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New York and Tokyo: A Study in Crowding

The pedestrian environments of New York and Tokyo were studied and observations drawn—how they differ, how they are alike and what lessons might be drawn from the denominators. Some of the conclusions are: people in both New York and Tokyo *like* street life; they are highly skilled pedestrians due to the small amount of space allotted to them; in both cities, modest reallocations of space could greatly improve the street environment.

Lessons from a Study of Major U.S. Downtowns Kenneth A. Halpern, Page 18 The future of American downtowns, as viewed from a study of nine major metropolitan areas, revolves around the problem of transportation, and ultimately of coherent urban design policies.

Subsidized Housing in Chicago

Devereux Bowly, Jr., Page 24

This article reviews the history of public housing projects in Chicago, from the early developments by wealthy social reformers up to and including the foreclosure, and demolition, of buildings renovated earlier by government funding. The problems of subsidized housing are examined as well as several alternatives currently being tested including the Experimental Housing Allowance Program.

Design Trends: Humanizing the Office Environment

Helmut Jahn and Dianne M. Ludman, Page 39

An overview of several office buildings and corporate headquarters recently completed or currently under construction in the midwest reveals that the work place is no longer simply a sterile environment. More and more attention is paid to appealing to the human qualities and emotions, and making the office space a setting responsive to human activity.

Noise and

Property Values Max J. Derbes, Jr., CRE and George H. Cramer II, Page 47 This excerpt from a Louisiana Highway Research Project monograph determines the effect of highway noise on adjacent residential properties (both rental and private units) and provides a set of procedures for a fair and accurate measure of the results of noise on property value. The conclusions reached are that neither apartment units nor single-family residential units suffer, due to noise, a price diminution as measured by sales comparisons and resale price increases, nor do they sell or change hands any more frequently than comparable units.

William H. Whyte, Page 1

The Appreciation and Volatility of Price in Different Classes of Housing

of Housing Michael G. Ferri and L. Randolph McGee, Page 55 The lack of research on the association between price changes and the characteristics of a home motivated this article. Here the relationships between the attributes of a home (age, size, amenities) and the price change in the unit over time are compared between the more "luxurious unit" and the smaller, less well-appointed house. In these days of a relatively unstable economy, the findings report that the price of a "better" unit is more sensitive to general housing conditions and the less-luxurious unit has greater price stability across the upturns and downturns of the market.

The Graduated Payment Loan: Implications for Mortgage Lenders

James E. McNulty, Page 68

This recent innovation in the home mortgage field is examined from the viewpoint of the lending institution. Practical points and questions, such as which groups are attracted to the GPM and what plan is receiving the most attention, are addressed and answered, drawing upon an extensive body of recent research and experience.

Measurement of the

Effectiveness of Use-Value Taxation

Jerry T. Ferguson, Page 75

This article develops a methodology to gauge the effectiveness of use-value taxation as an aid to preserving farmland from rapid and perhaps premature development. Using the results from a program established in Virginia, it addresses current issues of great interest to the many states now seeking ways to evaluate programs legislated several years ago.

Real Estate Issues

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EDITOR'S STATEMENT

Downtowns, suburbs and geographically rural areas are scanned from multiple viewpoints in this eclectic number of *Real Estate Issues*.

William H. Whyte, the legendary American scholar and author of pioneering studies of real life in Park Forest (remember *The Organization Man*?), of modern land planning (he wrote the Urban Land Institute's classic *Cluster Development*), and of conservation needs (*The Last Landscape*, among others), opens the discussion from the vantage points of pedestrians in downtown New York and Tokyo. His close and often witty observations of pedestrian movement in those cities have implications for developers, planners, merchants and Realtors everywhere.

Kenneth Halpern's tour of nine U.S. downtowns, reported in his recent book *Downtown U.S.A.*, gives him an unusually fresh perspective on the strengths and weaknesses of American City cores. His judgments and insights should provide ample food for thought.

Subsidized housing is explored in systematic fashion by Devereux Bowly, Jr., whose recent book *The Poorhouse* constitutes the best available documentation on housing efforts in a major U.S. city. Using Chicago as his example, Bowly examines the intentions, failures and occasional successes of the individuals and agencies responsible for the extensive collection of low-income housing projects on display in his home city. The lessons of Chicago's experience, as Bowly points out, are mostly negative—a result that will not surprise many real estate professionals, but may be unpopular among public housing specialists.

Helmut Jahn is one of America's leading architects, remarkable among other outstanding projects for the new Xerox Centre in Chicago. He and architectural writer Dianne Ludman bridge city and suburb in an up-to-the-minute discussion of trends in office building design that draws upon recent projects of C. F. Murphy Associates in the context of pioneering experiments by other architects.

Moving to the suburbs and to a question much agitated among appraisers and in the courts, Counselor Max Derbes, Jr. examines the impact of highway noise on residential property values, using his own Louisiana study as basis for observations that will be of interest to land use specialists everywhere. He is followed by Professors Michael G. Ferri and L. Randolph McGee, whose article we think will become the standard source on price volatility in single-family homes, which according to the authors is a function of the amount of luxury a unit offers. The graduated payment loan, rapidly becoming a nationally accepted format, is explored by James E. McNulty of the Federal Home Loan Bank of Atlanta, whose article looks at these loans from the viewpoint of the lender and provides needed insight into this increasingly important topic.

We close with a review by Professor Jerry T. Ferguson of the effectiveness of use-value taxation, a topic of immense interest to assessors, conservationists, taxing bodies and agricultural land owners who often see it as a solution to many of their most important problems. If Ferguson is correct, use-value programs have at best limited utility in that they are not significantly slowing the rate at which farm land is being converted by subdividers. Right or wrong, his thesis is worth exploring, and addresses a problem that must be solved if more of America's prime farm land is not to be lost to suburban sprawl.

Jared Shlaes, CRE/Editor-in-Chief

New York and Tokyo: A Study in Crowding

by William H. Whyte assisted by Margaret Bemiss

In the U.S. the conventional image of the high density core city is of a bad place, and bad not simply for its defects but for its essential qualities. Centrality, high density, compression—these are the factors that documentaries on the plight of the city customarily pick on, and the stock horror shots are of people jammed on the streets of New York, tense, unhappy, unsmiling. The image, unhappily, affects the reality it misrepresents; it is widely believed in Washington, not only by rural moralists, but by progressives who would save the city from itself. With few exceptions federal aid programs for cities have been laden with anti-density criteria which make it difficult for center city projects to qualify.¹

It is no frivolous matter, then, to note that many people on the streets of New York can be observed smiling, even laughing, and on the most crowded streets and at times, like the rush hours, when there might not seem much to be smiling about. New Yorkers themselves fervently deplore the city, its horrendous traffic jams, the noise and litter, the crowding. It is their favorite form of self-praise. Only the heroic, they imply, could cope. But they are often right in the middle of it all, and by choice, stopping to have a street corner chat, meeting people, arguing, making deals, watching the girls go by, eating, looking at the oddballs and the freaks.

People in Tokyo seem to enjoy themselves even more, and one of the reasons there is more crowding is the large number of them who are on the street because they want to be. The employment density in the center of Tokyo is less than in New York but there are more people on the streets throughout the day and the disparity is especially pro-

This article was originally published in *A Comparative Study of Street Life: Tokyo, Manila, New York* by the Research Institute for Oriental Cultures, Gakushuin University, Japan. Research was funded in part by a grant from the Toyota Foundation.

William H. Whyte is a writer and an observer who studies the ways people use urban streets.

nounced in the evening. At a time when most New York streets are nearly empty the Japanese will be out in force. Many will be in groups, a high proportion will be younger people.²

One is struck by the number of people to be seen smiling. Tokyo people are a street people and they see the comedy. Even during the morning rush hour, when some people break into a last minute run toward the office, there is laughter. The activity at major pedestrian crossings is similarly appreciated. The Japanese are quite serious about getting across: feet tap impatiently waiting for the green. But they also seem to look on it as a game, and the best fun is holding out to the last possible moment to make one's break.

Measurable? A smile index might be unduly solemn but there are many ways by which the social behavior of pedestrians can be recorded and compared. Let me go back to our early studies in New York. To chart the avoidance of crowding we focused a number of time-lapse cameras on several of New York's busiest street corners. We were interested to find out how far people would move out of the pedestrian traffic stream when they stopped to talk. To our surprise, we found that they didn't move out of it. Quite to the contrary, they stayed there, or moved into it, and the longer the conversation the more apt it was to be in the very middle of the flow. Subsequent studies of behavior in other kinds of places reveal the same propensity. What attracts people most in an urban place is other people.

You do not see these phenomena unless you look. One of the troubles with most pedestrian surveys is that they focus almost wholly on the pedestrian as a transportation unit—and how he gets from A to B. But what he does between A and B is important too. Study the social behavior of the pedestrian and you find that a significant part of his activity is not moving, but standing, talking, and looking. Much of the congestion on busy streets is traceable to this behavior.

This seems to be just as much the case in Tokyo as New York. Here too, much of the congestion is self-congestion. At the busiest corners, at the busiest times, you can see two or more people having a conversation, and they appear not in the slightest bothered by the fact they may be blocking traffic. Sometimes there is a "traveling conversation," moving in a small orbit, back and forth, but with the center of gravity the 100% location.

The greatest incidence we saw was in Shinjuku Station. There is such a maelstrom of foot traffic there as to scarcely afford room for any kind of socializing, yet there was a great deal of it, and during the peak of the rush hours especially. Some instances: Two young women, apparently waiting for a third, move back and forth in a ten foot range, chatting animatedly; after ten minutes they see their friend and go off with her. Three young junior executive types stand four feet outboard of a pillar, one of them practicing a golf swing. Two middle age women are engaged in a prolonged goodbye; they are directly athwart the stream of people emerging from a turnstile. Department store doorways are another habitat. They are a great place for meeting people, for conversing, and unlike New York's stores, Tokyo's do a good bit to accommodate this use. Takashimaya, for example, provides ashtrays for the people who sit on the ledges next to the doors. Matsuya has a line of twelve chairs at its side entrance.

The number one element, of course, is the heavy flow of people in and out of the store and it is in the middle of it that conversations are most apt to recur. Overleaf, from Margaret Bemiss' log of a day of department store life, is a map of conversations lasting one minute or longer in front of the Mitsukoshi store between 4:55 p.m. and 5:10 p.m. For comparison is a map of the doorway of Alexander's Store on Lexington Avenue.

Other prime actors will be people waiting for other people. During the time shown in Chart 1 there would likely be anywhere from three to six individuals waiting next to or in front of the doorway. And there would be no mistaking what they were doing. Waiting is structured activity, more so than in New York. Tokyo people are punctilious, and impatient waiters; just before the hour, or half hour, there will be much glancing at watches, scanning of the crowd for the missing face; past the mark there will be signs of growing annoyance, not always suppressed when the late-comer eventually arrives.

It is an interesting activity to watch, especially for those who are themselves waiting. This is the case at the great rendez-vous area around the statue of the dog Hachiko at Shibuya Station. Many of the people around it are obviously waiting and as they wait, there are scores of potential dramas to observe. Who is the unhappy girl waiting for? Is she waiting? Why has the man in blue come back? Denouements may be anticlimactic, but they are worth waiting for.

Plaza use affords another basis for comparison. There are few office building plazas in Tokyo, but one of them, that of the Mitsui Building, is one of the best anywhere. Save in one respect it has all of the elements we have found to be basic for successful plazas. It is, for one thing, eminently sittable: its ledges and planters alone provide more sitting space than the minimum we recommended for the new zoning standards in New York.⁴ In addition it provides tables and chairs movable chairs—both on its central portion and the raised terrace. It has an adjoining food facility, water, trees, and while the multi-level design is a bit busy, there is a nice sense of enclosure. The street, being cut off from the plaza, does not do much for it, nor does the plaza do much for it. The bulk of the users, however, are office workers from the building, and there is easy access for them on several levels.

