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Melvin M. Webber

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**The University of California  
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**THE JOYS OF AUTOMOBILITY**

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All over the world, public officials and informed publics are alarmed about the growing numbers of automobiles. Some see the situation as akin to a conflagration that's out of control, made all the more menacing because automobiles are proving to be such powerful agents of change. To be sure, there is less anxiety in the United States than elsewhere, and less still in the western United States, because the major cities there grew up in the automobile era and have street systems that are much better suited for automobile use.

The real reason for the automobile explosion should be clear, yet the commonplace explanation for the car's popularity is wrong. People everywhere are attracted to cars not because they are lovable nor because they are prestigious, but because they offer better transport services than does any other mode. Automobiles are chosen because the auto-highway system is the culmination of the long and cumulative process of testing and improving ground transport technology. Or, to state that more flatly, autos are popular because the auto-highway system is the best ground transportation system yet devised. Its superiority lies in its capacity to offer no-wait, no-transfer, door-to-door service. No other transport mode comes close to meeting that standard of service. It is the failure to meet that standard that is troubling mass-transit systems.

In competition with other transport modes in low-density places, the car wins hands down—mostly because travel time from origin to destination is typically shorter than via other modes and because money costs, although not low, are tolerable. Travel times are short because a car available for an individual's exclusive use is immediately accessible—always on call, as it were. Where parking is available at both ends of a trip, as is common in the low-density American metropolis, the car promises door-to-door accessibility. Where traffic flows freely, it promises a high-level of mobility. Money costs are tolerable because auto use is partially subsidized. U.S. motorists are charged a modest gas tax to cover most—but not all—costs of road building, while the heavy costs of congestion and air and noise pollution are not directly charged to the motorists who generate them. It's scarcely any wonder then that, given the car's inherent advantages and the impositions of some of its

costs on others, it has become the preferred mode for so many. It seems to be as popular in places like Mexico City where mass auto use has generated levels of congestion and air and noise pollution that nineteenth-century Pittsburgh steelworkers would have found intolerable.

Of course, there are still some for whom discretionary use of a car is still a dream. About 9 percent of U.S. households lack automobiles, and about 10 percent of the driving-age population is not licensed to drive, most of them because they are physically unable to do so. They are either too young, too old, or too disabled. Perhaps a fourth of them are too poor to own cars, even though auto use is underpriced. About half of U.S. families still have only one car, which all family members must share. Thus, even though automobiles are dominant over all other modes of personal transport, we have not yet attained free automobility for everyone.

The central transportation problem lies precisely here. It is not that we have too many cars, but, rather, that everyone does not yet benefit from the equivalent of the automobility enjoyed by those who do have discretionary use of cars. Our central mission is to redress the social inequities thrown up by widespread auto use, and our central task is to invent ways of extending the benefits of *auto-like* transportation to those who are presently carless. The task is made all the more imperative because the automobile has been such a powerful agent of geographic, technologic, and social change. Two of those changes concern me here.

First, the inherent improvements in mobility have combined with inevitable traffic congestion to induce a geographic explosion of metropolitan areas. Second, the auto's popularity has spelled the decline and, in some places, the demise of public transit services. In light of the popularity of suburban locations among families and firms, metropolitan spatial dispersion strikes me as a rather benign consequence of automobility. The loss of public transit services, in contrast, seems to be something of a tragedy. Large numbers of people have been positively hurt by the rise of the auto-highway system because the alternative of public transit service has thereby been eroded.

#### **THE METROPOLITAN SPATIAL EXPLOSION**

The automobile and its analog, the telephone, have shaped both the form of the modern city and the ways we live out our social and economic lives there. When accompanied by a ubiquitous road network of the sort we've built in

this country, and especially in the new western and southern metropolitan areas, autos permit direct connection *from everywhere to everywhere*—just the way telephones do. Moreover, because so many people have discretionary use of cars whenever they wish, they enjoy the benefits of random access to people they have dealings with—direct connection from virtually *everyone to everyone*, whatever their geographic locations.

