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## Places

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The Third Motor Age -- Jonesboro, AR; Hagerstown, MD [The Mayor's Institute on City Design]

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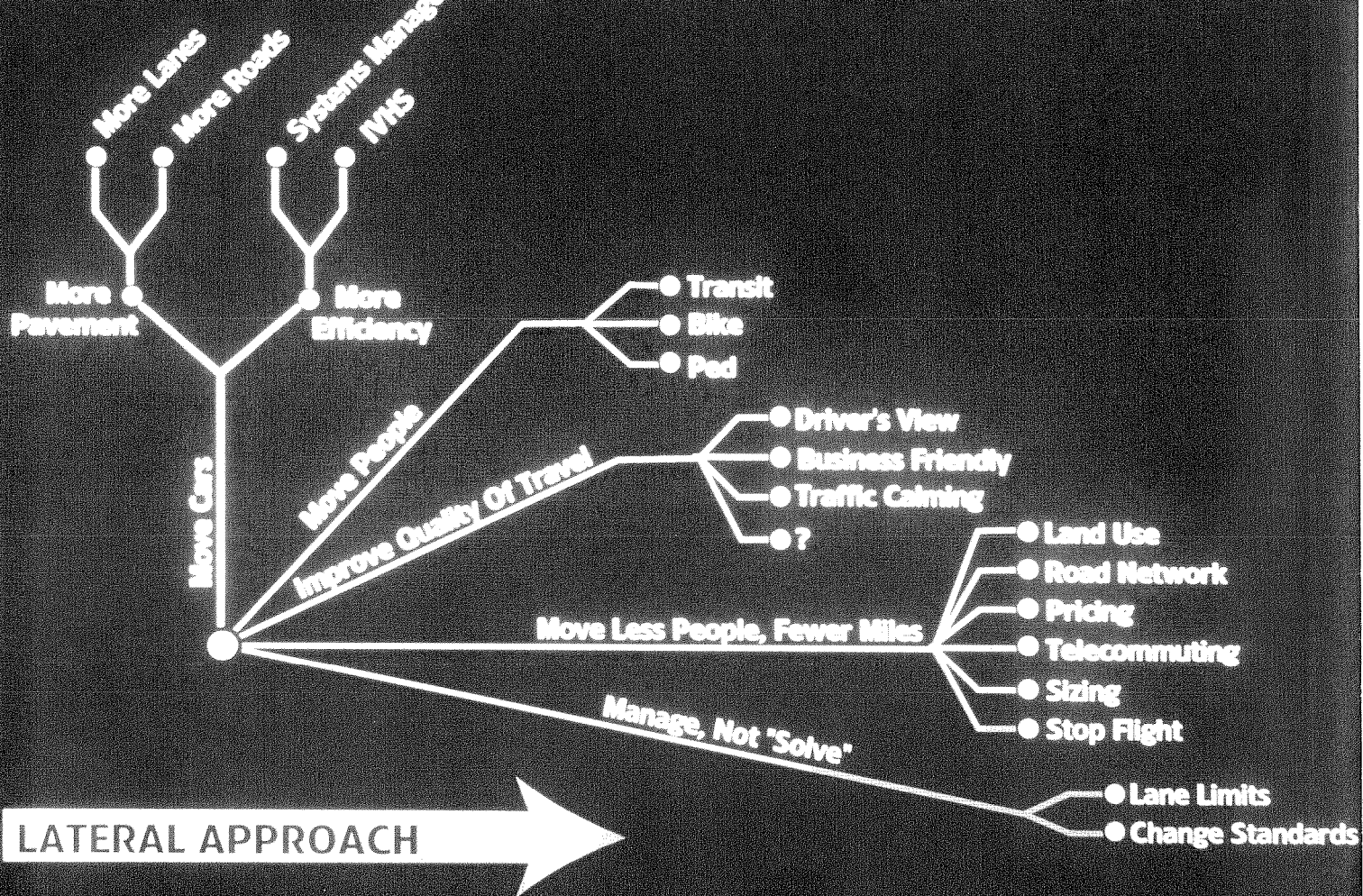
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Above: Old and new paradigms for traffic engineering.  
 Right: Trip assignment in a traditional urban street network. Illustrations courtesy Walter Kulash.