The main point is that people obviously like the plaza very much. Our sightings were of lunch periods on only two days, April 14 and 15, and it was overcast and cool. But there was a good sized number each day, averaging 120 and 134 people sitting at any one time, plus fairly heavy crosscurrents of people walking. In really good weather, the usage should be very heavy indeed.

CHART 1



The social life of department store doorways: these two charts are not wholly comparable. The chart of Alexander's records every person who stopped, whether alone or with others, during the hour 12:00-1:00. The chart of Mitsukoshi records people who stopped to talk during the fifteen minute period of rush hour. But both show the same inclination to cluster in the midst of the pedestrian flow. At Alexander's the cumulative pattern for five hours records almost half of the people concentrated in a small area where building lines would intersect.

On some counts, use patterns differed from those in New York. The proportion of people in groups was markedly higher—averaging 88% versus about 60% for comparable New York plazas. The groups were larger too, with some 39% in groups of four to eight people. The lunch hour, we noted, was just that—an hour—and a few minutes before one o'clock a very quick exodus began. (In New York the busy time for plazas runs from 12:00 p.m. to just before 2:00 p.m.)

In general, however, the place had the same amiable feel to it that good plazas do in New York. Characteristically, the most favored spots—the chairs and tables—were those in the middle of the pedestrian flow and the prime activity was people looking at other people. While the proportion of females was low—only 28% by one count there was the same elaborate inattention paid them by men in New York. Spacing patterns on ledges and planters appeared similar.

METHODOLOGY AND MR. KON

Since these comparisons are based almost wholly on observation, let me pause for a few remarks on methodology. In our research in the U.S. we have done interviewing from time to time and we have made as much use as possible of such data as subway turnstile counts, vehicle flow records, and the like. But our emphasis has been on the direct observation of what people do. We have used cameras extensively but our principal tools have been a pad of paper and a pencil, and a place to sit.

Observation is not a technique that ranks high in U.S. universities, nor, for that matter, in its elementary or secondary schools. Social science courses generally put observation on the bottom of the technological ladder and expose students to it briefly before taking them onwards to the more quantitative techniques. Because of this bias, most research tends to be once or twice removed from the reality being studied; on subjects like urban crowding, it is not apt to be of people on streets, but of data on responses to questions about people on streets. For students of street life, as a consequence, there are few counterpart studies to provide a base for comparison.

One fine exception is the work of the remarkable Mr. Kon. Over fifty years ago he was studying the life of the streets and public places of Tokyo. Nothing seemed to have escaped his curiosity and he set down what he saw with clarity and thoroughness. He charted the flow of students, minute by minute, as they came and went from school: the flow of pedestrians at various places; their age, their dress, their apparent occupations, how many were alone (75% on Ginza streets), how many were in groups; the length of their trips. He even charted the location of suicides in parks.

Most interesting to us, the methodology he evolved was very much like that we worked out by trial and error for our street life research. (In charting daily pedestrian flows he cumulated counts at five minute intervals; we used six minute intervals. Aside from that techniques are identical.) I have not had an opportunity yet to read all of his analyses, but when a translation becomes available I am sure there will be many good cues in it for current research.

THE PEDESTRIAN AS A TRANSPORTATION UNIT

The pedestrian is a social being; he is also a transportation unit, and a remarkably efficient one. He is able to propel himself, shift speeds and direction, sense obstacles and collision courses of other pedestrians; estimate crossing angles, accelerations, decelerations and countermoves, and all this in a split second. To produce a machine that would be his equivalent would require a computer technology and a degree of miniaturization of fantastic sophistication. Most transportation experts, however, scant the pedestrian and his potential; millions are being spent in research on new kinds of people-movers but very little on the oldest and best kind: people themselves. And nowhere is the attention more needed than in the center city.

Pedestrian speeds are a clue. It has often been observed that people in big cities walk faster than people in smaller cities. Just why they should has been a matter of conjecture. Social psychologist Stanley Milgram attributes the pace to the sensory overload on individuals, presumably so great in big cities as to induce them to speed up to se-

CHART 2

Lexington Ave.: east and west sidewalks combined, 57th-58th St. Wed. July 10, 1974; pedestrian flow. Counts taken at six minute intervals, alternating between northbound and southbound. Chart records estimated total north-south flow at twelve minute intervals. Male-female counts are recorded similarly.



CHART 2. Pedestrian flow chart; Lexington Ave. 57th-58th St. Based in continuous counts, cumulated at six minute intervals. Underneath is vehicle flow chart, based on time lapse film study. Pedestrian flow has three peak pattern, with major use at midday. Vehicles have saucer pattern.

CHART 3. Left are pedestrian flow charts of Mr. Kon. They record students going to school (black line) and leaving (dotted line). Counts cumulated at five minute intervals. Right is makeup of pedestrians on a street in Ginza area 4 p.m. September 1929.

cure relief. Whatever the explanations, the fact is big-city people *do* walk faster. A number of comparative studies have shown a surprisingly strong statistical correlation between speeds and population, regardless of country or continent.

In any one city, pedestrian speeds vary considerably according to the time of day, or the occasion, but the diurnal rhythms are quite consistent. There is the morning rush hour pace—in New York about 270 feet per minute on a clear pavement. In Tokyo the walking speed seems about the same but overall speed is higher because of the way so many people break into a run as they near the office. (In our motion picture footage, the runs recur at the moments just before the half hour and hour marks.)

Lunch hour speeds can be brisk too but there is a different quality to the pace. In New York it is upbeat. Groups on their way to lunch are apt to be smiling or laughing, as if on their way to a party. Something good, they seem to be conveying, is going to happen. For many people it is at this time of anticipation that the cyclical peak of the day is reached. Anti-climax or no, the post-lunch pace is slower. This is the time for the interminable leave-takings, and the sidewalk conferences when someone in the group brings up the real business the lunch was supposed to have been about. It is a deceptively casual time.

With the evening rush hour, pedestrian flows again reach their maximum. At key points where opposing streams of pedestrians cross each other congestion is heavy, and this is compounded by the "platooning" effect the traffic lights have on the flow. The crowd moves in pulses. Even so, where most of the people are moving in the same direction—on Park Avenue south to Grand Central Station, for example—average speeds are about 250 feet per minute. Flank speeds, of those who use or create passing lanes, go as high as 300 feet per minute.

As a New Yorker, I have taken some pride in being one of the city's pedestrians. They are an aggressive lot, incorrigible jaywalkers, and where a hesitant driver gives them a chance they will bully cars to a dead stop. With fellow pedestrians, however, they are quite cooperative, and here is where their timing and skills are most evident. We have filmed their behavior at subway entrances and key corners and through stop motion techniques have studied the various ways by which they avoid collision courses, signal intentions to oncomers, or bluff them into giving ground. The performances are impressive.

But Tokyo's pedestrians are in a class by themselves. Consider Shinjuku Station. By all accepted density standards it is a manifest impossibility. It is really a complex of stations and separate lines, confusing in its layout, inter-connected with an intricate set of corridors, walkways, escalators, stairs, cul de sacs. Its concourses are a mass of crossflows, obstructed by knots of people waiting for other people, teenagers, vendors, people saying goodbye. Even at off-peak times one has to look sharply to find a clear path; at the rush hours, when the pedestrian traffic reaches an intensity unmatched anywhere, the scene appears utter chaos.

But it isn't. Somehow, people sort themselves out and for all the density the pedestrian speeds remain quite high; indeed, it is at rush hour that one sees the most running. By rights, people should be bumping into each other all over the place. They don't seem to; our studies were informal but neither in our memories nor our film was there an observed collision. While it may be a subjective judgment, we also got the impression that a good many of the pedestrians were rather stimulated by the challenge, and perhaps a bit pleased with themselves.

With good reason. Pedestrians in cities like Tokyo and New York are fast and expert because they very well have to be. Not only are there more fellow pedestrians to contend with, there has been increasingly less space given to them. In New York, pavement widths were periodically narrowed over the years to make room for vehicles. Today the imbalance is almost ludicrous.

Lexington Avenue is the clearest example. As a transportation corridor it measures 75 feet in width. Fifty of these feet are given over to cars. The remaining 25 are given to two 12-foot sidewalks. This is just about the inverse of the way people use the space. In the stretch between 57th and 58th Streets, one of the most crowded in the city, about 12,000 vehicles pass between 8:00 a.m. and 6:00 p.m. carrying a total of about 28,000 people. During the same period some 42,000 people use the sidewalks. The 12-foot widths, furthermore, are only nominal; be-



CHART 4

Daily Distribution of People through Lexington Avenue Corridor

The most people in the least space, this chart shows the imbalance in space use on the heavily used block of Lexington Avenue, between 57th and 58th streets. Approximately 70,000 people pass through between 8 a.m. and 6 p.m. Of these about 40" are people in vehicles, about 60" are people on foot. But space allocation is the reverse; 66% for vehicles, 33% for people on foot. Note the minimal use of lane 5. It is pre-empted by a small number of long term parkers.

cause of obstructions such as trash containers, signs, grates, the effective width is as narrow as five feet in places. It's a feat that so many people manage to traverse the space, but it is a bad mismanagement of space that forces them to. In less extreme form, the same imbalance in space use can be found in most large U.S. cities.

Tokyo treats its pedestrians even worse. Save a few main avenues its sidewalk widths are narrower, and ratios between vehicular space and pedestrian space are heavily weighted in favor of vehicles. The small scale of the streets parallel to the avenues is an offsetting amenity and the very narrowness of their sidewalks induces pedestrians to use the center space as their own. The fact remains, however, that in the places where the most people have to walk there is relatively little walking space. On Harumi-Dori, for example, effective walkway space on the south side by a main subway entrance is twelve feet. I counted pedestrian flows there between 4:30-5:30 p.m. of up to 6,000 people an hour. (In terms of people per foot of walkway width, the theoretical result should be complete stoppage.)

On major avenues pedestrian overpasses have been provided. But these are more a concession to the car than the pedestrian. Cars don't have to stop for as many lights; it is the pedestrians who do, and because of the way the lights are set, for a long while, it's notable that many people wait for a chance to cross at street level rather than mount the stairs for the overhead crossing.

Tokyo's pedestrian crossing areas are well marked, well policed, the lights and the rules clear cut. At some main intersections the pedestrians get almost a minute for their crossing (vs. 30-40 seconds in New York). But the government does seem to regard the pedestrians as children, and incipiently naughty ones. The dainty girl voice on the loudspeaker: gently, this pitchwoman for authority chides people, "From now on the pedestrian crossing is dangerous. ... Let's cross safely at the next green light."

Tokyo does have heavy vehicle traffic to accommodate. But in good part the traffic may be heavy for the accommodating. That is the way it has been in the U.S.; but Tokyo has less reason. It has a splendid subway system and is in a far better position than most cities to shift some space away from vehicles. Not only on the grounds of amenity, but of transportation efficiency it could well gain if it did so. As a user of space the pedestrian is a far better unit than a vehicle and the space now alloted him is so minimal that even modest additions could have a high leverage effect.

New York is being forced to such opportunities. For air pollution control the federal government is demanding that the city sharply curb vehicle use in the central business districts. The city is aghast at the prospect; it fears that a curb on street parking will keep customers out of the stores. If our studies of parking and vehicle use are any criterion, no such result will come about, and eventually this will be recognized.⁴ Willy-nilly, a lot of vehicular space is going to become redundant and the opportunities for creating pedestrian space are going to be increasingly evident. They may seem unrealistic today, but now is the time to lay the groundwork.

FIFTH AVENUE AND THE GINZA

Both Tokyo and New York have experimented with traffic-free pedestrian streets. They have done it gingerly, and so far most of the street closings have been temporary. But they do afford an excellent basis for comparison. Fortuitously, the physical characteristics of the streets are similar—and so, to a surprising degree, have been the patterns of use.

