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PLANNING & ZONING NEWS

THE COCOONING OF AMERICA

Technology Drives People Geographically Apart

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THE COCOONING OF AMERICA:
Technology Drives People Geographically Apart

by **Albert A. Bogdan,** *McKenna Associates, Inc., Farmington Hills*

Three significant technologies have been the driving force in the redesign of our cities. The first is something I classify broadly as production technology. It is the combination of technologies that have led to the new more efficient manufacturing processes. The second is the compressor which is the base technology for climate control products such as the air conditioner. The third is the automobile. Each has been a driving force and a significant cause for the spreading of our suburbs and the isolation of individuals from their neighbors and communities. What I call the *"cocooning of America"* is further reinforced by the new information technology of today and tomorrow.

The state of our cities is a result of our inability to change them to be responsive to the modern world. The status of cities is directly related to the time in history when they experienced their greatest development.

The state of our cities is a result of our inability to change them to be responsive to the modern world. The status of cities is directly related to the time in history when they experienced their greatest development. Cities that have responded to the social and technological pressures are in better shape than those trapped in yesteryear. We tend to shackle ourselves in a nostalgic strait jacket instead of helping communities respond to a new reality. We need to understand the past and project the future. More important we need to start redesigning our older communities to that new reality. But first we need to understand the changes.

About the Author

Mr. Bogdan is the Director of Economic Development at McKenna Associates, Inc., a community planning firm. He is a former Director of the Office of Economic Development for the State of Michigan and has been director of economic development activities for several communities. Mr. Bogdan is responsible for economic impact analysis, market analysis, and the preparation and implementation of community and economic development strategies.

Production Technology

Henry Ford invented the assembly line. His line was the most flexible manufacturing process since the construction of the pyramids. Human beings were converted into automatons with each performing the same task repeatedly. The Model T Ford Plant, located in the three-square mile City of Highland Park, had up to 70,000 people working in a six-story production facility. The factory, located next to the Ford Model T headquarters, sits on less than 100 acres.

The production line was wonderfully flexible and fluid. Each person could be unskilled and still make $5 a day, enough to afford to buy the car they made. Each was taught only several or even one small task(s) that he/she replicated over and over and over again. People could be moved almost anywhere to recast the line. The plant has six stories. This human-based line could move people up one floor easier than it could move people from one end of a huge plant to the other.

Today, the old Model T Ford Plant still stands, as an archival warehouse employing only a few hundred people. It is a symbol of the throw-away society that not only throws away its plants, but also throws away its cities. It stands as a symbol of companies that abrogate their responsibility to the community by leaving their tailings behind in full sight of the public.

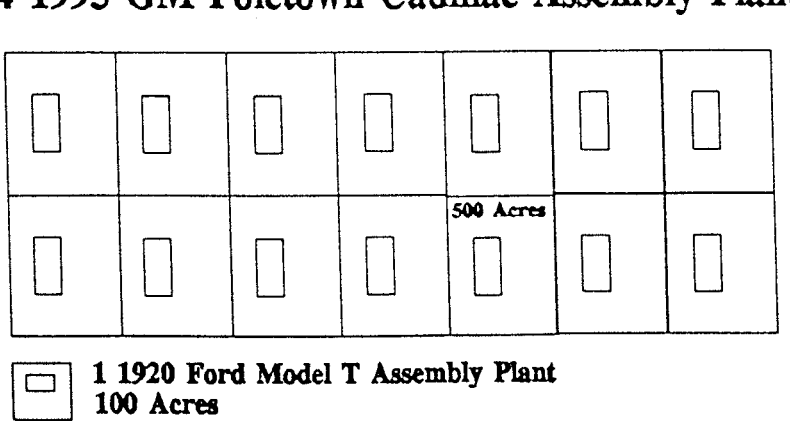
The modern auto plant is designed to redesign itself constantly. The single floor acts as a palette for the production designer. Parts or products can be sent from one end of the floor to another using automated guided systems. Robots or other manufacturing equipment can be clustered or reorganized easily to create a line for a different range of products. It has the flexibility to receive parts at various sections of the assembly line *"just-in-time"* to build the products without inventory. Products are built on a single floor for the greatest efficiency. The building provides a flat surface to easily move machines, people, parts, and products efficiently to create a new production line to build new products.