Walter Kulash

I am a traffic engineer. I love the smell of freshly laid asphalt on a cool winter morning! For the first twenty or so years of my career I worked in the very normal traffic engineering direction of providing ever more capacity. This was the transportation problem, not enough capacity, and engineers devoted all their efforts to moving more traffic, whatever the cost.

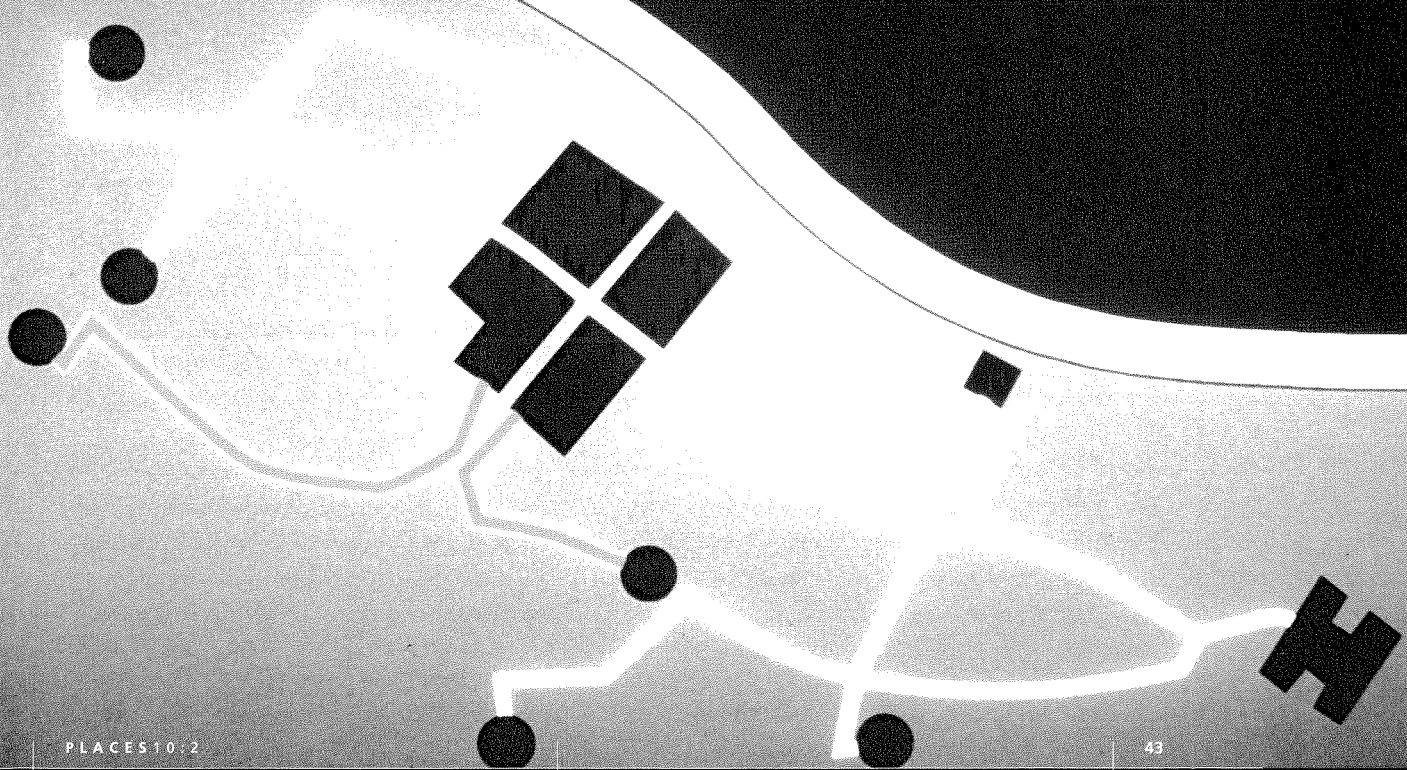
As early as the 1960s, there were indications, such as citizens' revolts against urban freeways, that public acceptance of continued road expansion might be limited. In recent years, the



