by 1942 his thinking had shifted somewhat and he proposed higher-speed, higher capacity facilities than had characterized his earlier plans. Undoubtedly inspired by his committee work, he called for the development of a new class of superhighway, which he called interregional highways. Interregional highways were higher-speed, dual-lane, limited access facilities designed to connect major urban areas to one another. They featured 200-foot rights-of-way, wide medians, no property access, no intersections at grade, and widely spaced entry and exit points--"few in number and a considerable distance apart" was precisely what Bartholomew suggested.

Interregional highways were designed specifically for the transportation of high-speed, long-distance, inter-urban traffic. The conventional superhighway, a smaller-scale facility with a 160 to 200 foot right of way and a lower design speed, was recommended for intra-urban traffic between the center of the city and its suburbs. Both facilities were to be supplemented by radial or cross county highways with 100-foot rights-of-way.

Bartholomew's superhighway proposals both inspired and echoed work by other planners. During the 1930s, planners in cities throughout the country unveiled urban freeway plans. The City of Los Angeles' Transportation Engineering Board (TEB) prepared one of the most famous of these plans in 1939 (TEB 1939). The TEB plan proposed more than six hundred miles of freeways for the Los Angeles region (Figure 4). These freeways are quite different from what was eventually built

in Southern California. The freeways were smaller facilities—three lanes maximum in each direction as opposed to five or sometimes more—designed for slower speeds of 45 miles per hour rather than today's 70 miles per hour, which allowed them to be more easily fit into the adjoining urban fabric. They were more closely spaced together so as to disperse rather than concentrate traffic, and most freeways featured rail rapid transit in the center median. The plan was popular with local officials, but they could not afford the construction price tag estimated to be more than \$1 billion. Instead, they devoted their efforts to leveraging modest state and federal financial assistance to build isolated facilities, like the Arroyo Seco Parkway and, eventually, the Hollywood Freeway.⁴ Similar stories can be told of the fate of ambitious urban freeway plans in Detroit, San Francisco, and many other cities. A shortage of money precluded building these ambitious plans during the 1930s, but they sat ready for a time when money might become available to complete them.

(Figure 4: Los Angeles TEB Plan of 1939)

The Origins of the Interstate Highway Program

In 1941, President Roosevelt appointed Harland Bartholomew to the seven-member Interregional Highways Committee. The committee, which also included Frederic Delano, Rexford Tugwell, and Bureau of Public Roads Commissioner Thomas MacDonald, was charged with following up the BPR's earlier Toll Roads and Free Roads report of 1939. In that report, the BPR had transformed a request to investigate the financial feasibility of a transcontinental toll road system into a blueprint for a 27,600-mile national system of toll-free superhighways. Bartholomew endorsed the concept of a national superhighway system but he was concerned about the effects of superhighways on urban areas (Figure 5). He recommended that the committee adopt what Lovelace (1993) terms a "society first" approach to urban superhighway construction. Bartholomew wanted the committee to permit some flexibility in facility design and leave route selection decisions in the hands of local officials who knew their localities better than state highway engineers—their potential rivals for control of the program (Alexander 1945). Bartholomew was concerned that state highway engineers lacked any experience building freeways in urban areas, and he worried that because of their inexperience they were likely to ignore the significant non-transportation effects of the new roads.

(Figure 5: Interregional Highways)

The Interregional Highways Committee recommended cooperation between state and local officials in making urban route location decisions, and its report to Congress emphasized the need to integrate transportation and land use planning (IHC 1944). But these two concessions to the planners on the committee were negated by the fact that financial considerations put the state highway departments in charge of the Interstate Highway Program.⁵ State highway departments had access to gasoline tax money to build freeways, while local governments and planners did not (Taylor 2001).

Unfortunately, the recommendations for cooperation between state and local officials in freeway routing and design were too often disregarded. State highway departments and the BPR developed uniform, 70 miles per hour, geometric design standards that were imposed, regardless of specific local conditions, out of a concern for ensuring safe, high speed travel. Facilities were placed where they could serve the most traffic at a low cost. As Lovelace (1993) observed, "They (state highway departments) would 'consult' and, later, would make environmental impact studies, but these seldom affected the choice of the cheapest alignment that would carry the most traffic. This resulted in the preemption of park land (Balboa Park in San Diego, Forest park in St. Louis), division of neighborhoods, and destruction of the fabric of historic districts" (135). State highway officials were not aware of the need to design and build roads differently and more carefully in urban areas, so they did not. Planners and local officials, confronted by an array of rigid design requirements and

inflexible state and federal agencies were left to tinker as best they could-but only at the margins.