The new modern plants takes up much more land area. The land is not available in the older built up cities. The land purchased for the Poletown GM Assembly Plant cost the City of Detroit (and its federal government partner) over $200 million. Detroit did a remarkable job of land assembly that caused conflicts that left scars on both the firm and on the City. The site replaced the abandoned six story, five million square feet Dodge Main Plant. The new 500 acre, 3.2 million square foot plant employs less than 5,000 people on two shifts.

The modern auto plant is designed to redesign itself constantly.

The GM Poletown Auto Assembly Plant has the same number of square feet as the Model T Plant (3.2 million square feet). The highly automated flexible manufacturing plant now uses machines rather than people. It employs 2,500 per shift. The single story plant requires 500+ acres. If we do some quick calculations, it can be seen that a city needs 7,000 acres of industrial land (almost 11 square miles) to obtain the same 70,000 jobs that 100 acres (0.16 square

Figure 1
Amount of Land Required For 70,000 Jobs, 1920 - 1995



miles) provided in the early part of the century.

(500 acres/5,000 jobs X 70,000 jobs = 7,000 acres

7,000 acres+640 acres/sq. mile = 10.94≈11 square miles)

The depopulation of our built up cities Isn't a result of their failure, it is a result of a major technology shift that has significantly reduced the jobs per acre.

Just try to imagine the impact on a city when it realizes it needs a 6,900% increase (70 times) of its land area (Figure 1) to obtain the same number of manufacturing jobs it was originally designed to support. It is devastating. The depopulation of our built up cities Isn't a result of their failure, it is a result of a major technology shift that has significantly reduced the jobs per acre.

The City of Highland Park, totally surrounded on all four sides by the City of Detroit, is less than three square miles in size. Also surrounded by Detroit, Hamtramck, the former home of the Dodge Main Plant, is only a little over two square miles in size. To keep the job base of the 20s, Highland Park and Hamtramck would have to move all of their residents to the suburbs. Detroit would have to empty 6 additional square miles. To this day, most cities or their leaders do not understand that cities need to be restructured to a new reality-a significantly lower land utilization for employment. Racism and interstate highways are blamed for the urban problems. While partially true, they are oversimplified answers that stifle the search for other solutions.

The growth of the suburbs, as job generators, became necessary for the economic viability of the region. The production technological shift is as great an influence on the growth of the suburbs as the reduction in household size and the expansion of the road structure. All reinforced each other to create a new paradigm.

Technological obsolescence closed the former Parke-Davis Plant on the Detroit River. The federal government (Food & Drug Administration) required the company to convert to totally automated production in an environmentally controlled facility. The manufactured pharmaceutical cannot be touched by human hands. After a complete and total analysis of the facility - they just could not accomplish the conversion of the multistory structure. Technology struck down another inner city plant. Due to its gorgeous location on the river, the plant has slowly undergone an adaptive reuse. Few facilities of that size can be effectively reused. They are just too big. And, when they do, they generally provide significantly less jobs and significantly less tax base.

To understand the scale of the reuse problem, a 3.2 million square foot facility could house three to four regional shopping centers (although parking would be inadequate); contain 3,000 households (a little less than 6,000 people); contain six prisons. None of these can obtain the financing because of the scale. None of these would be competitive with new suburban developments.

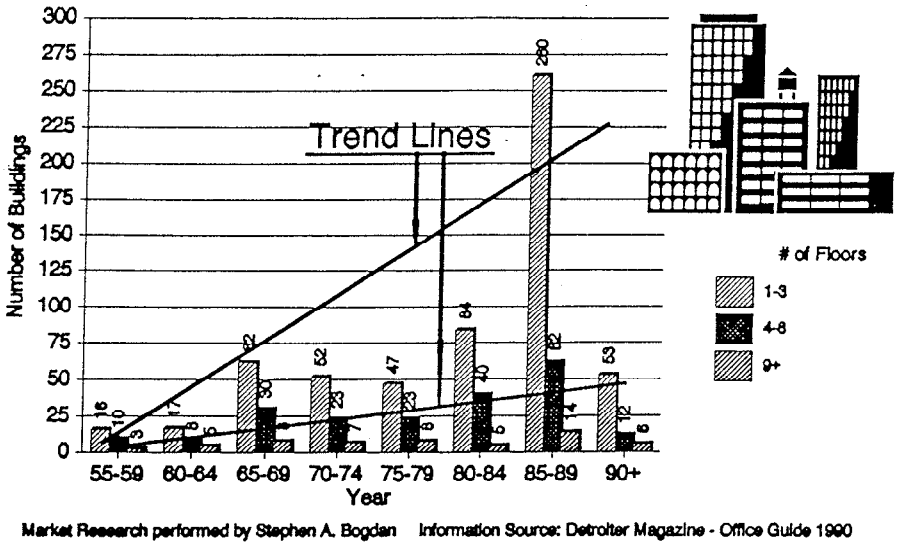
The average light industrial property of today houses approximately one person for every 500 square feet of industrial building space. The floor space of an average new factory covers approximately 20% of the land area. This essentially translates into today's non-auto assembly factories producing approximately 17 jobs per acre or 11,000 jobs per square mile -- still a far cry from the 1920s.