This degree of connectivity by telephones and automobiles is unprecedented, of course. Throughout human history people have had to locate near each other if they were to have frequent dealings, or else they had to suffer delays in making contact. Business firms thus tended to concentrate in business districts where mutual access was greatest. Employees had to locate near jobs sites, lest time and money costs became excessive. The search for cheap connectivity is indeed the only reason cities were ever built. It's only because of the cost of overcoming geographic space that people concentrated in cities in the first place. Were it not for these costs, there would be no cities. Were it not that costs of connectivity decline as densities rise, we would never have built the New Yorks, Londons, Tokyos, or even the Los Angeleses of this world.

These relations between connectivity and density are universal facts of life. For a couple thousand years nearly everyone sought to locate near the center of town, willingly accepting some degree of crowding. But expanding urban populations inevitably meant that most people nevertheless would have to live at considerable distances from the center. Indeed, every town and city has been suburbanizing ever since it was settled, growing ever outward to accommodate more and more inhabitants.

For most cities in eighteenth- and nineteenth-century America, the expansion was slow, limited by the slow speeds of available transportation systems—walking for most, horse-drawn vehicles for some. Later, faster electric trolleys permitted people to live far away and still get to work on time, but not very far away. When automobiles became available in large numbers in the 1920s, new suburban settlements quickly surrounded the old cities. Then it was possible to get to work in the center within a half-hour, even if one lived ten miles out.

During recent decades a series of dramatic technological and institutional changes have coalesced to accelerate that expansion—to trigger a virtual explosion of urban settlements, dispersing their parts into what we used to call the hinterland. Four of these changes have been especially consequential.

First, the conduct of business and industry has been changing. Expanding managerial activities, information processing, and specialized professional services have combined to displace mills and factories with offices as primary workplaces. By now, somewhere between half and two-thirds of all employed persons work in offices. Some of them are involved in managerial and other professional roles that require skilled judgment and frequent intercourse with other specialized persons, and many of these people therefore need to be physically near each other. However, the vast majority today are engaged in routine paper-handling or computer-processing activities that resemble routine production—activities that are much like factory work. People in these jobs don't need to be geographically adjacent to each other. Most can be located anywhere—even in isolated anywheres, even at home.

Second, manufacturing has been declining—from a third of all jobs in the United States at the end of World War II to less than a quarter today. Moreover, many industries that survive are largely freed from sites adjacent to sources of raw materials and power. By now, many manufacturers are more dependent on specialized knowledge than on stuff like ore and coal. Spatially footloose, a growing number of factories are able to follow their workers to wherever the workers prefer to live—an absolute reversal from early patterns.

Third, women have been going to work in ever-increasing numbers. Well over half of the nation's women are working or seeking work outside the home. Nearly two-thirds of married women between the ages of twenty-five and forty-four who are living with their husbands are in the labor force. (Twenty-five years ago only one-third of them were.) Moreover, nearly two-thirds of married women living in conventional nuclear families, complete with husbands and children aged six to seventeen, are now in the labor force.

Fourth, automobiles, airplanes, telephones, and now communication satellites and computer networks have made nearly everywhere immediately accessible to everywhere else, thus vitiating many locational advantages that once attached to certain cities and city centers.

Any one of these changes would have been enough to generate a revolution in urban development. Together, in concert, they are making for new kinds of cities without precedent.

Not long ago most corporations and business service firms clung to the metropolitan center, creating that most visible urban symbol of the century—the high-rise, center-city skyline. In the 1950s and 1960s a few bold firms moved their headquarter offices to outlying places such as Westchester



County, but they were exceptions—at most, portents of things to come. In recent times, however, a great many companies have become aware of those four fundamental changes that had been evolving unobtrusively over the decades, slowly accumulating force enough to provoke a virtual revolution in urban spatial structure.

The fundamental changes have unleashed a cadre of land developers who are now building gigantic office complexes on previously vacant land at the metropolitan edge and beyond. Tens of thousands of office jobs are being relocated out of the central city to each of these sites. Two new sites, well east of San Francisco, are projecting thirty thousand jobs within the decade. Tysons Corner, outside Washington, D.C., already holds over twenty-five thousand jobs. Throughout the country office buildings surrounded by extensive parking areas are sprouting near the single-family housing projects that supply workers to them. Although less visible than the skyscrapers downtown, these office parks are fast becoming successors to the high-rise central business districts and may become prime symbols of the future city. Several will soon contain more office jobs than are now in their metropolitan central business districts—San Francisco and Washington, D.C., among them. By relying on automobile access and by moving jobs out to where job holders live, office parks may be signaling the dissolution of the last force that has been holding the traditional city in place.