Postwar Freeway Plans

Many state highway engineers ignored Bartholomew's suggestions about freeway planning, and these ideas made his own postwar work different from that of other planner/engineers. Bartholomew believed that traffic service was an important function of a freeway but he emphasized that this was to be balanced against other community needs. For example, he advised that, "Neighborhoods, in so far as conditions permit, must be preserved and protected from the annoyances of heavy traffic movements. Major thoroughfares should follow the borders of new neighborhoods rather than splitting them into several parts" (Bartholomew 1954). He also continued to conceive of transportation-freeways, local roads, and often rail rapid transit-as a system that must work together to keep a community functioning. "The freeways and interstate routes can solve many but not all of the street problems. A supplemental system of major streets will still be required to serve areas that will not generate enough traffic to justify a freeway and to bring traffic to the interchange points along the freeway" (Bartholomew 1947: 10). And, many of Bartholomew's plans were multi-modal. His 1947 plan for rapidly growing suburban Alameda County, California anticipated the region's Bay Area Rapid Transit (BART) system of three decades later by including plans for rail rapid transit in the medians of two freeways (Figure 6). Tellingly, all of Bartholomew's freeway recommendations for Alameda County were built while his rail recommendations were cast aside-for a few decades anyway. But, above all else, Bartholomew still believed that the only effective way to deal with traffic congestion was through the careful coordination of transportation planning with community land use planning. As he noted in his 1954 plan for Atlanta, Georgia, "If a system of major thoroughfares is to function efficiently, its concept must be in full harmony with the economic and physical conditions prevailing in the community." (Figure 6: Alameda County Plan 1947)

Despite his calls for "society-first" freeway planning, Bartholomew's work of the mid-1950s and beyond reflects the victory of the traffic-service orientation of the state highway engineers in the struggle to design and build urban freeways. His 1954 plan for Atlanta, Georgia contains most of the same cautions about coordinating transportation and land use that characterized his work from the 1920s to the 1940s but it also contains an explicit emphasis on the facilitation of high-speed vehicle travel with the urban area. "The element of rapid and uninterrupted travel is the objective" (Bartholomew 1954: 6). The facilities proposed for Atlanta are traffic conduits above all else-modern freeways with large rights-of-way, high design speeds, and minimal frills. He cautioned engineers in the routing of the new expressways, as before, but his recommendations aim toward the same goal as that of the engineers: move more cars faster. Other modes of travel play little role in this narrowly focused plan.

Perhaps Bartholomew, tired of arguing unsuccessfully for a more comprehensive and balanced approach to freeway planning, finally gave in to the desire of most Americans to pour concrete as quickly as possible to "solve" the problem of urban traffic congestion. Bartholomew's work in the planning of the Washington Metro testifies to his continuing recognition that urban transportation planning must remain multi-modal, but his firm's freeway plans of the 1950s and beyond were just that, freeway plans, rather than the more comprehensive transportation system plans of the past. Still, Bartholomew and his firm left their imprint on the freeway and street systems of many American cities.

Robert Moses and the Traffic-Service Vision

"Doctors, we are told, bury their mistakes, planners by the same token embalm theirs, and engineers inflict them on their children's children."

Robert Moses (1949:5)

Robert Moses was perhaps the most famous, or infamous, planner in the United States. He served in state and local government in New York for more than four decades, during which time he presided over the construction of everything from bridges, power plants, and dams to university campuses, housing projects, and a network of highways that crisscrossed New York City and other parts of the state. Moses began his career in highway building as a proponent of recreational automobile travel, and he was the father of the Long Island parkway system. He ended his career as the man responsible for some of the most infamous urban freeway projects in the country.

Robert Moses did not engage in long-run transportation planning or comprehensive city planning as Harland Bartholomew did. Instead, Moses saw himself as a doer, a practical person, and he charged his staff with preparing blueprints for immediately buildable public works projects. Moses dismissed most planners as dreamers who produced little of practical significance to the average citizen, and he occasionally referred to them as "municipal smart alecks."