In 1972, New York designated a fifteen block stretch of Madison Avenue for a test. Every weekday over a two-week period the avenue is a busy one of stores and office buildings, but it is canyon-like and treeless. The rudimentary benches the city was going to put out seemed a highly inadequate way to furnish the expanse. Merchants were unenthusiastic; some very hostile. They feared the absence of cars would mean less customers but many "undesirables" (i.e bums, winos, hippies, characters, young people, very old people, teenagers, students, etc.). To find out just what the results would be we mounted time-lapse cameras and began to record the entire trial period.

Here is what we found out:

1. The number of pedestrians doubled. From a rate of about 9,000 pedestrians per hour, the flow increased to 19,000.

2. This increase was not at the expense of pedestrian flows on the parallel avenues, Park and Fifth. Rates there were about as high as they usually were.

3. Most of the pedestrians, 60% of the total, stayed on the sidewalks—where the shop windows were. The street was favored by people in groups, promenading.

4. The benches, which were placed in the middle of the street, got very heavy use. No places remained empty for more than a minute.

5. Food vendors were centers of activity. Wherever they set up their carts, usually at the curb, knots of people formed.

6. Most of the people were the people who ordinarily worked or shopped in the area. The undesirables that so obsessed merchants were seen by some merchants, but not by our cameras.

Subsequent plans for a permanent mall on Madison fell through, largely because of the objections of a merchant's group and the taxi drivers union. But other projects did go through: Sunday closings of Fifth Avenue; a permanent mall on Nassau Street in the Wall Street area; on Fulton Street in Brooklyn. New York has been less venturesome than a number of other U.S. cities but it has learned a basic lesson. With a well conceived pedestrian facility, supply creates demand. The existence of the amenity where none was before sets up new patterns of use, and new expectations.

The Ginza experience provides an interesting parallel. As of 1970, a sixteen block stretch of Chuo-Dori Avenue was closed to vehicle traffic on Sundays for a pedestrian "paradise." It was an immediate success. There was surprisingly little use of the street itself, however; as had been the case on Madison Avenue, most of the people stayed on the sidewalks. To liven things up, the department stores began putting tables and umbrellas and chairs along the center line of the street. In its dimensions, as well as in the character of its stores. Chuo-Dori resembles Fifth Avenue. From building line to building line, the right of way is about 95 feet wide on Chuo-Dori; 100 feet on Fifth. Sidewalks of both are about 22 feet. Pedestrian volumes, however, are markedly higher on Chuo-Dori. On weekdays, our counts indicated volumes at rush hour and lunch time of about 6,500 people per hour on the sidewalk alongside the Matsuya Department Store. Even during the midafternoon lull the rate was around 4,000. And this was just one sidewalk.⁵ For both sides peak volumes ran between 10,000 and 12,000 people per hour. Fifth Avenue volume at comparable periods range between 7.000 to 9.000.

Since I am later going to take up the elusive question of the ideal width let me note that Chuo-Dori and Fifth Avenue are similar in the degree of congestion—or, to be more accurate, of perceived congestion. Pedestrian flows are high, very high, and by conventional standards of people per foot of walkway width, they could be very uncomfortable. But they are not.

In part this is because of the breadth of the sidewalks. You cannot equate a given flow per foot of walkway on a narrow sidewalk with the same flow on a broad one. The figure may be the same; the psychological experience is not. Another factor is the attractiveness of the street: Chuo-Dori and Fifth Avenue are both lively and attractive streets and the people on the street are among its chief attractions. At choke points, such as subway entrances, the congestion is intense and this can color one's sense of the whole area. Along the most of the way, however, the weekday hustle and bustle is quite tolerable, and to many, enjoyable.

Now let us look at Sunday. On the Chuo-Dori, pedestrian volumes about double. Though there is now fifty more feet of walkway to traverse, the sidewalks get more traffic than they do on weekdays. Here are comparison pedestrian flows we checked on the Chuo-Dori by the Matsuzakaya Department Store (expressed in rate of pedestrian per hour).

	Weekday-1:30 P.M.	Sunday-1:30 P.M.
East sidewalk West sidewalk	4,160	4,280
(next to store)	2,060	3,820
Street		5,000
	6,220	13,100

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Checks made later in the day at other spots show a consistently high level of activity; even at the northern end, by the Takashimaya Store, flows were about 8,000—10,000 an hour. These flows, let it be noted, are quite different in character than those of the weekdays: the pace is slower, there are no rush hour peaks. But it is still a very heavy flow.

About 41% of the activity is on the sidewalks, 38% on the street. That the sidewalks continue to get the main play is understandable. This is where the vendors are. It is also where the stores are and Tokyo's are much more aggressive than New York's in beating vendors at their own game. They put out displays, special promotions, fast food stands, and they hustle for the business.

The street is less used but well used. The line of tables and chairs in the center of the street has proved successful in seeding activity. As soon as they are put out, the people come. Sitting there they can watch two strands of people traffic and the watching seems the main pastime. There is plenty of room for promenading, and as in New York groups tend to spread out as they make the tour. Eccentrics do their acts: we followed one man along the Chuo-Dori as he harangued people and waved his arms, an object of much interest to the seated groups he passed by.

In Tokyo as in New York, Sunday crowds are strongly weighted with family groups and children are much in evidence. In Tokyo they appear to be setting the pace, with the parents indulgently following as the children veer this way and that. There are impromptu games, much throwing of balls. And the eating is prodigious.

THE STREET AS A SENSORY EXPERIENCE

Some of the streets people favor most are physically and visually a mess-indeed, by most yardsticks, almost the antithesis of modern urban design. Some such streets pose interesting questions about people—and urban design; we have been particularly interested in studying them. One is New York's Lexington Avenue: specifically, the four block stretch from 57th Street to 61st Street. As noted before, the sidewalks are narrow and crowded; their pavements are cracked, full of holes, subway gratings; they are obstructed by a host of badly designed light standards, parking signs, mailboxes, trash containers, and much of the surface is in permanent use for temporary storage of crates, newspapers, displays of merchants, signs and whatnot. Further obstructing the flow is a host of street operators: handbill passers, demonstrators, hustlers for second floor establishments, pitchmen for stores, pushcart food vendors, knick-knack vendors, beggars. There are all sorts of noises—the cries of the vendors (three for a dollar, check us out), the blare of transistor radios, overamplified rock music from the record stores. From adjacent food counters come all sorts of smells-of pizza, knishes, hot dogs. At the sides and above is a wild miscellany of awnings, rickety marquees, flags, neon signs. The streetscape in New York is more chaotic. It is so awful that photographs of it are the standard horror examples in presentations on street design.

Why, then, do people persist in using the place? Many, of course, have to get somewhere else; it is a route to the business district, has one of the key subway transfer points. It also has such traffic generators as two department stores and a nearby complex of movie theatres.

If you track pedestrians, however, you find that many of them could use alternate routes just as well. You also find that on Lexington itself some of the sidewalks with the fewest obstructions attract less traffic than those with more. People have terrible things to say about Lexington and its crowding; some mean it enough to avoid it whenever they can, and these people—the ones not there to be studied—are worthy of consideration too. But it is obvious that many of the people on Lexington are there because they have elected to go there. This is very much the case on Saturdays; then you will see many family groups, with children perched on their father's shoulders; it is a time for shopping, browsing, eating, and looking at the crazies.

Now it is primarily a recreation area. The crowding reaches its peak in early afternoon and it is of a different character than the weekday rush. The pace is slower, more amiable and there is a lot of cruising back and forth. Puerto Rican teenagers come down from The Bronx and East Harlem to catch the action—and if you stay in one spot long enough you'll repeatedly see the same ones passing up and down the street and across, stopping to greet friends, sitting on car hoods to watch the goings-on.

J. B. Jackson once observed in *Landscape* that billboards on the edge of a city can have a special function for the stranger; they acknowledge him. They tell him where he ought to lodge or eat. They address him. Lexington Avenue does the same, and this in part explains the love/hate feeling many people have about it. You are not alone on Lexington. It is interested in you. It wants your attention, your interest, your money, your agreement. Its people thrust handbills at you, ring bells to get your attention, rattle collection cups, walk alongside to importune you. The street touches you. You touch it. Watch people as they go past a display of ferns, reaching out to touch; tapping a sign pole as they pass by, as if it were a chime. The sense of passage is strong; even when slowed almost to a halt, you are so close to what you are passing. And look sharply. The path ahead is to the earnest.

Overload? In many cases, yes. And it would be better if some elements were left out—the phony pitchmen, the hustlers, the holes in the pavement. It would be better if there were more room on the sidewalks, as our group has been advocating to planning boards. But one must be chary in sorting out the good from the bad. Lexington is an intensely urban experience because it is such a mixture, and you cannot have one without a good bit of the other. Lexington is demanding, peremptory, often annoying; but it is a challenge to your senses and to your wits—and this is why it is so attractive. Tokyo has miles of streets with such qualities and they are consistently more interesting. There are many reasons—the succession of coffee shops, food counters, outdoor displays; the profusion of neon and illuminated signs; most important, a people who so obviously enjoy the life of the streets. The Shinjuku area alone has more such streets than most U.S. cities put together, and for sheer sensory impact there is nothing to match its back alleys with their charcoal grills and smells and clouds of smoke.

One of the most interesting of all streets is the alley-like one in the Asakusa district leading to the Kannon Shrine. It is laid out in the traditional Japanese fashion: as a linear progression of shops, and it is narrow. The width is about seventeen feet and because of the open stalls on each side the effective walkway width is about fifteen feet. We were fortunate to be there on the day of the shrine's annual celebration and see it tested by some of the heaviest crowds of the year. The pedestrian flow was that of a downtown sidewalk—running at a rate of about 3,800-4,200 people per hour in mid-morning. The pace was slow. There was considerable self-congestion; people stopped frequently to look at the merchandise, reassemble their groups, buy something to eat. Two handbill passers stationed themselves in the middle of the flow.⁶ But it was a congenial kind of crowding, quite appropriate to the time and place.

It is probably not happenstance that so many of the most popular walkways range between fifteen to twenty feet in width. This is narrow by modern planning standards, but it seems to be quite functional, for both heavy and light loads. The walkway is broad enough to take care of very heavy flows; narrow enough to feel comfortably busy when there are fewer people. At peak times or slack, furthermore, the pedestrian experiences both sides of the street as he walks along. The various stores and attractions reinforce each other. It was with this in mind, that the merchants of Osaka developed guidelines over a proposal for a broad Ginza-type avenue. The merchants decided against it; they felt that the traditional 15-17 foot width was better for their mutual business.

I am not trying to suggest that the optimum width is 15-20 feet, or indeed, that there is any one optimum. Context is all important and this has to be studied just as much as such quantitative factors as lane width and people per foot of lane width per minute. But if this were done for a cross-section of highly liked walkways, however, observation would likely reveal significant consistencies, some obvious, some not so. The range should be eclectic; in addition to the walkways chosen in our joint studies in Tokyo, New York, and Manila, there could be included such places as the Ponte Vecchio in Florence, the Burlington Arcade in London, the Stroget in Copenhagen; Jan Gehl's excellent studies of the latter furnish fine basis of comparison. There should also be included highly liked places that are unusually expansive: the Champs-Elysees in Paris, the Galleria in Milan, Las Ramblas in Barcelona. How dispersed or concentrated are the flows in them? What are the paths? What channels them?

But we need not await further study to apply one finding already clear. The places people like most are places where there are lots of other people in a fairly contained amount of space—in a word, somewhat crowded. This is a lesson many planners and architects ignore. They over-scale, and especially so in the development of new areas. In the mega-structure approach now fashionable in the U.S., they have done away with the street almost entirely; they have buried it in vast underground concourses, dispersed it over great stretches of concrete, put it up in the air in glass-enclosed walkways. In creating pedestrian malls in smaller cities, they have often diluted what street life there was by spreading it over too much space. The vital frictions of the street are eliminated; the attractions placed too far apart to support each other. There is no critical mass of activity to seed more activity.