pendulum has begun to swing rapidly in that direction. Local elected officials, primarily mayors, tell us that the cost of providing ever more capacity has been too high, financially as well as in terms of quality of life. We are entering a new motor age, one in which the goal of maximizing traffic speed and volume is being balanced against other goals for creating livable urban settings.

# The Third Motor Age

ARTERIAL



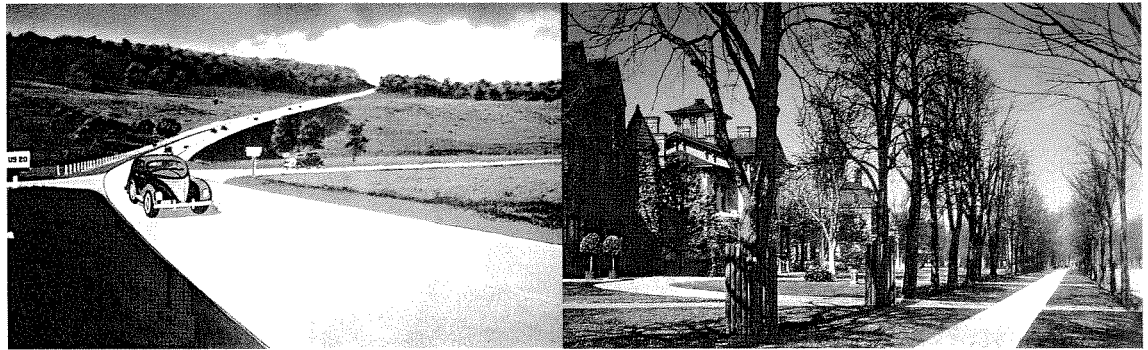
### The First Motor Age

It will help me explain where we are going if I describe from where we have come. The field of traffic engineering evolved very rapidly from unexpected quarters. William Eno, not a household name, was the father of the field. He never drove a car himself, but he was an avid horseman, and he realized that we would have to deal in an organized fashion with this tremendous invention that was crowding horses off the streets.

Eno helped establish many of our traffic conventions, like green signals for go, red for stop and

Traffic engineering proceeded very rapidly after an initial codification of the rules, and by 1941 it had produced a manual of almost anything you needed to know about the subject. For example, we had watched capacity carefully, and the 1941 *Traffic Engineering Handbook* reported that the capacity of a lane of traffic was remaining steady at about 1,500 vehicles per hour. Cars were improving, drivers were becoming more skilled, traffic engineering was advancing, but a lane still carried 1,500 vehicles per hour. Apparently, we were up against a human performance capability.

Landscapes of the first motor age. Right: an idealized country roadway. Far right: Buffalo's Delaware Avenue, still a grand street. Opposite page: A landscape of the second motor age. Detail of Norman BelGeddes' Futurama exhibit at the 1939 World's Fair.



driving on the right side of the road. He also had some prescient insights about the automobile. For example, he cautioned that a proposal for a pedestrian bridge across New York's Fifth Avenue was a bad idea. We would not learn to live with the automobile by separating ourselves from it, he warned.

In those early years, we did not try to rebuild our cities to accommodate cars. We thought we could incorporate cars by adapting existing street forms. The designs have proven to be enormously durable: Almost every city, for example, still has the twenty-four- to twenty-six foot-wide street type with generous sidewalks and plantings.

Through this period, cities grew in a familiar fashion. Their form started with a few major streets, quite often inherited from pre-urban paths, waterways or livestock routes. Then, as the city grew, more pieces of fabric were added. The pieces didn't always match, and they were quite often under different political jurisdictions, but the process was very organic and natural. From a traffic engineering point of view the interesting feature of this system was that it was a dense, highly connected network. There were many ways to get from one point to another.