Like the engineers he employed, Robert Moses originally believed he might build his way out of traffic congestion, if only they (public and politicians) would give him the money needed to translate his shelf of freeway plans into concrete and asphalt. In 1951 he warned New Yorkers: "I see no answer to the congestion problem but renewed and much more vigorous support by the press and public...of the only announced program which is broad and drastic enough to promise real remedies" (Moses 1951:6). The program was, of course, his plan for hundreds of miles of urban freeways.

Whenever the public began to waver in its support, he warned "It is obvious that this expanding use of the automobile can result only in further congestion of our streets unless we proceed diligently to provide express arteries to carry this traffic to its destination without cluttering up surface streets. This problem cannot be met solely by regulatory devices no matter how ingenious and essential...Delay spells inevitable deterioration of great metropolitan areas including the central business districts which presently bear the brunt of the cost of city government" (Moses 1963:3). He further warned New Yorkers that if they did not accept interstate highway projects such as the controversial Manhattan expressways, some other city would get their federal tax dollars.

After he had been stripped of much of his authority over New York freeway construction, Moses conceded publicly that there was a practical limit to trying to build one's way out of congestion and other strategies might be needed.

"Those who promise a complete round-the-clock solution of peak loads, as distinguished from mitigation of hardships, are either dreamers, ambitious politicians, sensational journalists or plain, ordinary fakers. The road builder cannot indefinitely multiply lanes and the traffic and policeman, no matter how widely advertised, is no miracle worker who can change the glut and empty patterns which bedevil traffic flow... The only long range answer in these few periods of glut is to change the pattern of arrival and departure" (Moses 1966: 2,5). Had Robert Moses become an early convert to transportation demand management?

Robert Moses and New York's Highways

Robert Moses began his highway-building career presiding over the construction of the parkways connecting New York City to the parks and beaches on Long Island. The roads he built in the 1920s and early 1930s were parkways with extensive landscaping and a great deal of aesthetic beauty (Figure 7). He prepared a 1930 arterial highway plan for New York in which he proposed the same "road-as-landscape-architecture" treatment for hundreds of miles of parkways throughout the region (Moses 1970). But the increase in motor vehicle congestion, the increasing speeds of which newer motor vehicles were capable, and financial pressures soon combined to compel a shift in his road designs from

an emphasis on aesthetics and recreation to more functional, barebones facilities to move lots of automobiles (Moses 1970).

(Figure 7: Henry Hudson Parkway)

During the 1940s, Moses began building modern freeways in New York City. While Moses persisted in calling many of these new roads "parkways" they bore little resemblance to the roads he built in the 1920s and early 1930s. Geometric design and the capability for mass, motorized travel replaced landscaping as their most important characteristics.⁶ Moses often claimed his roads were not the "gasoline gullies" being perpetrated by engineers on other communities but they were virtually identical.

The key to Moses' road-building success was his ability to take advantage of state and federal grants to pay large proportions of the cost of his projects. And he became an expert at leveraging the income from his various public enterprises to build more roads (Caro 1974). But as traffic congestion mounted, even the piles of money filling his coffers proved insufficient to pay for his road building ambitions. He sought more money from city, state, and federal government, and he used the occasions of new freeway openings as an opportunity to press for a larger public financial commitment to highway construction. He achieved many successes and suffered a few famous defeats, notably in the cases of the Cross-Manhattan Expressways he championed for nearly thirty years (Figure 8). But by the time he retired, Robert Moses had left his mark on hundreds of miles of parkways, expressways, and freeways throughout New York State.

(Figure 8: Cross-Manhattan Expressways)

Moses the Consultant

In addition to his work in New York, Robert Moses produced freeway plans for communities ranging from Portland, Oregon to Hartford, Connecticut. Moses cast himself in the role of a professional diagnostician of transportation problems. He and his consulting partners examined data, identified the problem and devised practical, immediate solutions.⁷ The client would then undertake the projects he recommended.