That's the big news for cities for the 1990s. The glue that has held them together is dissolving. Even when tens of millions of people were gathered into the large metropolitan areas, they were compelled to cluster around the city center: even the extensive suburbs have had to wrap around the old city and to stay within commuting distance of it. But that requirement is fast disappearing.

Especially in the new cities of the West and South, the compounding effects of the four trends I've noted are permitting a scale of spatial dispersion that was never before possible. With real-time accessibility permitted by automobile, telecommunication, and computer technologies, even the most specialized corporate executives are free to abandon the high-rise city center in favor of the countryside, where many of them prefer to live. Their employees, both male and female, need no longer suffer the discomforts and costs of the long commute into the city center. They too can live and work in the exurbs. Given the average American's manifest preference for a single-family house cum garden, it seems reasonable to expect that the long-term centrifugal move away from the old city center will accelerate, now that even office jobs are leaving.

The signs of the new urban patterns are everywhere. Populations have been expanding in small and middle-sized settlements well outside the old commuting range, even in such seemingly nonurban places as Vermont, the Rockies, the desert of the Southwest, and the foothills of the Sierra Nevada range. Equally striking, many of these migrant companies are engaged in highly specialized activities, just the sorts that require intimate contact with suppliers of diverse business and technical services. They've been able to locate far away from the old-style cities precisely because their employees want to live in those outlying places and because they can stay intimately connected to suppliers and customers through the now-ubiquitous transportation and communication links. Many firms are dispersing their parts to far distant suburbs located in places like Hong Kong, Singapore, and Taipei.

Do these signs suggest that the old cities will disappear? Not, of course, in the short-range future. There's far too much investment in buildings, institutions, and public infrastructure for the old cities to be abandoned, and, besides, the old cities are likely to remain viable in the long-range future as well. But the incremental growth is bound to be largely outside and at much greater distances than ever in the past. Hence, the recent construction boom in central cities may soon end. Tremendous oversupplies of downtown office space already have put a stop to construction in some cities, and others are fast overreaching their markets, too.

And so it seems that the age of the high-density cities might be coming to an end, to be succeeded by a wide array of new settlement types, most developed at low densities, mixing high-rise and low-rise buildings, in environmentally amiable settings, readily accessible to recreational areas, typically in scattered locales with a relatively small population in each, and exhibiting much greater variety in spatial structure than was feasible in the past. Can the trend be stopped? Probably not. The forces propelling it are powerful—the automobile among them—and most are outside anyone's control. Does the new direction portend a loss of the cultural richness long associated with the city and city life? I think not. Current capabilities for travel and communication permit even the most highly dispersed populations to be intimately associated and to enjoy the society's intellectual and material wealth.

Los Angeles has long been the exemplar of the culturally rich metropolis made viable by widespread availability of automobiles, highways, and telephones. As compared to many living in the midst of America's old urban centers, the new exurbanites surely must enjoy comparable opportunities to those in Los Angeles, suggesting that spatial patterns of cities no longer shape the important qualities of peoples' lives.

But it's clear that the quality of exurban life depends on open automobile and telephone channels. The continuing revolution in telecommunications has been expanding channel capacities of telephones at persisting exponential rates—and with constantly lowering costs. In contrast, capacities of the auto-highway system have been falling while costs have been rising.

The automobile's popularity poses a genuine dilemma for us. The car's success has generated its own greatest limitation, for few cities in the world were designed to accommodate automobiles. Most cities were built for pedestrians or, at best, small carts, so, when autos swarm into Florence, Bangkok, Lagos, and Tokyo, there is simply no space for them. Even the new auto-based cities of the American West—even Los Angeles—are proving incapable of accommodating the numbers of cars being amassed there, in part because even enthusiastic highway planners never expected that there would be so many cars.