Tokyo provides examples too. Compare the old streets of Shinjuku with the new ones in the redevelopment area. As seems to be the case when designers are given a large blank canvas, the scale is Olympian. The streets are laid out expansively, with visual order and coherence. And they are a bore. They are far easier to negotiate than those of the older section and because of the office population the pedestrian flows are heavy. But they are essentially transportation flows; along most of the streets there are no bordering stores or coffee shops to cause one to tarry. Save in the pedestrian tunnels there is no sense of enclosure. The sides of the streets are so far apart as not to belong to the other. There are some good spaces at the destination—the plaza of the Mitsui Building, especially—and as the area is unfilled, there should be more. But it all could have been so much better. In one of the liveliest subcenters in the world, it does seem a shame that the planners were unable to replicate the factors that help make it so. This does not mean slavish copies of the picturesque, gratuitously complex street patterns. In eminently contemporary terms it should have been possible to incorporate some of the basic factors.

The most basic factor is mixture. This is the reason Tokyo's streets are consistently more interesting than New York's. Tokyo's present an amiable disorder of activities, up and down and sideways, with pachinko parlours, offices, coffee shops all mixed-up together, and restaurants going up two, three, and four floors. Actually, there is a great deal of order. Tokyo's streets have long been structured as a linear succession of uses, and if they are experienced that way they are eminently sensible as well as interesting. Significantly, the one area in Tokyo that is supremely dull is the one most rational by western planning standards—the single purpose Kasumigaseki government district. In its imposed order, it is like the civic center areas of many U.S. cities, and its streets have as much interest.

Some of the characteristics of Tokyo's streets may be too rooted in Japanese culture to be transferable. But in such basics as mixture of

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uses the U.S. has a great deal to learn from Tokyo. For years the whole impetus of our zoning has been to enforce a rigid separation of uses. Market forces have further accentuated this by pricing out marginal uses. Now office buildings are erected where once stores and cafes were. But the new rents are too high for stores and cafes, and in their stead are windows of banks. In the case of mega-structures, as Los Angeles is demonstrating, there may be no windows at all: just blank walls. (At the biggest tourist attraction in the area, Disneyland, people pay money to walk along a replica of a regular street, with sidewalks and stores.)

There have been counter-trends. New York has introduced vertical zoning to encourage multiple use buildings, combining stores, office space, and apartments. In the new open space zoning, developers of office buildings qualify for floor space bonuses only if 50% of the frontage is given over to retailing or food.

But far more needs to be done; if nothing else, there should be programs to assure mixture where there still is mixture. The areas that have a street life most like Tokyo's are the mixed use areas on the fringe of the office and residential areas—such as Lexington in the upper 50's. Keeping them mixed is going to be no easy task.

In both New York and Tokyo more space should be given to pedestrians. One way is to create space in new construction. New York has done well in this respect. Through incentive zoning it has induced developers to provide plazas and arcades; in total, more new space than in all U.S. cities put together. Many of the plazas lacked basic amenities but this is a curable defect; guidelines have recently been adopted by the city to assure that the plazas be inviting and enjoyable.

Another way is to transfer space from vehicular to pedestrian use. This can be done with little hurt to space needed for vehicular movement. It is space for non-movement—parking—that is redundant. Elimination of just one ten-foot lane along a street could free up large amounts of space and the leverage effect would be great. Five feet added to most sidewalks would more than double the effective walkway width.

So it can be with other kinds of spaces—small parks, arcades, sitting places. In high density core areas they can be a very efficient use of space. In New York the most heavily used and yet pleasant and amenable of spaces are among the smallest; the two best measure 42 by 100 feet and 65 by 100 respectively. In Tokyo, similarly, the spots where people most like to tarry are small, busy places—a sidewalk with shoeshine people, the benches alongside a store, a meeting place outside a station. These are the kind of bits and pieces usually scorned in orthodox planning, with its emphasis on order and structure. But in them is the genius of the place, and with just minor reallocations of space many more can be created.

For Tokyo and New York, in sum, the opportunities are incremental, small scale, subtle—and therefore immense.

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- 1. One example is the urban open-space grant program. When it was enacted in 1961 a provision was stuck in disqualifying any open-space project less than 25 acres. This was to prevent cities from squandering the money on "bits and pieces" of space—i.e., about the only kind that center cities could acquire. The provision has been lifted but thanks to other constraints, the great bulk of open-space grant funds disbursed through federal programs had gone to suburban and rural areas.
- In spot checks of pedestrians in 1929, Mr. Kon found that in the Ginza area 64% were younger people; in Shinjuku, 59%. This tendency still seems to be true today.
- 3). To earn the plaza bonus of extra floor space, developers must provide at least one linear foot of sitting space per 30 square feet of open space. We did not measure the Mitsui Plaza's sitting space but cursory estimates indicated it would far surpass these minumums.
- 4. One result will be that store owners won't hog the spaces the way they have been; or diplomats or doctors or policemen or the special privilege parkers who have accounted for the bulk of the center's parking, legal or otherwise. The idea that parking meters encourage bulk turnover by shoppers is a myth. Spaces are dominated by long haul parkers—such as store owners.
- 5. Pedestrian counts are generally given as a total figure for both sidewalks. In many cases, however, there can be a substantial difference between one side and the other, especially when there is a traffic generator as important as a department store on one side.
- 6. The handbill passers were as efficient as any we have studied. The best we've checked in New York is Handbill Frank: his completion rate averages about 50% acceptances to offers, rising to 58% at rush hour, when he works best. The two at Asakusa were averaging 63%. They had, it should be noted, a superior routine. Both were dressed in ancient garb. One worked as advance man, holding aloft a sign counseling people to take the interesting card that would be given them. The other gave out cards (they were for a nearby restaurant featuring eels). As in New York, most of the people who took handbills read them. Unhappily for the litter problem, handbills are a very effective form of advertising.

Lessons from a Study of Major U.S. Downtowns

by Kenneth A. Halpern

The steady disintegration of the central city in America has been a direct consequence of a clearly established, if unwitting, national policy since WWII. Although in recent years signs of resurgent strength are evident in the downtown areas of American cities, there are still enormous problems ahead. One major problem, not easily solved, lies in the demography of the older, larger American city. In most metropolitan areas, the suburbs are now richer and more powerful than the cities they surround. The power comes from the collective numbers of people in the suburban ring, now often greater than those in the center city, and effectively represented in Congress.

Much of the money for the good suburban life is still earned in the downtown areas of cities. Suburbs, many of which were subsidized to begin with through FHA (Federal Housing Administration) lowinterest home loan guarantees and federally funded highways that get the suburbanites to and from the downtown, further exploit the wealth of the city through their exclusionary zoning practices, placing the burden of maintaining the poor solely on the city. Shadrach Woods, the late well-known American architect, opined, "suburbs are neocolonists."¹

Looking more closely at the downtowns of nine cities recently surveyed for urban policy design (New York, Chicago, Philadelphia, Houston, Washington, D.C., San Francisco, Boston, Atlanta, Minneapolis), several things contradictory in nature and often dealing with transportation are apparent. For example, the three and a half million people who must be in these nine downtown areas to make a living are

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exposed daily to inordinarily high levels of pollution largely caused by the automobile. Without radical changes in transportation policies, especially regarding use of the automobile in the heart of downtown areas in large American cities, any other improvements to the downtown will be cosmetic at best.

Many cities of moderate size, like Minneapolis and San Francisco, have tried to ameliorate the negative impact of the automobile through urban design changes in the city's infrastructure. Minneapolis prohibits the automobile on its main shopping street—Nicollet Avenue. And San Francisco has reduced the automobile capacity of Market Street. Despite Boston's stated program to ban the automobile from a 10-block area of its downtown, no American city, including Boston, has effectively placed restrictions on the use of the automobile downtown as have literally scores of European cities in their entire centers.

Ironically, the downtowns of the two largest cities in the U.S., New York and Chicago-whose downtowns function only because 80 percent of Chicago's commuters and over 90 percent of New York's commuters use public transportation—have only recently begun to implement a modest plan of street closings in their centers to benefit the high number of pedestrians and public transportation users (State Street in Chicago and Broadway as it passes through Times Square in New York will both be closed to the private automobile). Yet it is Chicago and New York, perhaps more than any of the other cities surveyed here, that desperately need reorganization of surface transportation priorities to favor the pedestrian, public transportation, emergency services and pick-up and delivery of goods. Considering that mid-town Manhattan is an area of only one square mile in a region of 12,000 square miles, it would seem reasonable that a few streets in mid-town could be reserved primarily for the one million people who work in that tiny area, especially since over 80 percent of them arrived at work by means of underground transportation systems and must walk to their destinations.

MORE FUNDING FOR PUBLIC TRANSPORTATION

Part of the reason for the dilemma is simple: more federal money is available to build highways than to improve public transportation; a lot more! Between 1956 and 1976, 38,000 miles of interstate highways were built in the U.S., while from 1945 to 1970 less than 20 miles of subways were built.²

According to John Hirton, deputy administrator of the Urban Mass Transportation Administration, "Since 1946, federal, state and local expenditures for highways and roads have totaled \$361 billion."³ Included in this figure is the \$65 billion already poured into the interstate highway program that was originally estimated to cost \$27 billion and will receive another \$35 billion if the highway lobby gets

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its way. In 1973 alone, \$24 billion was spent on highways. Hirton also said, "More than one fourth of this was raised by property or general taxes (non-user) and constitutes a clear public subsidy."⁴ In contrast, federal grants for public transportation in 1973 totaled only \$650 million.

The federal government is ultimately responsible for the short-sighted aspects of this one-sided program. Having helped hook Americans on driving to work, only the federal government has enough money to unhook them. Enforcing clean air standards coupled with more money for public transportation is one approach, but the federal government still has an inordinately strong bias toward funding highways. Even the Environmental Protection Agency now says it has yielded to local pressures and will no longer try to enforce clean air measures (although many environmental groups are suing cities to carry out previously agreed-upon standards). This might have been different had bus and subway riders been as effective a lobby as the auto manufacturers and oil companies.

HIGHWAYS ARE RARELY IN THE PUBLIC INTEREST

Despite the amassed knowledge of the problems and inadequacies of highways, several cities persist in investigating completion of existing systems. The lesson from viewing older cities such as Boston, New York and Chicago is that massive highways serve fewer than 30 percent of the incoming commuters at an overwhelming and unnecessary cost (both in terms of dollars and environmental, burdens not totally unrelated) that is rarely in the community's interest. Says William Ronan, former chairman of the New York Metropolitan Transportation Authority, "If the Long Island Railroad were discontinued, 29 one-way lanes of highway from Long Island to New York would be required to handle the commuter load currently served by the railroad."⁵ Only a national program of conservation that simultaneously encourages the use of public transportation will help.

Los Angeles functions—barely—because it has multiple centers, avoiding the heavy concentration of jobs at a single point, a common trait of older U.S. cities. The intensification in recent years of certain of these centers in Los Angeles, including its "downtown," is a cause of concern to planners. With Los Angeles' almost complete dependence upon the automobile, the increased density might tip the balance and make the entire highway system, already at peak capacity, completely unworkable.

Quite the opposite of the situation in Los Angeles, New York and Chicago are completely dependent upon public transportation. It is therefore incredible that these cities are only in the past year beginning to stripe exclusive bus lanes in their respective downtown areas. Even Houston has exclusive bus lanes downtown! While buses account for less than three percent of the vehicles on New York's streets, they carry over 40 percent of the surface passengers and are forced to compete with the private automobile for space.

PUBLIC TRANSPORTATION MUST BE MODERNIZED

Another problem is that New York and Chicago's subways are among the darkest, dirtiest, most dismally depressing subterranean environments ever created by man. Although many straphangers must ride them to and from work, they abandon what are multi-billion dollar systems at all other times, mainly due to the perception that they are unsafe (which may be directly related to their foreboding appearance). While New York and Chicago do have a few modernized subway stops, steps must be taken soon to up-date their entire subway systems as Boston has already done. In fact, Mayor Koch of New York committed the city in 1978 to just such a program. The expansive subway networks of New York, Chicago, Philadelphia and Boston remain the key in these particular cities to a cleaner, healthier environment.