One of Moses's earliest commissions resulted in a plan for arterial improvements in Pittsburgh (Moses 1939). The primary focus of his plan was street traffic congestion, and Moses believed his road straightening and widening program would offer a great deal of relief to harried motorists. But he also urged the people of Pittsburgh to develop a beautiful parkway extending from the suburbs to the Triangle as an adornment to their city, and he spent much time discussing the aesthetic treatment of the parkway. In 1939, Moses was still a believer in recreational parkways and he had not surrendered entirely to the utilitarian, traffic-service-only focus of his engineering brethren. Pittsburgh officials actually made most of Moses's recommended street improvements.

Moses' consulting activities became more numerous as World War II ended and officials contemplated the use of highway projects to address rising traffic congestion and to provide jobs for the expected masses of unemployed.⁸ In 1943, Moses unveiled a comprehensive plan for Portland, Oregon. The plan touched on ports, parks, playgrounds, and schools, but arterial improvements—specifically freeways—were its central feature (Moses 1943). Moses proposed the development of an inner beltway and crosstown radial routes. The proposed freeways were fully modern in all respects: stark, minimally landscaped facilities designed for high-speed travel; these roads were traffic conduits designed to reduce traffic congestion and look like typical interstate freeways (Figure 9). Portland adopted the plan, despite uncertainty over whether the state and federal aid Moses said was essential to completion of the plan would materialize.

(Figure 9: Portland Freeway)

Moses's work in Portland won him a contract to design a freeway system for Baltimore in 1944. He again emphasized the construction of freeways to provide

practical, traffic relief (Moses 1944). The proposed Franklin Expressway was to have some parkway landscaping, but it bore greater resemblance to the modern utilitarian freeway than to the recreational parkway. Yet, Moses cited the pre-war Long Island parkways to skeptical residents concerned about the freeway's potential effect on nearby neighborhoods (Moses 1944). And in a preview of a tactic soon to be adopted in many cities, he reassured the reader that the expressway could help in Baltimore's battle against slums and urban blight.⁹ The people of Baltimore chose to ignore Moses's advice.

Undeterred, Moses continued his work as a consultant for hire with his 1946 plan for New Orleans (Moses 1946). He advised New Orleans to build an elevated, high-speed freeway near the French Quarter to provide direct, high-speed access to the city from the east and west (Figure 10). Moses stressed the benefits of removing vehicle traffic from the crowded streets near the French Quarter, but residents eventually balked at building the road. But in stark contrast to his other plans, Moses ventured to make recommendations on other aspects of New Orleans' transportation system (Moses 1946). He devoted a great deal of attention to the issue of streetcars, recommending (successfully) that New Orleans retain its streetcars rather than convert them to buses. He also discussed the need to provide parking facilities for motor vehicles, and he recommended that they be built in tandem with the expressway. New Orleans chose to ignore most of his recommendations (Moses 1970). (Figure 10: New Orleans Expressway)

In 1949 Moses prepared a freeway plan for Hartford, Connecticut. Moses spent much of his time criticizing a previous recommendation by the state highway department, made largely on financial grounds, to take part of a park for use as freeway right-of-way (Moses 1949). Moses took great offense at proposals by state highway departments to "invade" parks but seemed to have little trouble with his own incursions.¹⁰ His consultants rerouted the proposed east-west freeway to avoid taking park property and to minimize residential and commercial takings; instead, the road was routed through a slum area so urban renewal funds could be used to help finance the project. As in the case of New Orleans, Moses recommended that the city build a parking garage in tandem with its expressway construction. While the expressways were built in the locations he suggested, his other recommendations were not followed. When considered in total, his consulting career was very much a mixed bag-although his traffic-service approach to freeway planning, shared by the state highway engineers, emerged triumphant.

Assessing Two Visions and Two Men

At its core the conflict between planners and engineers over freeways revolved around the tension between (1) integrating the freeway into the urban fabric without substantial interruption and (2) providing direct, high-speed travel for masses of motorists. Given the costs involved and the design constraints, it was possible to achieve one set of goals or the other-but rarely to achieve both. Harland Bartholomew sought to achieve both goals-but his early plans prioritize integration into the urban fabric while his later plans lean toward prioritizing high-speed travel. Robert Moses embraced the traffic-service vision, limited only by his belief that providing roads for very high-speed travel might be a waste of money.