As one outcome of rising traffic congestion, employers and families are moving farther and farther out into the expanding metropolitan fringe in an effort to escape congestion. The consequences, of course, are to further increase reliance on automobiles, further contribute to the traffic congestion that caused them to seek relief in the first place, and further erode the existing, but marginal, public transit services. What, then, are the social equity consequences of the automobile transportation system?

#### **PUBLIC TRANSIT ALTERNATIVES**

As employment in each metropolitan area expands, slowly in the older center cities and explosively in the suburbs and exurbs, commuters are overloading suburban road systems that were never designed for the numbers of cars they're now having to carry. In another unanticipated switch, suburban and exurban traffic congestion in many places is now more severe than center-city congestion, with little prospect for expanded capacity in sight.

But, even if there were more roads, efforts to counteract rising highway congestion by expanding highway capacity traditionally have yielded only temporary relief. That's because the Law of Highway Congestion assures that traffic volumes will expand to fill the available space—until just-tolerable levels of congestion are again reached. In this country even that temporary remedy is seldom available any longer, because environmentalists and NIMBYs are standing by, ready to file suit to block virtually any capital works project suggested.

And, then, perhaps the most negative and devastating consequence of

mass auto use has been the decline of the public transit systems that the car has displaced. All those who do not have discretionary use of motor cars thus thereby lack even the modest levels of mobility their parents and grandparents knew. With most new jobs locating in the suburbs and exurbs, persons who, because of racial discrimination or low income, are geographically constrained to central-city housing districts thereby lack adequate access to employment. Indeed, all who lack discretionary use of cars are deprived to some degree, and they are deprived because the auto has been so successful.

I suggest that this bare fact poses the central policy imperative that transportation policy planners must face. The task is to create *public* transportation systems capable of approximating the degrees of mobility that uncongested *private* automobiles provide.

Contemporary suburban land-use patterns in western and southern metropolises and in suburbs everywhere are increasingly mixed, densities are low, and, so, origins and destinations of trips are spatially dispersed. To be effective, a public transport system must be able to serve groups of persons having the same origins, destinations, and schedules. Inevitably, and especially in exurban districts, these are small groups of persons. Prospects for *mass* transit systems—that is, for systems using large vehicles—are nil for most trips in the new western and southern metropolises or in suburbs everywhere. Large-vehicle systems, like railways and subways that effectively serve older high-density cities of Europe and the American East, are complete misfits for most travel within suburban areas and within western and southern metropolitan areas.

Instead of new underground railroads of the kind built in the San Francisco Bay Area, Miami, Atlanta, and under construction in Los Angeles, we need to make better use of automobiles, vans, and small buses. Even the standard fifty-passenger bus is often too large for travel within low-density settings. The appropriate modern transit system must employ small vehicles whose operating characteristics match contemporary land-use and travel patterns. Those are either automobiles or vehicles that resemble automobiles.

The joker is that we don't need much more road or rail capacity, because we presently have tremendous excess passenger-carrying capacity going unused within the present auto-highway system. As Wilfred Owen has noted, we now have enough front seats in the nation's automobiles to carry the entire American population at the same time, plus enough back seats to carry everyone from the Soviet Union as well. The trouble is that many of these seats are being driven around empty.

Varieties of suggestions have been offered for encouraging carpooling, including giving free video-tex computers to commuters so that drivers and riders having the same origins, destinations, and schedules can be matched up. On the San Francisco–Oakland Bay Bridge where East Bay carpoolers are rewarded with a free toll and a fifteen- to twenty-minute time saving, commuters collect strangers who queue up at bus stops and BART stations. The result: average car occupancy on the bridge during the morning west-bound peak period is 2.1 persons, compared to 1.25 elsewhere—70 percent greater! Other market-like schemes, aimed at filling those empty seats, need to be invented and tested.

In the short term many other proposed ameliorative techniques remain to be exploited for squeezing more cars onto the existing road system. Schemes such as “smart” traffic signals, which count cars moving through a road network and then adjust themselves to maximize traffic flow. Schemes like “flex time” for spreading commuters’ cars over more hours of the day. I suspect that the most effective means for getting the auto-highway system to work well in the short run is to increase the number of persons in each car.