The only land intensive substitute for the old factories is high rise offices and hotels. That is why cities focus on their downtown for development.

The only land intensive substitute for the old factories is high rise offices and hotels. That is why cities focus on their downtown for development. These are the employment centers that can substitute for the old factories in terms of jobs per acre. The Renaissance Center Complex in Detroit employs almost 10,000 people on approximately 40 acres (250 people per acre). It doesn't have the same density as the old factories of the 20s (700 people per acre), but it's closer. However, the people employed in the offices and hotels need a different set of skills. They do not employ the highly paid unskilled people that the old Model T line could employ. In addition, office sites, generally, are not located in the same neighborhood as the obsolete plants.

However, even office development has changed. A review of office construction between 1950 and 1990 in the Detroit Metropolitan Area indicates that even the office work environment has shifted to shorter buildings distributed throughout the suburbs. The economic shift to smaller service related businesses is pushing a market for lower cost, smaller offices responsive to growing businesses. See Figure 2. Production technology, whether manufacturing or office related, is pushing the employment per acre lower and lower. The result is work centers spread further into the countryside.

Figure 2
Office Buildings by Height, Southeast Michigan, 1955-1990+

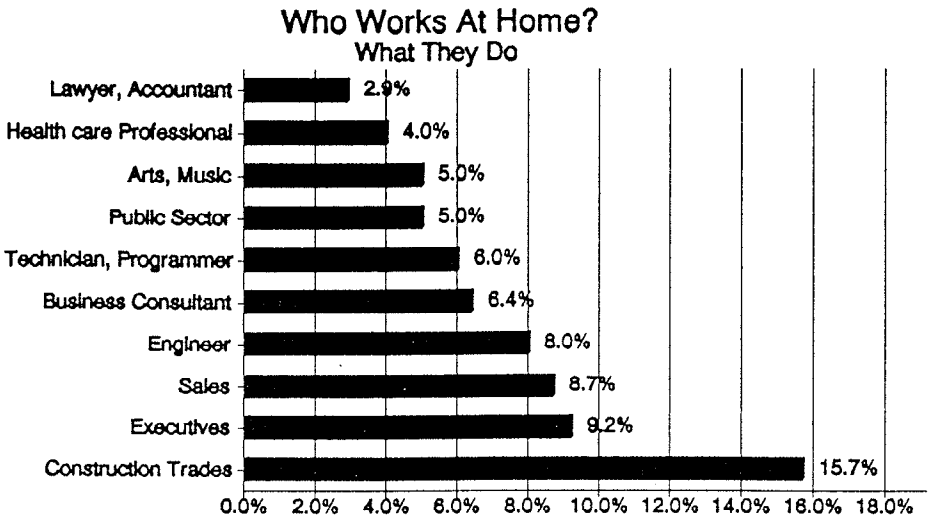


Market Research performed by Stephen A. Bogdan Information Source: Detroiter Magazine - Office Guide 1990

Production technology, whether manufacturing or office related, is pushing the employment per acre lower and lower. The result is work centers spread further into the countryside.

The next step in the job distribution process will be to transform more and more homes into office/home centers. The downsizing of American businesses has occurred just at the time that the baby boomers have reached their age of maturity. The large availability of skilled talents permits industry to pull together skilled teams for each project. These entrepreneurial teams of people with the right combination of talents will join together, and separate and join together in differing combinations.

Figure 3
Home Businesses - U.S.