The commitment to new and improved public transportation must include programs to induce more drivers out of their automobiles and into buses and subways. Some of these inducements can be direct: increased taxes on gasoline and downtown parking. Some can be less subtle, such as closing streets to private automobiles. Attention, too, must be given to the role major employers can play as van and carpooling and other such programs in Houston suggest.

An indirect approach can come directly from the auto insurance companies. At present, auto insurance premiums in large cities are staggeringly high: Boston \$950 per year; New York \$720 per year; Chicago \$520 per year. Many who own automobiles in these cities have viable public transportation alternatives but may feel obliged to use their automobiles as they have already spent so much money on insurance alone. Among other factors, insurance rates depend upon the type of vehicle being insured, the city in which it is driven, the driver's age and overall driving record. Given the fluctuating nature of insurance rates, it would seem that the costs could be substantially reduced for the automobile owner who uses public transportation during rush hours; that is, the insurance would not cover the automobile during those hours. This would be of benefit to insurance companies and auto owners alike. During the five-day work week, 40 percent of auto accidents, including 28 percent of fatal accidents, occur during the six hours that constitute the morning and evening rush hours (7:00-10:00 a.m., 3:30-6:30 p.m.). Besides the increased protection of life and limb, the savings to the motorist should more than offset the cost of using public transportation.

PLANS FOR URBAN DEVELOPMENT

As to other issues related to urban design, only Philadelphia of all the cities surveyed has a comprehensive plan for the city's development,

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which has been followed officially since 1961 and unofficially since 1947—and it shows!

With the exception of lower Manhattan, New York and San Francisco do not have comprehensive plans. Instead, they have taken several urban design features typically illustrated in comprehensive plans and written them into zoning laws. While many of the urban offices set up were consolidated under budgetary cutbacks, the urban design controls in New York remain legally binding on all new construction.

THE CASE FOR ZONING

Zoning should be a creative tool for regulating new construction to ensure that future buildings are responsive to existing environmental conditions. It seems clear that many cities should re-evaluate their bonus systems to better correlate the zoning incentive to the true needs of the center. In many cases though, cities ought to insist that a building have certain obligatory urban design features without resorting to incentives. The intent of zoning incentives works only when the zoning's basic limit is at a threshold where the developer wants to build more than the zoning allows. Of the cities surveyed, only Boston, San Francisco and New York have established clear zoning policies that work this way: the developer usually builds according to the city's urban design criteria in order to get a bonus to build a slightly bigger building.

Zoning can also be instrumental in saving landmarks, but it is no substitute for a clear public policy to preserve the city's cultural and architectural heritage. Where local governmental interest or appreciation is lax, as in Chicago, citizens should have recourse to state and federal programs that are strong enough to prevent destruction of recognized landmarks.

Since it now appears that many center cities are reaching a sort of population equilibrium (at least for a few years), zoning bonuses can no longer be relied upon as a tool to create the kind of open space necessary in the center and other, more direct means will have to be used to provide this needed space.

RETURN TO THE CITY

In the last 20 years, urban renewal, though harshly more disruptive than it needed to be, has at least shown the willingness of middle and upper income groups to live in the city, especially near downtown. While this may not be a consideration in cities like Houston (with control over 2,000 square miles, middle and upper income groups are in the city by default), it is very much a part of thinking in cities like Philadelphia, San Francisco, Chicago, Boston and New York where politicians seek middle and upper income housing as a way to increase the city's tax base.

In Philadelphia's Society Hill area and San Francisco's Golden Gateway Center, the housing is affordable to middle and upper income groups only, but is nonetheless an integral part of the city fabric which is accessible to everyone. The Houston Center project and Chicago's Lake Point Towers, however, would portend a future where these income groups live in fortress-like enclaves, often in locations which exploit the city's natural beauty and only serve to make the surrounding streets deserted and unsafe. In the absence of more humanistic attitudes of developers and their architects, zoning could be used to insist that future housing not be so exclusionary, at least in appearance and ground-floor use.

Battery Park City in New York, if ever built close to its original intent, will show how a city can provide a well-planned environment accessible to and inhabitable by a diverse population.

No doubt the downtowns of the nine cities considered here as well as other American downtowns can be revived as attractive places for business if new opportunities are seized upon to establish urban design structures that can give grace and beauty to the urban center. providing urban life with the dignity and amenity that characterizes so many cities outside the U.S. American downtowns can become vital organisms that integrate shops, offices and apartments with parks, plazas and a sensible transportation system that conveniently and comfortably moves passengers and allows for effective delivery of goods and services.

TRANSPORTATION POLICY A MUST

But if central cities are to become workable, livable places, politicians will inevitably have to make tough and costly decisions, many of which will be related to reorganizing transportation priorities. Implicit is the need for the cities to exert more control over the land the city directly administers, the more than 50 percent mostly in sidewalks, streets and parking. The cost of not making these decisions and establishing a coherent urban design policy for the downtown will be even greater, with a continued exodus of jobs and continually deteriorating, demeaning and unhealthy environment.

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^{4.} Ibid.

^{5.} Ibid.

Subsidized Housing in Chicago

by Devereux Bowly, Jr.

Despite the untold billions of dollars spent in this country over the last half century on subsidized housing, this subject has received too little attention. Programs have come and gone almost without evaluation of their social and economic impact. In the next few years, major decisions will have to be made about the direction of housing in America. If programs are to be planned intelligently, they can only be in the context of the achievements and failures of the past.

Chicago is an ideal case study of subsidized multi-family housing. Incorporated in 1833, it is one of the youngest of the major cities, its entire development occurred during the post-industrial revolution period. It has long been an innovator in the technology of building, and is unexcelled in the quality of its architectural design, yet its experience with subsidized housing has, on the whole, been a negative one. This raises serious questions as to the very nature of subsidized housing, whether or not we should have it, and if so in what form.

The more than half century of experience with major subsidized housing projects in Chicago could have taught many lessons. The unfortunate fact is that it is a story of decline. The first subsidized housing in Chicago was built by wealthy social reformers without governmental assistance. Between 1919 and 1930 three significant developments were constructed: the Garden Homes by real estate developer Benjamin J. Rosenthal, the Michigan Boulevard Garden Apartments by Julius Rosenwald, and the Marshall Field Garden Apartments. They are still standing, and provide better housing than the great majority of the public housing that followed. Although those

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projects have been successful socially, and are well designed, none was viable economically. The problem of providing adequate housing for the poor could not be solved by philanthropic endeavors alone.

PUBLIC HOUSING

The second major wave of activity occurred as part of the New Deal—the creation of the Chicago Housing Authority (CHA) to build public housing. By 1976, on its 40th anniversary, CHA had become the largest landlord in the city and the second largest local public housing agency in the country. It owned 30,462 units of family housing, another 9,175 apartments for the elderly, and controlled 3,098 private units under its leasing program. The units owned by CHA were in 1,273 separate buildings which cost \$563 million including land acquisition.¹ As of June 30, 1976 the total CHA tenant population stood at an estimated 140,000 people, or about 4.5% of the population of Chicago. This was down from 144,188 at the end of 1975,² and 147,842 at the end of 1974.³ The decrease reflects a slightly higher vacancy rate in CHA units and the overall trend toward smaller families.

Although it has built and now maintains a massive number of housing units, CHA has failed to fulfill the expectations of its creator, the social reform movement. That movement saw public housing as a major component in the effort to rid the city of slums and to transform those at the bottom of the social spectrum into healthy, upwardly mobile citizens. CHA has eliminated large slum areas and constructed a body of sound, safe, and sanitary housing for poor people, not an insubstantial accomplishment. There is no evidence, however, that the housing has helped to make the residents more self-sufficient or contented; in fact, the opposite may be the case.

Among the residents of CHA family housing at the end of 1975, there were 40,439 adults and 911,074 children.⁴ Only 13% of the families had both parents in the home, and that same percentage (although not necessarily the same families) were self-sufficient, the rest receiving some form of governmental income grant, mostly AFDC.⁵ Of the total CHA households, 13% had annual incomes under \$2,000, 24% between \$2,000 and \$2,999, 25% between \$3,000 and \$3,999, 10% between \$4,000 and \$4,999, and 28% over \$5,000.⁶ Of the family housing population, 95% were black, 3% were white, and 2% had Spanish surnames. In the CHA elderly units, 50% of the residents were black, 48% white, and 2% Spanish.⁷

The original intent of the federal public housing program was that rental income should cover operating expenses of the housing projects. Construction was paid for by the local housing authority's sale of forty-year bonds, the principal and interest of which are paid by the federal government. There are three major subsidies involved in such housing: 1) the direct federal payment of the construction bond principal and interest, 2) the loss to the federal treasury due to the fact that the holders of such bonds do not have to pay income tax on the interest received from the bonds, and 3) the loss to local taxing authorities because the housing authority does not have to pay real estate taxes, but only an amount equal to 10% of rental income (which for CHA in 1975 was only \$695,290⁸).

Through the early 1960s, CHA tenant rents were at least enough to pay the projects' operating expenses. As late as 1965, a small operating budget surplus existed, which was used to reduce the federal payment of construction bond principal and interest. After that date, rental income failed to keep up with greatly increasing operating and maintenance costs. In 1967 the federal government started paying CHA an operating subsidy (ten dollars per month) for each elderly apartment. The major operating federal operating subsidies came with the Brooke Amendment: a provision in the 1969 Housing Act that limited a tenant's rent in the federal public housing program to 25% of the family's adjusted gross income, with the federal government paying the local housing authority the difference between the actual operating cost and the rent received.⁹

By 1976 the basic rent schedule on units for families at or below CHA income admission limits was \$50 for an efficiency, \$60 for a onebedroom, \$70 for a two-bedroom, \$80 for a three-bedroom, \$90 for a four-bedroom, and \$95 for a five-bedroom apartment. However, due to the Brooke Amendment, the majority of the tenants paid even less than these basic rents. By 1973 the average rent of CHA federal developments was \$45.15 per unit, per month, representing 42% of the total operating cost per apartment, which averaged \$106.81.¹⁰ By 1975 the average rent had increased to \$53.54 but represented only 39% of the operating cost of \$137.64 per unit.¹¹

CHA's income figures demonstrate its increasing reliance on direct federal subsidies. In 1971 CHA received a total of just over \$31 million from the federal government, about \$19 million for debt service, \$3.5 million for the Brooke Amendment subsidy, \$6 million for the elderly and other special programs, and \$2.7 million for the leased-housing program.¹² By 1975, the total from Washington had more than doubled to \$67 million, broken down approximately as follows: \$25 million for the leased housing program, and \$1.6 million for the Target Projects program.¹³ In 1975, CHA tenants paid only \$23.8 million in rents for the federal projects.¹⁴

The 42,735 units controlled by CHA in 1976 were less than 4% of the total residential housing units in Chicago. Although the absolute number of CHA units is large, it is statistically almost insignificant as a proportion of the total number of units in the city. The majority of the poor families live in private housing. The public housing program might have achieved more if it had been conceived and carried out as a demonstration of high-quality housing design and innovative con-

struction techniques, instead of being scaled down, as it was, to the bare minimum.

EARLY OBJECTIVES

It is difficult to ascertain the exact design objectives of early public housing projects, because they were not articulated by the administrators or architects. Economic considerations played a part in the housing design but were by no means the entire picture. Although the reasons for those decisions are now a matter of conjecture, it is possible to isolate certain factors. 1) In the understandable concern for quickly replacing some of the terrible slums that existed, too little attention was paid to the aesthetic and social implications of this new type of housing. 2) The federal and CHA officials responsible for the projects knew little about architecture. 3) A conscious effort to make the building modest, to blunt public criticism that poor people were getting something for nothing from the government, also assured that public housing would not compete with the private housing market. 4) The overly detailed specifications formulated by the governmental bureaucracies inhibited creativity. Also important was the lack of public pressure on CHA to produce well-planned and designed housing. What resulted were dreary rows of barrack-like dwellings, physically better than the slums they replaced but not very attractive compared to the majority of the housing in the city.