When we consider the careers of both men and their legacies, we find that Bartholomew had more plans adopted and more facilities built, but his original society-first vision for the freeway-one shared by many other planners and a few engineers as well-was destined for the "what-might-have-been" box. Moses had fewer plans adopted and facilities built-outside New York-but his vision emerged triumphant in the interstate program. While Moses's direct influence over the program was slight, except perhaps as a figure to inspire other similarly minded freeway builders, the traffic-service orientation he embraced was triumphant. The finance mechanisms of the interstate program (gas tax finance via highway

trust funds) placed the engineers and their traffic-service vision in the drivers' seat. Planners were left to work at the margins to do what they could to temper the rigid uniform, geometric design standards adopted by the American Association of State Highway Officials (AASHO) and the Bureau of Public Roads (BPR). Bartholomew and other members of the Interregional Highways committee had recommended flexibility in the federal program, but flexibility was missing. Local control, that other great recommendation of 1944, was similarly non-existent. Instead, local officials had to take the money to be used as and where specified or leave it.

The only way Bartholomew's "society-first" vision could triumph was if cities turned their backs on state and federal highway dollars, but few cities were willing to do this. City officials could not afford to build the plans championed by the planners, so they embraced the interstate program-with its virtually free money and its design and routing requirements. In 1991, the federal ISTEA legislation introduced the long-sought flexibility and greater local control sought in the 1940s by local officials and planners. But the freeway is already here, and the few attempts to remove the most disruptive freeway intrusions on the urban fabric, such as the Big Dig in Boston, have proven spectacularly expensive.

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Notes

1 The data refer to the 66 largest US metropolitan areas, which are those with populations greater than 500,000. According to Highway Statistics 1999 (Table

HM-72), freeways make up 12,378 of the 425,733 miles of roadway in these urban areas and carry 1.1 billion out of a total 2.8 billion daily VMT.

2 While the characterizations are fairly accurate for the general body of practitioners in both fields, the fact that Bartholomew and Moses don't fit the template illustrates that there were cleavages within the two fields as well as between them.

3 The 150-foot right of way included a 26-foot rapid transit right of way in the center, surrounded by two 20-foot express highway pavements and two 20-foot frontage road pavements. Grass strips separated all of the road sections. Bartholomew estimated that eight lines of vehicles could be accommodated on the facility, six lines of moving vehicles and two lines of parked vehicles.

4 The Hollywood Freeway was built for higher vehicle speeds than contemplated by the TEB plan, but it did include a rail rapid transit line.

5 There is often confusion about when the interstate program was actually created. The Federal-Aid Highway Act of 1944 created the Interstate Highway System, but did not provide additional federal funding for the program. Subsequent legislation in 1956 (Federal-Aid Highway Act and Highway Revenue Act) created a dedicated federal highway trust fund to finance the ambitious program.

6 But while Robert Moses emphasized the traffic service capabilities of his freeways, he placed a few limits on how far he would go to accommodate the whims of motorists. For example, he wrote, "Speeds of over 35 or 40 miles an hour are a luxury that cannot be afforded, because as speeds increase, the safe capacity of the artery is drastically reduced" (Moses 1953: 3).

7 "The group of men who make this report do not belong to the so-called long-range school. We do not claim to be able to see the distant scene. From habit and experience we aim at nearby objectives" (Moses 1939: 3). It should be noted that Moses's plans were prepared in association with the engineering firms he employed on his New York projects.

8 Many officials feared a return of Depression-era unemployment when hostilities ended. The 1943 and 1944 issues of American City are filled with warnings about the need for public works projects, including several pieces by Moses himself. Moses proposed using freeway projects as an alternative to the "make work" projects that had characterized many Depression-era public works. In the Portland plan itself, Moses even advised officials to find a new name for public works because of the term's association with "wasteful" Depression-era relief programs.

9 "Some of the slum areas through which the Franklin Expressway passes are a disgrace to the community and the more of them that are wiped out the healthier Baltimore will be in the long run" (Moses 1944:9).

10 "No persuasive arguments have reached us for cutting through Bushnell Park. Only three reasons, or rather excuses-none of them valid-are conceivable. First, there is the assumption of some right-of-way engineers that parks exist primarily to afford cheap, convenient and easy locations for heavy traffic...second...line of least resistance.... (T)hird...theoretical planning rule that all arteries should be rims or spokes of a wheel feeding the hub of some all-important midtown area-a piece of academic slide-rule reasoning which has little support under actual conditions" (Moses 1949: 3).