Source: The Wall Street Journal 6/90

New manufacturing businesses are being formed that have no production facilities. In California, semiconductor production facilities are known as *"Foundries."* They are shared by firms working from their homes and small offices. Designers, engineers, packagers, marketing and sales people join together to form temporary teams with their product manufactured in *"foundries"* located in Japan, Singapore, Korea, Texas, or California. In the U.S,. forty million people now work at home part of the time. See Figure 3. Fifteen million people work from their home full time. In the next century, the home will become a major work center in the United States.

The compressor permitted the establishment of a climate controlled environment that lets us isolate ourselves in our air conditioned cocoon separated from the world outside.

Climate Control

The invention that had the second most important impact on design of communities is the compressor. The compressor is the heart and soul of climate control equipment such as the air conditioner and refrigerator. It changed the way we live, the way we shop, the way we work and the way we interact with each other. It changed the entire nature of community. It permitted the establishment of a climate controlled environment that lets us isolate ourselves in our air conditioned cocoon separated from the world outside.

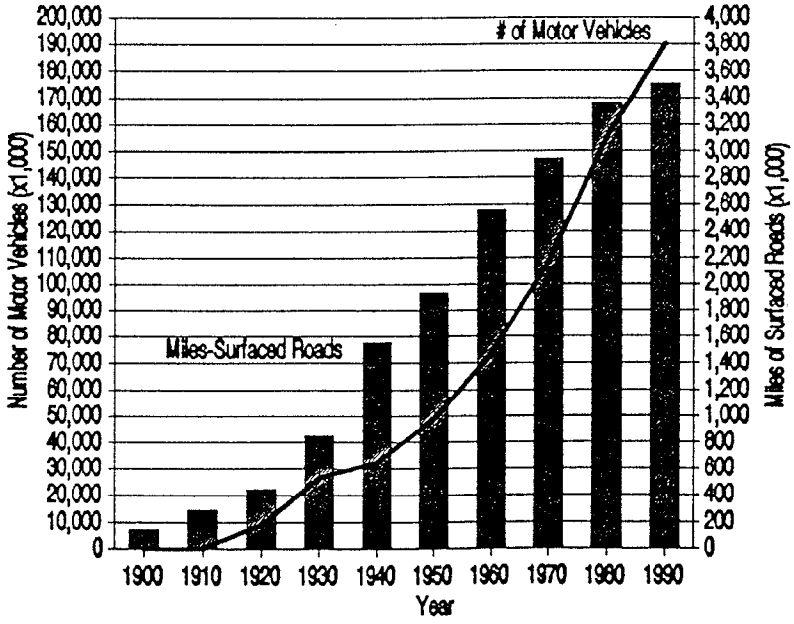
Air conditioning was initially designed and built for the textile industry in order control temperature and humidity in their production area. Its cost in the 20s and 30s limited the use of air conditioning to theatres, offices, airlines, and passenger rail. However, the mass use of air conditioning in the home, auto, and work place had its major growth in only the last two decades.

Before air conditioning we had to live in homes with windows open to permit air to circulate throughout our house or apartment. To cool off we put our heads out the window or went outside. At the same time, the open windows brought in the sounds of the outside. The open windows became our cooling area, our security viewing area and our means of communication because we could talk to people as they walked by. When I was a child, my mother would open the third floor tenement window and watch over us as we played. Her voice would echo through the neighborhood if we ever got out of line.

People leave their air conditioned enclosed home, get into their air conditioned enclosed automobile and arrive at their totally enclosed air conditioned offices or factory or go shopping in their air conditioned enclosed mall or store.

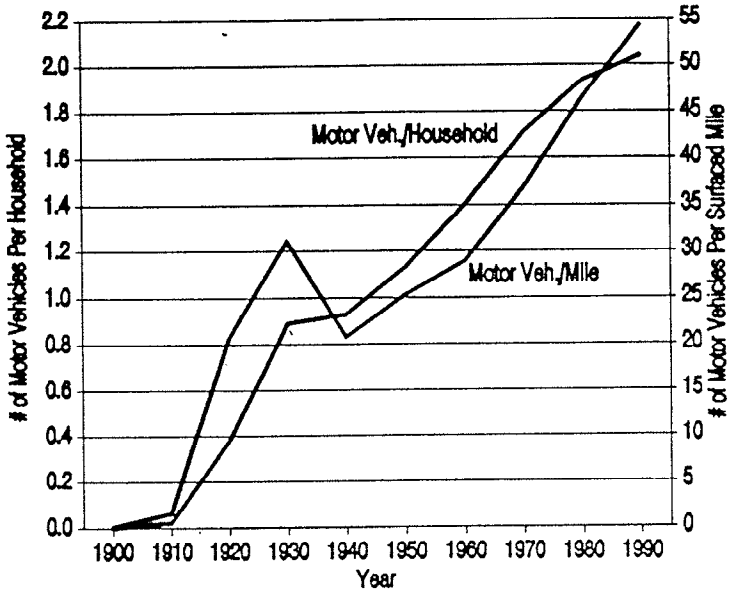
Homes were designed with front porches so we could enjoy the evening breeze at the end of a warm summer day. Every home or apartment reached out towards the community. People shared the common space that expanded communication, provided security and cooled us off. The coming of the air conditioner changed our life style. All windows were closed in order to keep the inside of the house cool.