The greatest defect and ultimate irony in the history of public housing is that the social reformers, who were its most dedicated early supporters, neglected the social dimensions of their creation. The very people who should have been most sensitive to the consequences of building massive projects inhabited solely by poor families, and containing no facilities for broad social interaction except a few parks and community centers, completely disregarded them. The philosophy of both the social reformers and public housing officials was paternalistic. The residents were treated like children, and the tragedy is that for some it was a self-fulfilling prophecy—they acted like children and were satisfied to have public housing and welfare policies control their lives. Public housing thus tended to perpetuate a permanent class of dependent people.

The public housing concept's most basic fault was isolating poor families into enclaves. Such limited exposure fails to provide residents, especially the children, with the opportunity for contact with people in a variety of circumstances. Even in slum areas there is usually some better housing occupied by middle-class families, who may even own their homes. The ideal of making the extremely poor population upwardly mobile, part of the original philosophy of public housing, would have been best achieved by getting them out into the general population where there is some interaction across class lines, some exposure as to how the economy and the business world operate, and some exposure to persons with more education.

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Another reason for family public housing's lack of success was simply that it had too many missions. In addition to providing housing for the poor and jobs for construction workers, it was a major vehicle to empty the slums. This added tremendously to land acquisition costs, and required by definition that the projects be located in slum areas where often the only tenants attracted would be those on the very bottom of the income scale, usually with large families, who simply could not afford to go elsewhere. The slum clearance itself displaced thousands of families, many of whom were relocated to existing CHA projects under special priorities. A de facto purpose of public housing (after Elizabeth Wood, CHA's progressive first director, left in 1954) was to isolate the poor and especially the black population away from the white middle-class areas of the city. Although nominally CHA is an independent agency, in reality it has operated as an arm of city government; its commissioners are appointed by the mayor, much of its planning is done by city agencies, and its sites have had to be approved by the City Council.

Public housing construction during the 1950s and most of the 1960s involved almost exclusively high-rise buildings. This type of housing was viewed by CHA as having a certain inevitability. CHA could have constructed the same number of units in low-rise buildings, on the same sites where the high-rise projects are located but apparently felt unable, or unwilling to do so. Throughout the period there were numerous small vacant lots and large vacant tracts of land available both in the inner city and in the outlying areas. Other major cities including Cleveland, Pittsburgh, and Los Angeles built no elevator, family public housing whatsoever. The high-rise projects in Chicago are ironically anti-urban in their planning. With 80% or more of their sites left vacant, they lack the characteristics that differentiate a city from a suburb: intensity of land use, a variety of building types, the presence of small shops and other businesses, churches and institutions of various types.

MODERATE INCOME PROJECTS

The attempts to develop moderate-income subsidized housing, like public housing, were not very successful, but for different reasons. The endeavors of the Chicago Dwellings Association, and later the Kate Maremont Foundation and the Community Renewal Foundation, involved smaller projects than those of CHA, with better architecture and some experimentation in rehabilitation of existing housing. They were financial failures, however, because of inadequate subsidies and mismanagement. Those Section 221(d)(3) and Section 236 projects built with federally subsidized mortgages at below market interest rates and developed by community organizations were also fiascos. In retrospect it is incredible that completely inexperienced groups were allowed to develop multimillion-dollar projects, with 100% financing. The input of such groups into planning housing is highly desirable. but it should have been recognized that the housing field is a highly complex and competitive one. To turn over such undertakings to amateurs is comparable to teaching a novice to fly an airplane by putting him in the cockpit and giving him the controls. The better course would have been to let the community groups start with small rehabilitation projects, and allow only the ones which showed real proficiency to get involved in the large undertakings.

According to HUD statistics as of mid-1976, 50 Section 221(d)(3) and 236 projects, with 2,639 units, had been foreclosed or were in the process of foreclosure. This represents more than 13% of the city's units.¹⁵ The foreclosures were heavily concentrated in the projects developed by nonprofit sponsors. Some of the buildings rehabilitated under the two programs have already been demolished, just a few years after their rehabilitation. In addition there were 33 projects with 4.620 units that had their mortgages in default as of 1976.¹⁶ Many of these were for new construction projects by for-profit developers. Some were only a few months behind in their mortgage payments, and some had been in default since 1971 and were more than 50 months in arrears.¹⁷ HUD does not want to take back the projects because it is not set up to own and manage housing, and the market values of the projects are considerably below the balances of the mortgages. Also, too many foreclosures are embarrassing to HUD, because it shows they financed nonviable projects. HUD thus plays along with the owners of many properties in default, especially if at least the interest on the mortgages is being paid. If the Chicago foreclosure and default figures as of 1976 are combined, they comprise 83 projects, with 7.259 units, or 36.4% of all 221(d)(3) and 236 projects built in the city, a dismal record. HUD hires private real estate companies to manage the properties it takes over, and eventually hopes to sell them to new buyers. Many are in bad locations, and some are in terrible physical condition.

Even with the high delinquency and foreclosure rates, some of the 221(d)(3) and 236 developments have been financially successful, especially those built by professional real estate developers. They were, on the whole, much more careful about the sites they selected than the nonprofit developers. A few have achieved the full permissible return of 6%, but many others have made a lesser profit. They have presumably all benefited from the tax shelter afforded by the projects, and some investors have even contributed additional capital to help cover operating expenses in order to prevent a project with a negative cash flow from going under, to preserve the tax advantages and their equity position.

In addition to selecting better locations, the private developers have tended to hire experienced managers or management companies for their properties, which some of the community organizations have not done. Professional management has not guaranteed success, but has achieved a better record than that of community groups which managed their own properties. Professionals were more insulated from local pressure, for example, to rent apartments to the friends and relatives of the leaders of community groups, regardless of their desirability as tenants. The professional managers tended to screen potential tenants more carefully, and to favor elderly tenants who are more dependable than younger families with children in the home.

For many of the 221(d)(3) and 236 developments, even those with good locations and management, unexpectedly high real estate taxes and sharply increasing expenses and federal limits on rent increases were simply too much of a liability and they failed to break even.

The subsidies received were not enough to make the projects viable. There were those who benefited regardless of the viability of the projects, including the building contractors and mortgage lenders. Both groups lobbied aggressively for the programs, and saw to it that they were designed in such a way that they lost nothing even if the projects failed.

DEVELOPMENT AUTHORITY AND SECTION EIGHT

By 1976, with the virtual construction halt of CHA projects and the 221(d)(3) and 236 programs, additional multi-family subsidized housing in Chicago was limited basically to projects with mortgages from the Illinois Housing Development Authority. IHDA is able to issue below-market-rate mortgages because its bonds offer tax-exempt interest.

It must be remembered that the cost of IHDA projects is not free to the taxpayers. In fact, the mechanism of tax-exempt bonds to finance mortgages is actually very expensive when considering the drain on the federal treasury. Research shows the cost of mortgages financed by tax-exempt bonds to be high in relation to the benefits conferred. Because most of the bonds issued by state housing finance agencies are held by persons in the high income tax brackets, and by banks and insurance companies, it has been estimated that the tax loss is equal to 48% of the amount of interest paid on the bonds. The dollar benefit conferred, in the form of lower interest rates on the mortgages, is considerably less than 48%.¹⁸ It would be less expensive for the federal government to simply subsidize the mortgages directly, rather than losing a greater amount of tax revenue through tax-free bonds. Also, the presence of more tax exempt bonds on the market tends to bid up the interest rates that have to be paid on them, and increases costs to all local and state governmental units raising funds on the bond market.

The United States Housing Act of 1968 and the Housing and Community Development Act of 1974, with its Section 8 program, heralded a change in federal policy away from developments built specially for the poor, and toward getting them into the private housing market. Under the Section 8 program the local housing agency, CHA, leases
privately-owned apartments and in turn subleases them to low and moderate income families at rents equal to 25% of their adjusted annual income. The federal government pays the difference to CHA. The program has not had a major impact as it involves only a few thousand units, although there are an estimated 600,000 families eligible for it in the Chicago area.

Because of the tremendous amount of paperwork involved, many landlords are reluctant to participate. Also, the program has been misused. CHA secretly secured 1,384 Section 8 subsidies for units that it owns, built in the 1950s by state and city funds and thus not part of its main body of federally subsidized housing. It then used the federal commitment of continuing Section 8 subsidies of high "market rents" for the units to secure a \$10 million mortgage to rehabilitate them. The transaction was not announced until it was an accomplished fact. The effect was not to provide additional housing for poor people, but instead to provide an additional federal subsidy to CHA. HUD has also approved Section 8 commitments to 100% of the units in newly constructed buildings financed by IHDA. Again this is in contravention of the intent of Congress in formulating the 1974 Act which seeks an economic mix in housing, and thus avoidance of geographical concentrations of poor families.

HUD is currently misusing the program to help unload its inventory of foreclosed Section 221(d)(3) and Section 236 projects. It has agreed to give virtually all such projects on Chicago's West Side, several hundred units, to a community group complete with millions of dollars in grants to renovate the properties which were built or rehabilitated only 10 to 12 years ago, and with continuing Section 8 subsidies to insure their future viability. In light of the previous failure of the projects, a strong argument can be made that good money is being sent after bad.

THE CHICAGO CONTEXT

Future housing policy must be formulated in the context of what is happening to our cities generally, and can only be made intelligently if major demographic forces are understood. The most dramatic change in Chicago during the quarter century from 1950 to 1975 was the accelerating loss of population. As recorded by the census, its population reached a peak in 1950 at 3,620,962. It declined to 3,550,404 in 1960, a drop of 70,558 or just under 20%, and by 1970 the population had fallen another 181,045 to 3,369,359, or a decline of more than 5%. It has been estimated that the 1975 population of the city stood at 3,094,143, a decline of 275,216, or 8.2% in only five years.¹⁹ It is predicted that the city's population will be below 3,000,000 by 1980 for the first census year since 1920.

This decrease is due to the combination of the declining birthrate and a greater number of people moving out of the city than moving into it.

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As the total population of the city has decreased, its black population has increased steadily, from 14% in the 1950 census, to 23% in 1960, 32% in 1970, and an estimated 38% in 1975.²⁰ The decline in population has been so great that, according to estimates of the United States Bureau of the Census, between 1973 and 1974 the entire metropolitan area lost population because the suburban growth was less than the city's population loss. Specifically, in the six-county Chicago Standard Metropolitan Statistical Area (SMSA), the population fell from 6,999,800 on July 1, 1973, to 6,971,200 a year later; the 1974 figure was actually 6,500 less than the 1970 Chicago SMSA total,²¹ These declines are part of the national phenomenon of migration to the "sunbelt" areas of the South and Southwest, especially Florida, Texas, and Arizona.