Suburban commuters’ automobiles are carrying only about 1.25 persons on average. That means that only a fourth of the front passenger seats are being used at any given time—that three-fourths of the front seats and all of the back seats are running around empty. Traffic congestion would disappear, as if by magic, if we could somehow fill just a few of those seats—say, raising the ratio from 1.25 to 1.4 persons per car.

But how do we fill near-empty cars? Clearly, incentives must be sufficiently rewarding as to induce solo drivers voluntarily to share their cars with others. Congestion-free diamond lanes have proved successful in some places. Computer-linked carpools promise to make it easier for drivers and riders to find each other. Jitneys and collective-taxis that use automobiles as public-transit vehicles thus approximate what private autos do best. But the most likely instrument for filling the empty seats is congestion-pricing of roads. Dollar charges that approximate each motorist’s contributions to the collective congestion can be justified on sheer equity grounds. But they are also incentives that encourage motorists to share the monetary costs with passengers. Differential prices that vary with levels of congestion and time of day would also encourage commuters to shift their hours of travel, thus reducing congestion levels directly. Road-user charges in the forms of substantially increased fuel taxes and substantial tolls seem to be increasingly

acceptable to political leaders, and we may soon see experiments designed to increase car occupancy while simultaneously reducing traffic volumes.

In the near-term, nevertheless, improvements must be made in public transit systems. Any workable public transit system must be compatible with urban land-use patterns that have been shaped by automobiles. If it's to compete with the automobile, a transit system must do so on the automobile's terms. That is to say, it must approximate the door-to-door, no-wait, no-transfer service the auto provides. If public transit can mimic the private car's operating characteristics, there is a decent chance that we can raise bus occupancy enough to make suburban places accessible to each other and provide mobility for people who cannot drive or who do not have discretionary use of personal vehicles. Only auto-like vehicles can do it. Paradoxically, small-vehicle, auto-like systems operate successfully and effectively throughout the third world. We have much to learn from the jeepneys of Manila, the colectivos of Caracas, and the mutatus of Nairobi.

In sum, I contend that there can be no question about the automobile's virtues as an instrument of personal mobility—indeed, as an instrument of personal freedom. People everywhere adopt it because it offers better service than any other transportation system yet available. Despite the high personal and social costs attached to its use as the mass-transportation system in the new western and southern metropolitan areas, and despite the costs of congestion, the consensus holds that it's well worth the price.

The auto—or its successor with comparable traits—is here to stay. We obviously need to do something about its negative environmental effects, and we need to find effective fuel substitutes and other means for stemming its horrendous appetite for petroleum products. Enough has been done on the chemistry and engineering of the automobile to assure that technological possibilities for ameliorating these undesirable side effects are virtually in hand. Prospects for a better battery and for electrified roadways are becoming real, and so too then are prospects for an electric car that generates neither air nor noise pollution. In the long run, but within the life-times of most of us, we might even see a fully automated auto-highway system with operating characteristics equivalent to those of both autos and buses. Such a system would vitiate the devilish dichotomy that distinguishes highway and transit systems. Recent developments in electronic sensors and in computers suggest that an automated urban transportation system may soon be feasible.

There can be no question either about the auto's contributing role in reshaping the modern city, helping to convert it from a single-centered, high-density concentration to low-density, highly dispersed, and variegated settlements scattered over the landscape. But, as car ownership has spread, mass-transit systems have declined—positively handicapping all who do not have personal cars at their disposal. Obviously, this group includes the rapidly increasing numbers of aged persons, who, by losing their driving skills, are also losing personal mobility.

I am suggesting that the most difficult and most important problem of the automobile is not that it's tied up in traffic jams or that it has been reshaping the modern city. Land-market responses to traffic jams induce people to move to less-congested places in a constantly self-adjusting search for preferred locations. Out of the search process, a new urban spatial structure has been evolving—a structure that seems, in turn, to be workable for the collective society as well as for the individual relocators who are inducing it.

By far the most difficult and most important problem attaches to the automobile's negative effects on social equity—to the loss in mobility it has caused for people who don't have cars. To attack that shortcoming we need, minimally, to develop public transit systems and market-incentive systems that extend auto-like transport services to the carless. Maximally, we need new transportation technology that, through automation, will make cars available to those who do not yet have free use of them. Our central challenge is to invent ways of extending the equivalent of automobility to everyone.