Figure 4
Motor Vehicle Registration & Number of Surfaced Road Miles, United States 1910 - 1990



Sources: Motor Vehicle Association, U.S. Department of Transportation

Figure 5
Motor Vehicles/Mile, Motor Vehicles/Household
United States 1910 - 1990



Sources: Motor Vehicle Association & U.S. Census

The growth of air conditioning enclosed every building. The old downtowns were replaced by the air conditioned mall which permitted people to shop in all kinds of weather; stormy, cold or stifling hot. Buildings no longer face outward; they all face inward. Windows were sealed or even eliminated to keep the cool air inside. People leave their air conditioned enclosed home, get into their air conditioned enclosed automobile and arrive at their totally enclosed air conditioned offices or factory or go shopping in their air conditioned enclosed mall or store. Their only contact with the general community is the short walk between the car and the home, business or shopping area. Even then they would drive around the building several times to find a parking space as close to the door as possible. People have isolated themselves from each other. They are creating a private world with only limited access to the general community.

Transportation

The major cities developed during the early part of the century were developed on the water. Water was initially the center of commerce for fur traders. Later, water transportation was the major method of moving bulk goods such as coal, iron ore, and the heavy products produced in the factories. Detroit became a great center for shipbuilding, shipping and industry. This created the strong industrial foundation for the auto industry that followed. The water location was further reinforced as an economic center by the construction of rail systems that terminated and fanned out from the water. As the cities changed from economies rooted in an industrial base to one founded on information and communications, water (although providing an attractive environment), acted to truncate the ground based transportation network.

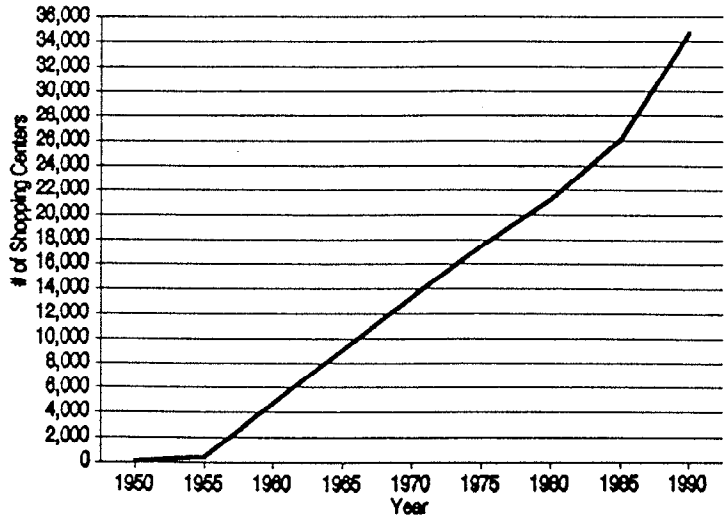
Due to the physical barrier of the Detroit River, the City of Detroit road structure primarily radiates out in a semicircle. Half the commuter access is *mostly* lost. As a rule of thumb, offices are built within 20 minutes of the home of the chief executives. If the number of accesses is truncated, and the roads start to clog up, chief executives will look for the path of least resistance - the suburban office centers near their homes. Under the circumstances, Detroit has been highly successful in locating many new office buildings in the City. They succeeded in spite of its locational disadvantages and its abandonment by many of its corporate leaders.