### The Second Motor Age

Traffic engineering's adolescence started in the 1920s, with visionaries who concluded that we had to reconfigure our cities and our lives for the automobile. They argued that there was no longer a place for traffic-filled streets; cities could no longer adapt to, or live with, the automobile. We begin to see distinctly suburban street patterns with separate land uses, major boulevards (but fewer of them) and no more fine-grained street network.

A 1928 diagram by LeCorbusier accurately describes this new street and land-use pattern — major arterials going directly into a pod of land use. Our own American icon, Frank Lloyd Wright, came to exactly the same conclusion. The "Broadacre City," as he called it, is "everywhere or no-where." This was part of the image of the second motor age — big arterial roads, few of them, isolated land uses, suburban-type towers surrounded always by a sea of green.

From these visions certain things are missing. You never see a storage place for all the vehicles: where would they park? Where did people buy and sell things? The two activities that dominate our landscape today — parking and the notion



that once you bundle people together on a road somebody is going to want to sell them something there — did not occur to these visionaries.

The dominant features of our present road system took form at this time. The pattern of isolated pods of development was thought to be appropriate for the automobile age, separating traffic, with its impacts, from surrounding activity. The expected extinction of walking eliminated the need to have origins and destinations within walking distance of each other. The functional classification of roads established a hierarchy of streets according to their intended traffic use, and it dictated that the upper end of the spectrum, the arterial street, be reserved for long-distance, high-speed travel, ideally unimpeded by friction from driveways and commerce.

Until this time traffic engineering was the duty of the already overworked municipal engineer. But the second motor age also marked the emergence of the professional, full-time traffic engineer, isolated from other disciplines. The consequence of this isolation has been to remove the practice of traffic engineering from the broader concerns about what makes cities healthy and pleasant.

### **A Third Motor Age?**

Until now, we traffic engineers have defined and responded to the traffic problem with vertical thinking: Cars aren't moving, so get out there and move the cars. That typically has meant more pavement — wider lanes, more lanes, wider turns. Lately, these strategies have become very difficult and expensive, and attention has turned to making the pavement we already have more efficient through innovations like intelligent vehicle highway systems, smart cars and better signal systems.

Now a growing number of mayors, commissioners and citizens are rephrasing the question. Isn't moving people, not cars, what we really mean to do? What about improving the quality of travel, rather than its quantity? Can we move fewer people fewer miles? What about changing our land use or stopping the need to constantly flee from cities? Who says that vehicles must move at an unimpeded flow regardless of what that is doing to our cities? We've changed many types of standards over the years; isn't it time to rethink our standards on traffic?

We are now realizing that trying to cure traffic congestion with more capacity is like trying to



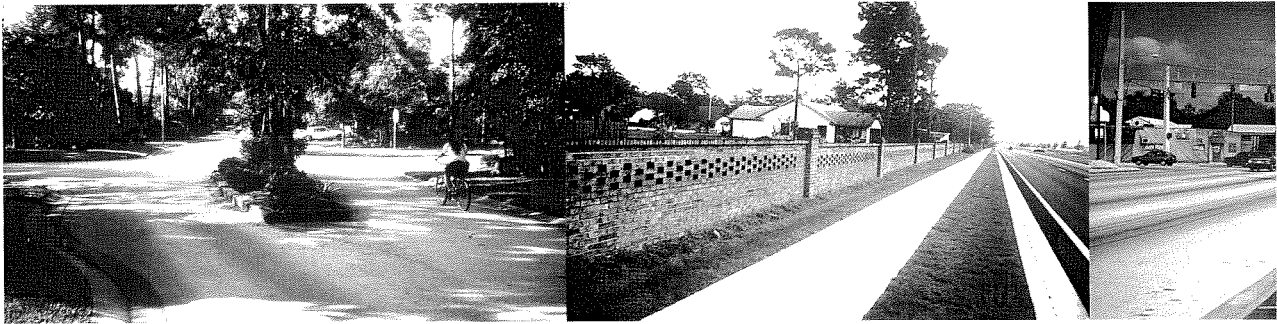
cure obesity by loosening your belt. We've loosened the belt for fifty years, but the problem has only become worse.