The housing stock of Chicago also shifted during the period. In 1950 there were 1,106,100 units in the city and the total increased by 108,800 units, or 9.8%, to about 1,215,000 in 1960.²² The housing supply in the city increased significantly during the decade, even though the population decreased slightly. This is a result of the ending of the postwar housing shortage, less doubling up of two or more families in a single unit, and the creation of a vacancy reserve which is normal in a market without an acute shortage of housing. Since 1960, however, the housing stock has fallen in Chicago. In 1970, according to the census, it stood at 1,209,200,²³ a decline of 5,800 units or about one-half of one percent during the decade. A special Census Bureau study called Component of Inventory Change (CINCH) found a slightly smaller total of 1,197,300 units in the city in 1970, and found that there had been a decrease of 19,300 units during the 1960 to 1970 decade.²⁴

During the years 1970 through 1975, building permits (excluding public housing) were issued for only 18,673 units in Chicago,²⁵ accompanied by demolition permits for 30,282 units,²⁶ yielding a decline of at least 11,609 units. The actual decrease in housing units during the period was probably considerably greater because of: 1) units demolished without permits, 2) the surplus of mergers of small apartments, over-conversion to smaller units of large apartments, caused mainly by the banning of glass emergency fire doors opening into other apartments and, 3) the withdrawal of marginal units from the market (for example, the city has been aggressive in forcing discontinuance of use of illegal basement and attic apartments). As the stock of housing has fallen in Chicago... and the suburban areas have grown, the city's proportion of the housing units in the metropolitan area has decreased from 66% in 1950 to 56% in 1960, and to 49% in 1970—the first year the suburbs had more units than the city.²⁷

Even though the supply of housing has fallen in Chicago since 1960, the decrease has been much less than the population drop, and thus the housing market is nowhere near as tight as it was then. Available evidence indicates that by the 1970s there was no longer an overall housing shortage in Chicago although specific shortages remain, most notably sound housing for poor families, and rental units in specific areas such as Hyde Park, the North Side lakefront neighborhoods, and the Far Northwest Side. The vacancy rate of housing units in the city increased from 4.7% in 1960 to 5.8% in 1970.²⁸ The 1970 vacancy rate was twice as high as New York City's 2.8%, and higher than the 4.6% rate in Los Angeles.²⁹

Traditionally the greatest shortage of housing in Chicago has been in that available to the black population. In the last three decades there has been so much white out-migration from the city, and such massive racial change, that by 1976 there was not even a general shortage of housing units in the predominantly black sections of the city. As the black population has become increasingly middle class and moved to neighborhoods not previously occupied by blacks, the vacancy rate in the traditional ghetto areas has gone up; for example, Woodlawn and Lawndale became depopulated as many of their residents moved to South Shore and Austin respectively. The remaining shortage of sound housing for the poverty population is more a function of the inability to pay rentals necessary to support such housing than of a physical shortage of housing units.

In the late 1960s and the 1970s, a new phenomenon has come upon the scene in Chicago and many other American cities—the large-scale abandonment of housing by owners who simply walk away from their buildings and leave them to be demolished by the city. Housing abandonment has been most prevalent in the old ghetto areas of the South and West Sides, but is also occurring in Uptown and the Near Northwest Side Humboldt Park area. The ultimate cause of housing abandonment is lack of demand for marginal and slum housing. Rents in the late 1960s and the 1970s have stayed constant, or at least not gone up enough at the lowest end of the housing spectrum to offset inflation of costs, especially heating costs, maintenance, repair of vandalism, and real estate taxes.

ONE CONTRIBUTING CAUSE MAY BE INEQUITY IN PROPERTY TAXATION

A 1973 study for HUD by Arthur D. Little, Incorporated, evaluated real estate taxes in 10 cities and found that in Chicago tax rates were relatively higher in slum areas than in other sections of the city. The study isolated "Stable Neighborhoods" (Hyde Park and Norwood Park), "Upward Transitional" ones (Lincoln Park), "Downward Transitional" (Logan Square), and "Blighted" (Woodlawn). The effective real estate tax rates (property tax as a percentage of ownerreported market value of the property) for the selected Chicago neighborhoods were as follows: Stable, 5.2%; Upward Transitional, 0.8%; Downward Transitional, 4.7%; and Blighted, 10.7%.⁴⁰ Thus the effective tax rate was 13 times higher in the Blighted neighborhoods than in the Upward Transitional ones.

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The precise effect of real estate taxes on housing abandonment is difficult to ascertain. The Arthur D. Little study found that when real estate taxes in Chicago were considered as a percentage of rental receipts, the differences between types of neighborhoods were not as great. The figures were: Stable, 20.7%; Upward Transitional, 9.9%; Downward Transitional, 17.4%; and Blighted, 19.9%.³¹ The study may have become obsolete by the late 1970s because of new assessment practices in Cook County. As each of the four assessment districts is being reassessed, according to the regular quadrennial pattern, there is greater input into the system of recent sales of comparable real estate in the area (by the use of computerized data). Many properties in the inner city actually have had their assessments lowered for the first time in many years. It is difficult to evaluate real estate taxes and housing abandonment because taxes have in fact usually not been paid for several years prior to the abandonment.

As demand for housing in the worst area of the city has decreased, the nature of slum ownership has changed. Multiple ownership of buildings in such areas by real estate companies and investors has been reduced, because of their declining profitability. The buildings are increasingly individually owned, or at least being bought on contract, by people who live in the buildings themselves or in the area. If there were still high demand for housing in the inner-city areas, the rents there would be bid up and there would be an incentive to maintain the buildings at least at the minimum level necessary to avoid a demolition suit by the city.

An important factor for the future of Chicago is whether the city will be able to maintain its existing middle-class population, both black and white. In recent years there has been some middle-class relocation from the suburbs to Chicago, but of course a much greater outmigration of middle-class families to the suburbs. Chicago has always had very strong neighborhood identification, especially by its middleclass population which was originally based to a high degree on ethnicity. It is unrealistic for the city to try to attract middle-class families in any great numbers to the highly blighted areas, even if attractive housing were made available there. Due to its limited resources, the city seems to have no choice but to limit large-scale expenditures in those areas. Possibly in 20 years or more, when the cycle has been completed, there will be the chance of a revitalization. accomplished by a new wave of urban renewal, in which the city sells the land it has accumulated by virtue of demolition liens and unpaid real estate taxes.

LOOKING AHEAD

A controversial philosophy concerning the city's role in the current urban dilemma has been articulated by Anthony Downs, former chairman of the board of the Real Estate Research Corporation and influential in Chicago and national housing policy. In recommending

how cities should spend the limited funds available under the federal Community Development Program, he draws the analogy to the military medical technique called triage. Under triage, combat surgeons divide their patients into three categories: 1) those who will probably survive whether operated on or not, 2) those who are so badly injured they will probably die whether operated on or not and 3) those for whom an operation would probably make the difference between life or death. Like the surgeon, Downs advocates that cities should devote their major resources to neighborhoods in the third category, which he calls "in-between areas," as opposed to the "healthy areas" or "very deteriorated" ones.32 Although such a policy is unpopular with many people, it seems the only rational course at the present time with the federal funding of housing and urban programs at a very low level. If cities tried to spread the funds out to all problem areas, they would probably have no discernible effect, as has been the case with many urban programs in the past.

The economic and social forces affecting housing in Chicago are so vast that the city government itself is unable to have any major impact on them, and it is questionable whether even the present program of the federal government, unless funded at a very high level, would have much effect. It is clear that modest programs such as those of Sections 221(d)(3) and 236 have not been very important in the overall recent history of the city. Rather than trying to provide housing by programs such as these, the ultimate solution to the problem of low-income housing is to provide the poverty population with the necessary funds to compete adequately in the private market.

The main housing problem of the poor is simply that they do not have the funds to secure adequate housing. There are two major ways this could be remedied: by a guaranteed annual income, or by a system of housing allowances. The guaranteed annual income would be the most comprehensive solution to the problem, and the one that would promote maximum freedom. It would allow poor families to afford sound housing in the private market but would also permit them, if they chose, to live very modestly and spend a small proportion of their income on housing and the rest for other things. Although the idea of a guaranteed annual income has been widely discussed for more than a decade, support for it does not seem to be increasing because of the high projected cost and the unknown effect such a system would have on employed persons with marginal incomes just above the level of the guarantee figure.

Sections 501 and 504 of the Housing Act of 1970 directed HUD to set up an experimental program to determine the feasibility of a system of housing allowances. The Experimental Housing Allowance Program was launched in 1971 by HUD's Office of Policy Development and Research. Among the major institutions participating in various aspects of the experiments are the Urban Institute, Stanford Research Institution, Rand Corporation, the National Opinion Research Center,

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and the M.I.T.-Harvard University Joint Center for Urban Studies. The project is actually composed of three major studies. The first is a three-year consumer or demand experiment to measure the effect on low-income recipients of different types and levels of allowances. It is being conducted in Allegheny County, Pennsylvania (Pittsburgh), and Maricopa County, Arizona (Phoenix). Over 1,700 households at each location are being provided with 17 different forms of housing allowances, for comparison to each other and with a control group not receiving any allowances.

The second major experiment is a market one called the Housing Assistance Supply Experiment, to determine what effect housing allowances have on the supply of housing. Major questions being considered are: will the allowances merely bid up rents in poverty neighborhoods, or enable the poor to move out of them? Will housing allowances cause an increase in the supply of sound housing by encouraging rehabilitation and new construction? This experiment, which is to last five years, is being conducted in Brown County, Wisconsin (Green Bay), and St. Joseph County, Indiana (South Bend). It started in 1974, and ultimately was planned to involve about 15,000 households. The program is open to all families (but not to single people under 62 years old unless handicapped) unable to afford standard housing, using one-quarter of their adjusted gross incomes. Each household receives monthly cash payments to bring it up to that level, provided each resides in safe and sanitary housing. The study includes both renters and homeowners. As of the end of September 1975 the median income of those enrolled in Green Bay was \$3,480 and the median monthly housing allowance was \$59. In South Bend, the median income was lower, only \$2,730, and thus the median allowance of \$74 per month was higher.³³ The final experiment, to run for two years, will evaluate administrative methods and costs. It involves eight public agencies administering small housing allowance programs of 400 to 900 families each in various urban and rural locations around the country.

By the early 1980s these studies should be finished and evaluated, and there may then be an effort to enact a housing allowance program. Such a system, unlike earlier federal housing policies that were funded at such a relatively low level that they failed to touch most of the poor, would be based on universal entitlement and would thus be a major income transfer program. Like other such programs—public aid, food stamps and Medicaid—it would be aimed at a specific national goal. It could be funded at any level, but to be effective the cost would be large. Very early estimates have ranged from \$5 to \$7 billion per year.³⁴ A realistic estimate for the cost during the 1980s would be \$10 billion annually. That amount could theoretically be raised simply by cutting back the \$2.38 billion direct federal budget outlay for subsidized housing and eliminating the indirect federal housing subsidy now in existence, based on the income tax deductibility of real estate taxes and mortgage interest, which totals more than \$9 billion per year.³⁵ These indirect federal housing subsidies accrue overwhelmingly to families with incomes of \$10,000 or more per year.³⁶

If a national housing allowance system were enacted it would cause a large inflow of resources into the Chicago housing market, and might well provide sufficient demand to stimulate the maintenance and rehabilitation of a considerable amount of existing housing. In the past, housing policy has experimented with several subsidized housing programs in an attempt to find solutions to the problem of adequate housing for poor people. The programs have not made a decisive impact, at least not in Chicago. The potential of a housing allowance program is that it would involve large-scale resources and that it would work through the private housing market, which has efficiently produced a tremendous supply of largely well-designed and constructed housing. The housing allowance remains the best hope for a solution to the low-income housing problem, and perhaps for the future viability of the housing stock of Chicago.

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Design Trends: Humanizing the Office Environment

by Helmut Jahn and Dianne M. Ludman

Secretaries, corporate executives, marketing managers have replaced laborers and factory workers in number; software has replaced hardware. By the mid-80's, the office will be the primary place of employment in the nation. With this social shift has come the need for architecture to respond to the changes in the work force, the need for more "humanized" office spaces.

The office building is no longer the place of routine procedures and sterile coldness, a place effacing the identity of the individual worker, a place of status and glorification of commercialism. The emphasis is rather on human factors—the variety of tasks to be performed, the work flow, improved environmental control and efficiency, the needs and goals of its workers. The office has evolved into an information and communication services center, rearranging the distribution of work and responsibility.