The largest increase in the highway systems in the United States occurred during the Depression years of the 30s. We built over 700,000 miles of surfaced roads (Figure 4). The Work Project Administration (WPA) put millions of unemployed people to work improving the rural road network. Many roads in the rural communities still owe their existence to the WPA. For many areas, the roads did little to improve their economy. For others, it permitted tourists to arrive and changed their farm based economy to a tourist base. Overall, people still flocked to the cities for jobs.

The transformation of the cities slowed in the 30s since the Depression stalled new investment and reduced motor vehicle usage to the lowest increase in the number of registered motor vehicles since the beginning of its history. During the Second World War the U.S. built no autos. The transformation of the cities and their suburbs was put on hiatus until the 50s.

In the 20s, the average household did not own a car (Figure 5). Less than four of every ten households enjoyed auto ownership. Even by the 30s there was less than one motor vehicle per household. The Depression again slowed the increase in auto use until after World War II. Auto responsive development activity didn't begin until the 50s when motor vehicle ownership expanded to 1.13 motor vehicles per household. This meant that a large number of households still did not have a car. Cities that developed before the early 50s did not have to be responsive to the automobile. The 50s became the period of the "miracle miles" when retail buildings with large open parking began to concentrate on the major roads in the suburbs.

Figure 6
Growth of Shopping Centers, United States 1950 - 1990



Source: Urban Land Institute

Except for the 30's, the surface road network in miles never expanded faster than the number of motor vehicles. By 1990, the number of motor vehicles per mile had expanded to 55 per surfaced mile. However, hidden in the numbers are the various actions of local transportation agencies to improve the flow of traffic. A traffic engineer searches for a laminar flow of vehicles with no interruptions. The engineers widened streets, removed parking from in front of businesses and converted streets into one way highways, speeding cars through the neighborhoods. Statistics do not show the increased capacity through modern street design. Most road improvements follow the Third Law of Urban Growth - auto traffic expands to exceed the road capacity available.

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In every instance, each of the steps inadvertently and systematically acted to reinforce the decline of the older cities. Every action reduced the marketability of the property and reduced its value.

In 1950, there were only 100 shopping centers recorded in the United States. By 1953, that number tripled. The first regional shopping center, designed to be responsive to the auto driving consumer, was built in the Detroit suburbs in 1954 (Northland Shopping Center). The first totally enclosed climate controlled regional mall didn't open until the 70s in the suburbs of Minneapolis (Richfield, MN). The new climate controlled centers began to replace downtowns as the major retail center. By 1976, there were over 18,000 shopping centers. Northland had been converted to a climate controlled mall. As Figure 6 shows, by 1990 the number of centers exceeded 35,000.

The forces of change had begun to leave the cities of the past behind. The new suburbs had a clean slate. They could design themselves to meet the needs of the commuter. Cities would no longer be designed for people. They were designed for the automobile. The new subdivisions were designed to be residential havens —a destination. The use of cul de sacs and/or limited street network reduced residential traffic and improved the safety of the neighborhood. It created what Oscar Newman defines as *"defensible space."* In addition, the front entrance to homes are its driveways and the door to its two or three car garage. The front entrance of retail businesses is their parking lot. Communities now have more spaces for cars to park then places for people to go.

Older suburban cities such as Hazel Park and neighborhoods such as Detroit's west side built their commercial strips before the mid-fifties. They have become obsolete. The buildings were too small to compete with the larger, more efficient commercial buildings accessible by automobile. Parking was eliminated from the streets to speed auto travel and to eliminate auto conflicts. Conflicts, after all, caused accidents. Buildings that abut each other faced streets that no longer were a source of customers. Housing, located at their rear became an obstacle to parking expansion.