We're starting to realize dangers we've been creating in our new street layouts — the ones supposedly designed for this new motor age. Conventional suburban street patterns direct every trip through one (and only one) way out of a particular land use pod and onto an arterial, which is the only route to the entrance of another land use pod. This makes an ugly mess out of arterials.

them with dense street networks. This pattern handles traffic by dispersing trips through the network in a variety of ways. Traffic never builds up to a large volume on any single route, and people make local trips, like going from home to school, without getting on major arterials.

This dense network of small streets outperforms the pattern found in suburbia. A network theoretician would explain this performance in terms of redundant routes, multiple intersections and the uncooperative nature of traffic flow. Simi-

### A Trip in a Typical Suburb



Moreover, we are bundling thousands of people together in one place, along arterials. Almost no kind of municipal will or citizen outcry can stop businesses from wanting to sell something to this captive audience.

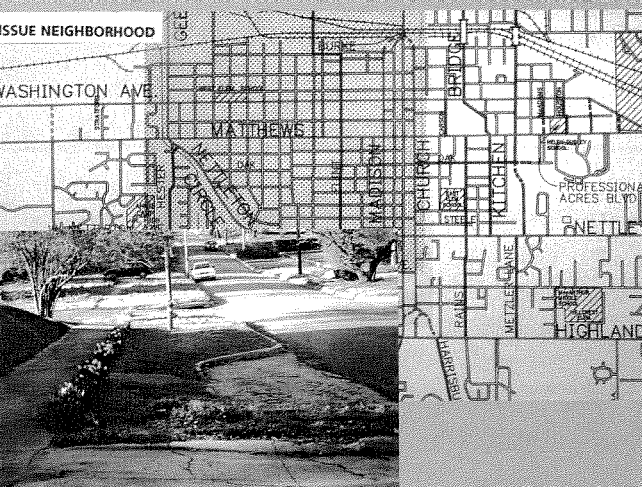
On the other hand, we're realizing the treasure we have in our traditional street layouts. Our old pattern of development, found in the core of almost every city, mixed land uses and connected

lar networks of highly interconnected links are the basis of computer design and telephone networks. This is not news to traffic engineers, but factors like land use codes and subdivision design have driven road design in the opposite direction.

Our highway capacity manual makes an interesting and little understood point: there is no economy of scale on wide streets. It says that the maximum capacity of a street is about 1,900 vehi-

Case study illustrations:  
Map of central Jonesboro,  
with case study area indicated.  
Inset: Typical residential  
street in case study area.  
Courtesy Richard Dagenhart.

## Jonesboro, Arkansas Greenway or Arterial?



Jonesboro's mayor proudly claims to have no problems, only opportunities. Nevertheless, the opportunity that Mayor Hubert Brodell finds most challenging is one that mayors could do without. Rapid development has saturated the city with automobile traffic, which is overwhelming the orderly arrangement of streets, blocks and neighborhoods that have made the city so livable.

Jonesboro, the economic hub of the Arkansas delta,

has grown from 31,000 residents in 1980 to about 60,000 today. Once it was an agricultural center; now its young, educated and affordable labor force attracts manufacturers, like Post Cereals, from throughout the central states. With associated job growth in the regional medical center, the university and retail sales, Jonesboro expects a population of 100,000 within 20 years.

But these opportunities come with costs. Growth naturally occurs on the fringe.

Yet, most employees work downtown or commute through it, and they complain about the traffic.

Brodell knows the importance of the older, established neighborhoods near downtown. They make a community by housing young married couples and elderly persons who are seeking affordable housing, traditional neighborhood ambiance and convenience to the entire city. Residents of these neighborhoods complain, too, about the

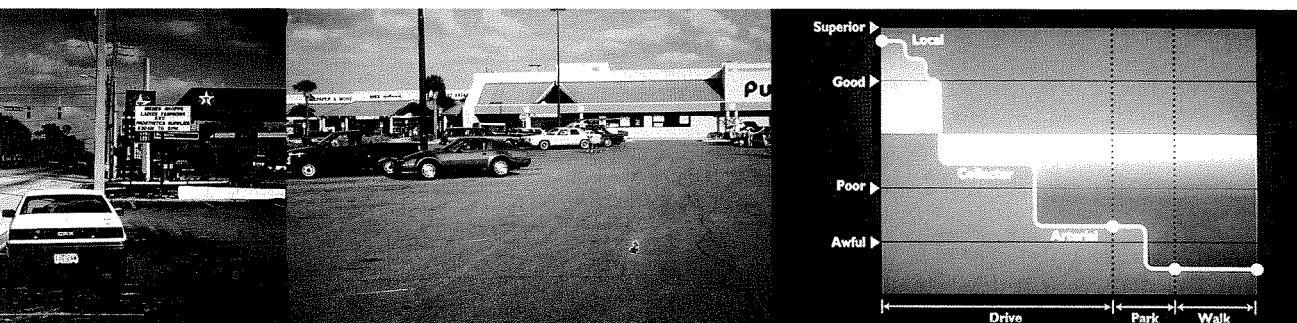
cles per lane per hour, times the number of lanes. There is no economy gained with wider streets. A lane carries this 1,900 vehicles whether it's on a beautiful little residential street, a handsome commercial street or the ugliest arterial in the world.

Another interesting feature of traffic is that you move the most vehicles at twenty-five to thirty-five miles an hour — the design speed of traditional urban streets. Most people think that we can move more vehicles at higher speeds, but the increase in spacing that drivers require outweighs

retail store on two different road systems.

Our first trip begins on a pleasant local street in a conventional suburban subdivision. Consider the quality of the typical daily trip. In this subdivision, you quickly come to the collector street, which has been walled off to protect the subdivision from traffic. Inevitably you travel on a commercial strip because this is the only available route. You arrive at a parking lot and walk into your destination.

How does our quality plot look? Our trip was good when we started off in that nice subdivision,



the increase in speed. You can prove it yourself. Go out and count!

### Trip Quality — The Missing Dimension

Traffic engineers are concerned with the speed and capacity of travel. Other qualities may actually be more important to travelers, but they are not measured. To illustrate this difference in quality, let's take a typical daily trip to a local

retail store on two different road systems. The trip along the walled connector wasn't so good, it became poor along the arterial, and I've not found anybody who likes the parking lot walk! Most of the trip was bad, and the most important parts of the trip, where we were actually meeting the environment with our feet, were the worst of all. Can't we do better?

Let's take a comparative trip in a traditional urban setting. You start off in a traditional neigh-

high traffic volumes on their streets. Brodell knows that ultimately too much traffic will destroy these neighborhoods, leaving deteriorating housing, a declining tax base and a loss of jobs.

At the 1994 Mayors' Institute on City Design: South, Brodell described traffic issues in one neighborhood, whose streets are remarkably beautiful. They are narrow, only 18 to 20 feet wide, yet their rights of way are about 60 feet, with sidewalks at the property line. As a result,

20-foot greenways run along both sides of the street. These spaces are used as big grass lawns or sometimes for trees and flowers. Many older houses have parking spaces gracefully indented into the greenway.

A recent traffic plan offered two alternatives. One widened streets so they could carry four lanes of traffic, two in each direction. This would increase capacity but would be expensive and destroy the unique street character. The other chan-

neled traffic on pairs of one-way streets. Although this would conserve the street character and avoid the costs of street widening, it was opposed by residents. They resisted the inconvenience of one-way streets and had no desire to live in a neighborhood split by arterials, whether traffic runs one way or two.