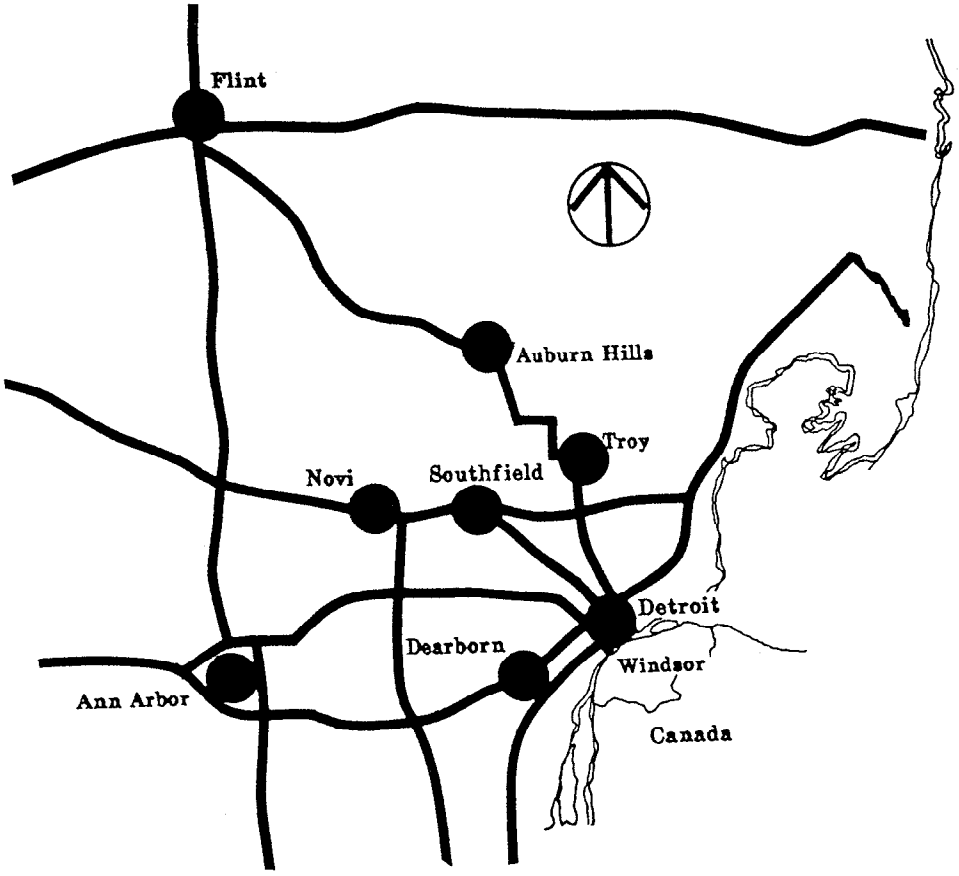
There appears to be one truism in the design of cities. Studies performed by MIT and the U.S. Department of Transportation indicate that no matter what the mode of transportation of an era (walking, horse, trolley, or auto) - people tend to take an average of approximately 20 minutes to commute to work. As the commutation starts to increase, changes occur to decrease the time consumed. The commuting time was approximately 20 minutes in the 18th century. Today, the average commuting time remains 20 minutes. When commuting time increases, new employment clusters are created. Residential densities increase around them. Road systems are expanded to move people to them.

Only when the roads fill up and cannot be expanded due to geographic constraints and the time of travel increases beyond acceptable personal convenience can we expand mass transportation. Except for the poorest people, the forcing function is convenience and time -- not costs.

The design of metropolitan areas has changed over the last century. They no longer can be viewed as suburbs surrounding a central city. The combination of lower density jobs, lower density living, and the need for jobs and home to be within an average 20 minutes has caused residential areas to cluster around employment centers marching away from the central city. The central city has become only one of many employment centers—albeit the psychological first.

In the Detroit area we can see these focal points moving systematically outward. See Figure 7. Along I-75 it has marched from downtown to Troy to Auburn Hills. The Flint Metropolitan Area is already economically integrated into the Detroit Metropolitan Area. The map pinpoints an obvious gap that will be filled between Flint and Auburn Hills. The same is evident as we drive the

Figure 7
Employment Center Growth Pattern Detroit Metropolitan Area



Lodge Freeway to I-96. The Southfield employment cluster was the predecessor to the Novi cluster. New employment clusters will form within the next 20 years. Draw your own projection on the map.

The forces of change had started even before the birth of the interstate highway system. President Eisenhower announced the formation of the new system in 1953 as a national defense endeavor in response to the Soviet threat. He had fallen in love with the German Autobahn as a military network for moving armies and supplies. He wanted to replicate it here.

The interstate highways did not cause the changes. Instead, they responded, reinforced and extended the process. They tended to make employment clusters continuous ribbons of economic activity instead of more isolated clusters.

The interstate highways did not cause the changes. Instead, they responded, reinforced and extended the process. They tended to make employment clusters continuous ribbons of economic activity instead of more isolated clusters. During the 50s the surfaced road network expanded faster than any other period other than the 30s. Although the entire interstate network is only forty-two thousand miles, over 600-,000 miles of surfaced road were added in the 50s.