The resource team suggested the plan was too narrowly conceived — both alternatives tried to move more traffic through a

neighborhood that really shouldn't have any more. The team made three suggestions. First, in the short term, distribute traffic more widely throughout the city, using the existing streets more effectively without channeling traffic onto arterials. Second, increase the number of continuous cross-town streets to better distribute traffic. Third, address land use issues. Managing growth and land use may not be politically popular with some constituencies,

but it is necessary to manage traffic effectively.

Brodell, who won a recent re-election campaign dominated by planning and traffic issues, is still struggling with Jonesboro's traffic politics: some of the four-lane streets are being built in his older neighborhoods. He only wishes that the new ideas of traffic planning had been developed five or ten years ago, when traffic solutions for Jonesboro still really opportunities.

— Richard Dagenhart



neighborhood environment. Then you come to a connector street. (This street, by the way, is carrying the same density of traffic as a major street, and this is how good it can look while it's doing that.) After driving down an arterial street, you arrive at a shopping area, such as this lovely, rebuilt environment in downtown Knoxville. There is parking available, and a brief walk to your final destination.

The first trip may have been a little quicker, but who cares? It was an awful experience. The

drive into an area, park once and walk to numerous destinations. In a suburban “park many” atmosphere, you drive, park, go to a single destination, get back in the car and repeat the process. The former creates nicer environments, enormously less exhaust emissions and fewer vehicle trips — and is highly valued by places that have it.

There are many ways to make traffic flow differently and change the character of streets. One can narrow intersections so only a single vehicle can get through, or create elaborate, deliberate

### A Trip in Traditional Urbanism



second trip was lovely, most of the way. Anybody who sells a product recognizes immediately that the second trip would be vastly preferable to the first. We can sell that product more easily, financially and politically. We traffic engineers have never dealt with having to sell what people really want and are just beginning to understand this.

Traffic engineers are also beginning to understand the “park once” environment, in which you

narrowings that make drivers behave differently, deflecting their path.

Reclaiming pavement from traffic is becoming popular. In the Miami Beach art deco district, a wide street was narrowed to one lane of pavement in each direction to make more space for night time crowds, street life and commercial displays. In Beverly Hills, traffic lanes are being turned into spaces for sidewalk cafes and diagonal parking.

## Hagerstown, Maryland The Design of the Public Square



Left and center: Hagerstown's public square in 1808 and today. Right: Central Hagerstown. Courtesy MICD: East.

Hagerstown's downtown has never stopped working. Its pattern of streets and buildings remains intact, spared from destructive renewal projects. Distinguished buildings have retained viable uses, and the region's cultural institutions continue to call downtown home. Small successes, such as the relocation of utility lines to rear yards and the maintenance of stable neighborhoods nearby, have helped sustain downtown's office, business and retail activities.

But the Public Square, the physical and symbolic center of the city and region, is another story. The two streets that cross in the square suffer from both high traffic volume (abetted by street widenings that shaved space off the square) and the noise created by trucks seeking a shortcut through town. A heavy dose of greenery renders the space unusable for many of the activities one might expect in a grand public square. Not surprisingly, the quality of the space

and the activities around it has steadily declined.

Mayor Steven Sager came to MICD: Northeast in 1995 looking for ways to help the square bounce back. The city had won some victories, attracting new office and retail uses to the square by promoting greater use of the space after business hours and on weekends, times when it typically had been empty. These efforts have been gradually re-establishing the value of the space in the mind of the community.