The federal and state highway agencies of this nation are unintentionally the biggest destroyers of communities of any single government action. Instead of working with a community to redesign itself to be responsive to the automotive age through the creation of parking clusters, they destroyed its economic life.

In too many cases, instead of responding to the change, community leaders suffer nostalgia attacks.

- They attempt to keep an *"urban"* design environment that prevents communities from reinventing themselves to a new reality. They try to place new retail buildings on the street, with parking in the rear—they create buildings unresponsive to the automotive orientated marketplace, They try to replace a reality that never existed. The original, in more cases than generally known, were built on rural roads with front parking responsive to the marketplace of their day.
- They promote a grid network of residential streets that are no longer responsive to the marketplace of today or tomorrow. The home has become a sanctuary, a destination, a safe neighborhood. The neighborhoods of tomorrow will provide a spiritual haven with its people linked together in virtual communities located in cyberspace.

There is a need for new policy to help older communities whose residential neighborhoods and commercial strips were built prior to 1954 to design their commercial and industrial areas to be responsive to the automobile. The grid network of residential streets need to be made competitive by creating a safe and attractive "There" for the 21st century. We need to help communities to redesign their commercial and residential neighborhoods to be responsive to the new reality. The automobile is now over 90 years old—it is time.

Telecommunications

Other technologies have begun to make this isolated lifestyle more manageable. The creation of television now permits people to be entertained without having to leave their couch. As we move to the 500 channel television, people can travel the world, go into space, swim under water, enter new worlds of fantasy, and vicariously enter into other people's lives through various talk shows without ever having to touch another human being. The Opera, theater, movies, sporting events are no longer seen by the common man in a downtown location—they are now seen in the comfort of our homes. It's the only place it can be afforded by the average household. The price of live entertainment has isolated us from the arena and theater. In addition, shopping, investment purchases, banking, bill paying, budgeting can all be done from a key board at home. We can do it all from within the cocoon of our home.

In 1994, in the United States, more home computers were sold than TV sets. The effects of the growth of the new telecommunication technology and computer technology on the community are very contradictory. The world is becoming smaller as individuals are accessing every part of the Earth instantaneously. The expanding Internet permits people to communicate on a world stage. At the same time, people are geographically isolating themselves from social interaction in their own community. The worldwide access is creating an inverse communication helix-distance is becoming inversely related to communication.

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Internet is a worldwide unmanaged computer communication network. It permits anyone to say anything to anybody in the world; it is the libertarian's communication network. It has no rules, except those established by the managers of each access gate. Anyone can join and become a club member with anybody else on any subject. It is part of the fast changing process that is creating a worldwide neighborhood of individuals that never have to touch another person. It is simultaneously isolating people from their physical neighbor to create new virtual neighborhoods in cyberspace.

The new technology is creating new businesses that no longer have to be located near population centers. Credit card processing operations are growing in South Dakota & Delaware. Airline reservation operations are located in rural areas. Making sure that you are linked to the communications superhighway is the key economic development strategy for isolated communities. Information processing businesses do not need to be located in the middle of a metropolitan area. They can be geographically isolated.

Every one of the technologies, whether it is production, compressor, automobile or telecommunications, is further isolating human beings physically from each other and making their physical interrelationship less important. Their connection to work centers become less important as they work more with their minds through their computers. They can communicate through the entire world without ever having to step into an automobile or airplane or even an office building. The physical isolation of human beings from each other is even further reducing the need for homes to be densely clustered or even to be very close to work centers. It will bring work into the home.

In this isolation, people only have to communicate with people with the same interest—people like themselves. They can isolate themselves from people of differing cultures, ideas, or interests. They can do so in total anonymity. It is still questionable whether this work at home will result in greater social interaction at home. Instead, just as people do with their TV sets, each home dweller may enter their own private area, turn on their computer station and communicate with each other and their comrades in thought from their quiet cubicle.

The community of tomorrow will be located on an information super highway that will weave people together over a world wide communication web. It will be located near a physical super highway to provide quick access to new work clusters when needed. Each node of the web will be in a residential haven that permits a high quality of life. More people will locate on the exurban edge of metropolitan areas as they help stretch the urban envelope further into the countryside. To be competitive older urban neighborhoods will need to be redesigned into insulated *"Places"* that provide a personal safe haven from everyday pressures. ❑