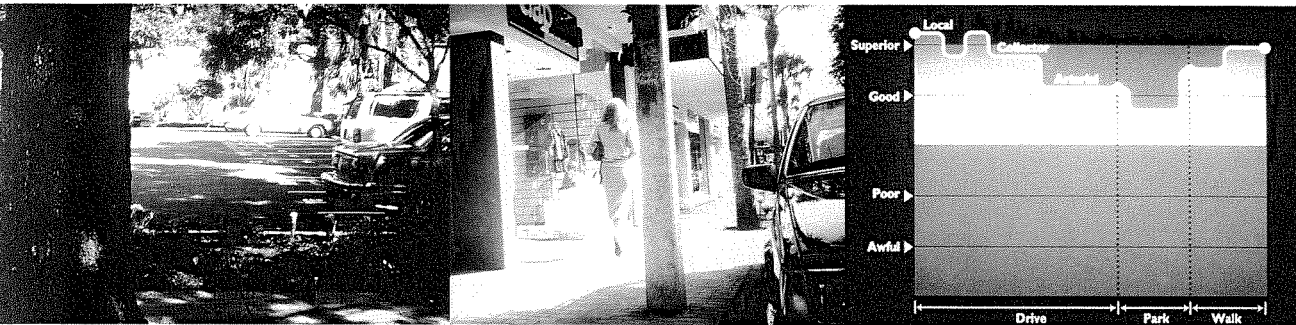
Discussion at the institute addressed current plans for the redesign of the square and initiated broader, conceptual thinking about traffic and its impact on downtown. Sager was encouraged to reroute through truck traffic around downtown, retain traffic patterns that support retail uses and tame traffic to improve the pedestrian environment. Traffic noise and speed problems could be addressed by re-timing the lights, reducing turning radii, changing the



Then there are various innovative traffic control devices. Speed bumps are respectable, better looking and better engineered than the nuisances we associate with drive-in restaurants. They perform a valuable service by slowing traffic and encouraging it to use other routes. The roundabout traffic circle is making a comeback. It's a thoroughly respectable traffic engineering device that can lend scenic appeal. A recent article in the *ITE Journal* demonstrated convincingly that roundabouts have higher capacity with better

pectedly strong course toward intermodalism. Florida and Texas, suddenly finding themselves highly urbanized, have moved rapidly with intermodal policies. Ten U.S. cities have installed new light-rail systems in the last decade, and several are expanding. Portland, Baltimore and Denver have demonstrated impressively how light rail can be a stimulus for better land use and urban design.

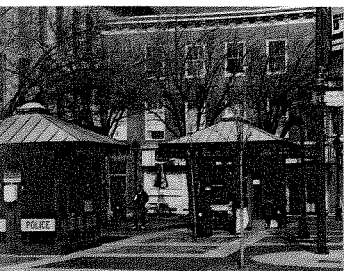
The Third Motor Age will see urban designers, environmentalists, community activists and advocates of livability permeating transportation plan-



safety that normal intersections, in most cases.

In the emerging Third Motor Age, the U.S. is moving toward an intermodal transportation policy — an understanding that growth in automobile mobility is not infinitely sustainable and that other modes of transportation (walking, transit) must satisfy a greater portion of travel demand. This is evident at all levels of government. The Federal ISTEA legislation set an unex-

pectedly strong course toward intermodalism. Engineers, who have traditionally dominated transportation planning and design, will ultimately respond with creativity in devising operable standards for assuring new qualities, such as livability. In fact, terms like “parkways,” “boulevards” and “signature streets” are already entering the road planning vocabulary. The design of streets as premier urban spaces, once an exciting and promising endeavor, is poised for revival.



texture of paving in the square, and pulling the stop lines for traffic back to the edge of the space. Trucks might be discouraged by weight limitations on downtown streets.

The resource team also encouraged Sager to look to the history of the square for

ideas about a new design. The 1970s remodeling of the square and designs now being considered interpret the square as a green public park, not the commercial marketplace it once was. Given the square's narrow width, the mayor was encouraged to seek solutions that maximize the sense of enclosure created by the historic facades surrounding the space and to simplify the design by eliminating clutter at ground level. Proper lighting and simple paving could

enhance flexibility for formal and informal uses.

Redevelopment activities initiated by Sager and the Chamber of Commerce are continuing. Several rehabilitation projects on or adjacent to the square are funded and will be complete within two years. As a result of his experience at MICD, Sager and his staff have adopted a comprehensive plan to address traffic and other problems downtown. — *Matthew Bell, Siddhartha Sen.*