Frank Lloyd Wright's Johnson Wax Building, Racine, Wisconsin, 1936-9, is one of the rare exceptions in the past of an office environment that considered the life and needs of the daily employees. The quality of life is becoming a deciding factor in the choice of where to work or live as workers are becoming better educated, more sophisticated. People go to their "place of work" rather than "job," and consider a comfortable atmosphere a basic right. Employers are being compelled to provide more amenable workplaces. The designs of office buildings propose attractive, stimulating workspaces, integrating the various aspects of human behavioral needs: physiological, safety and

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security, social, ego and self-fulfillment needs. The office building becomes an amenable, liveable environment, a setting responsive to human activity.

A new image of the corporation itself is emerging that corresponds to the changes in the emphasis of the nature of business. Companies are concerned less with conveying hard-line tactics and more with appealing to human qualities and emotions. They enhance their image as people-oriented corporations by attempting to convey a corporate sensitivity and consciousness of quality. Programs of corporate enlightenment, sponsorship of the performing arts, philanthropic civic activities, art patronage has as much to do with corporate image-making and public relations as with tax incentives and investment portfolios. For their physical structures, they seek those that will embody and express their new image as well as provide an arena for the activities for those to whom they appeal.

BACK TO THE GARDEN

Deere & Co. is one such corporation concerned with maintaining a tradition of quality while also operating on a human level. It has committed a large investment in the arts, tastefully acquiring a large corporate art collection, intelligently seeking the services of architects recognized in their profession. Architect Eero Saarinen and landscape architect Hideo Sasaki created a headquarters for Deere & Co. in Moline, Illinois that is a strong, elegant statement, not only as a beautiful piece of architecture but in its creation of a better working environment. Sensitive to the needs of its future users, the headquarters building provides a tentative open plan dividing floors with moveable partitions, creating small communal groups of workers. In a more democratic layout, window views are given to assistants and secretaries, and in the exchange, executives and administrators occupy the central areas. Intermingling exterior views into the interior spaces, Saarinen provided views and visual enjoyment for all workers.

The recent addition of Deere West by Kevin Roche/John Dinkeloo continued that tradition, and created a building sympathetic with Saarinen's, yet establishing its own identity. The dramatic focus of the building is the 11,000 square foot interior garden. Surrounded by the office spaces, the garden is also integrated into the life of the office. Two floors enter out into the landscape; a third floor balcony overlooks it. Besides its visual expression, the garden functions as a circulation element; employees walk through the garden to the cafeteria. The concept of direct participation and human entry into the interior garden developed at Deere West marks a change from carefully deposited office plants for decorative effects, or, for example, the remote sunken sculpture garden created by Isamu Noguchi for Skidmore Owings & Merrill's Chase Manhattan Bank of the 60's where humans, sealed off by windows or balcony, were allowed to "look but not touch." A subtle aspect of human factors design, then, is the need for providing a sense of participation and personal choice of the user. In the layout of office space, in the landscaped garden, Deere & Co. headquarters provides its occupants the involvement necessary for a sense of well-being.

A similar use of an interior garden incorporating a sense of direct contact was achieved at the Bradford Exchange, Niles, Illinois, where architects Weese Seegers Hickey Weese Architects Ltd. transformed a discarded strip store into an office and display space. A 3,000 square foot skylit, sunken landscaped garden with a fountain and running brook serves as the central organizing spine, dividing the areas of office landscape. The garden also acts as a conference and dining area, and a museum display area and small theater for visitors contribute to the people-oriented office. While imparting a soothing atmosphere, and creating aesthetic effects, the trend towards office gardens contributes both to the corporate image and to more humanized workspaces that reflect the growing concern with health, nature, clean air and water, and other issues affecting the quality of life.

ATRIUMS, NATURAL LIGHTING

In the design of the new corporate headquarters for Rust-Oleum Corporation by C.F. Murphy Associates, the underlying idea was to create a pleasant and humane space flooded with daylight—a building that is open, light and inviting. The satisfaction of the employees, the warm, cheerful atmosphere encountered in the offices of the recently completed building are strong indications of the successful fulfillment of those ideas. In creating the office space, the office can be a "special place" in which its workers can have a stake, and encourages a sense of pride and respect.



Rust-Oleum Corporate Headquarters

Jahn & Ludman: Design Trends

Situated on a 5.96 acre site in the suburb of Vernon Hills, Illinois, the design for the Rust-Oleum headquarters sought to preserve the site for landscaping and its visual benefits rather than parking. The structure seemingly floats above the below-grade parking, where workers enter from the depressed area up into a pleasant and open environment. The 30' x 40' bays cantilever 20 feet in one direction and 15 in the other to optimize the parking area and create large column-free office space. Stairs and ramps tie the floating structure to the outside grounds, not as heavy anchors but rather invitations to above. Once invited into the central skylit spine, employees find all functions organized around the spine with the utmost efficiency, openness and comprehensibility. The atrium-the central unifying space-divides the office into four modular areas, two on each side of the spine. The sense of openness is accentuated by modular desk arrangements and glass-walled offices. With its stairs ascending up through the spine, and the series of bridges interconnecting office areas, this central space helps people circulate, entices them to move around. The interplay of verticals, horizontals, diagonals and the colorfully painted mechanical systems. treated as sculptural forms, and reflecting the owner's products, contribute to the visual and spatial excitement for the user. The atrium, then, becomes the "people place," In one section of the atrium is the employee cafeteria; the visitor waiting and reception room in another. Other amenities afforded the daily worker include an audiovisual room, a chapel. Flooded with comfortable natural daylight (an energy savings as well), the inside also provides just as pleasant a view to the exterior landscape beyond. At night, the visual effects provide a heightened sensory experience.

There has been an increasing use of atriums and skylights and natural lighting in developing architectural concepts to humanize interior spaces and provide comfortable and functional work environments, while at the same time exploring the applications of natural light to energy savings and the efficiency of the building. C.F. Murphy Associates' design for the Program Support Facility for the Department of Energy at Argonne National Laboratories in Illinois is a building with insulating glass and skylights designed to act as a solar collector, and at the same time deals with the effects of daylight and the creation of a human environment as an alternative to conventional office space. The concept of the interior spaces is based upon open office planning and the maximum use of daylight to increase user comfort and conserve energy. The three-story atrium facilitates orientation, movement and spatial comprehension for the user, in addition to providing natural illumination within and a view to the natural wooded environment outside. The Argonne Program Support Facility represents a serious and sophisticated approach to the considerations of the use of natural light, and a thorough analysis of its contribution to the performance of the building in terms of human satisfaction and comfort as well as energy efficiency.

THE URBAN CONTEXT

The urban office building presents its own special needs, for example, the desirability of its location, its relationship to business corridors, its access to transportation and commuter routes. The new urban office building is being placed within the context of its city site. Infill buildings are seeking compatability with existing neighbors. Plazas and street level spaces become integral elements in the design. The result develops the creation of urban spaces—spaces with their own unique rhythm and flow of activities. Large urban office buildings are aware that their mere presence will alter and create, populate and invigorate these new urban spaces. In addition to the life within their offices, they will be contributing to the life of the city streetscape, realizing a human concept on a more public scale. Outdoor plazas become people places, boasting large scale sculpture, offering an array of activities-places for relaxation, enjoyment, entertainment, dining. Urban plazas, whether indoor or outdoor, can relate to the pattern and pulse of the surrounding streets, to the office building itself as a unifying element, or as an inviting entry adding to the gradual crescendo of the spatial excitement. In an almost classic Italianate tradition of urban living, the populace within the privacy and restrictions of their respective offices can escape to the social ambiance of the city's new grand piazzas.

The underlying idea of C.F. Murphy Associates' Xerox Centre now under construction in the heart of Chicago's business district is the design of an infill building on a corner, placed within the context of the remaining block on the Dearborn Street corridor. The 880,000 square foot office building is set back 20 feet on Dearborn and at Marble Court, continuing the landscaped promenade established by the First National Plaza. Breaking with the concept of a "freestanding tower" on a plaza, the Xerox Centre slopes towards the neighboring structures, and its curved wall transforms the two sides of the Monroe-Dearborn corner into a single, provocative facade. In its attempt to preserve and invigorate the streetscape, the speculative office building thus becomes vitally important in creating and enriching the environment in our cities. At the ground level of the Xerox Centre, emphasis is on providing pedestrian circulation through the building. The location of commercial areas along the perimeter achieves maximum exposure both from the street and within the building. Plans for outdoor sculpture reinforce the overall commitment to continuing the creation of spaces for people begun along Dearborn.

Skidmore Owings & Merrill's design for Three First National Plaza shares the aim at contextualism and compatability with its neighboring structures. One of the nine new office buildings to rise in Chicago's Loop area, it features a 10-story ground level enclosed atrium, and a granite tower rising behind it, and continues the Chicago tradition of integrating function with distinctive design. Another design from the same firm is that of a multi-atrium office building, stacking three atriums vertically. The mechanical core is located at the back of the building, freeing the front for either atriums or expansive office floors. Terraces overlooking the atriums offer tenants a variety of spatial configurations from floor to floor.



Chicago Board of Trade Addition

Another building that will soon participate in the life of the Chicago streetscape is the 584,000 square foot addition of trading floors, office space and support areas for the Chicago Board of Trade and the Chicago Board of Options Exchange, a joint venture of C.F. Murphy Associates and Shaw, Swanke, Hayden & Connell. The addition, designed to function with the existing building as one unit, pursues the relationship of old and new as a generator of form. The building derives its formal characteristics from an interpretation of the Art Deco style of the existing landmark structure, not duplicating its technique but rather its meaning, and thus expanding beyond the modernist interest in form as a resulting expression of function and technology to instead achieve a new synthesis. While the addition will preserve the history of the life of the building, it will at the same time create a new life of its own. An important design element is the accommodation of a covered pedestrian arcade at street level, resulting from projecting the building 20 feet on its sides beyond the existing structures to provide adequate size trading floors. The arcades along its east and west will meet and continue along its south side, where it adjoins the Loop's celebrated elevated transit line. From this arcade a two-story mid-block street ties into the existing lobby, thus encouraging retail activities and movement through the commercial spaces of the building. The concept of the office building as a place for human activity and the creation of a type of urban life-style is carried through within the design of the building as well. The first twelve floors are large bulk spaces housing the trading floors and support functions corresponding to similar spaces in the existing structure. Above this, the office floors are designed as U-shaped spaces around a central atrium which adjoins the existing structure. Glass elevators, providing orientation and revealing the original building, will offer their users a dramatic, soaring experience of space—a sense of being borne up into the past. Communication, as it relates to people's use and perception of buildings and their meanings and associations, then becomes a determinant in the approach of office buildings to the basic human needs and behavior of the people they will serve.

INTERIOR PLANNING

The interior spaces of office buildings reflect similar humanizing concepts and trends. The type of interior layout should evolve from a thorough process of planning for the organization it serves and should have a built-in capacity for change and growth. Changes in space and facilities planning reflect changes in the operating structure of the office; the office layout mirrors the corporate matrix as it operates—the quality and quantity of personal interactions, workflow relationships and the hierarchy of authority. Within the office building, open office planning provides one solution for maximum flexibility of communication and organization planning. The richness of exterior and interior space, light and vistas, for example, can be shared by all levels of the work force. Modular seating arrangements can provide flexibility and accommodate growth. In a post-Miesian age, the trend away from huge office floors, from the efficiencies of the überlandschaft classic office landscape, marks a growing shift towards more human goal-oriented planning. In commenting upon the results of the recent national study of office environments conducted by Louis Harris & Associates for Steelcase, Ada Louise Huxtable wrote that the workers "resent the slick, inflexible impersonal arrangements.... They agreed, almost to a man and a woman, that the relationship of surroundings to job satisfaction is extremely high. Their call is not for more stylish design but for more considerate and

comfortable design ..." (*New York Times*, January 31, 1979). Modified open office planning offers appropriate degrees of enclosure—areas for privacy and thought, areas for social grouping, planned for the psychological comfort of workers.

THE HUMAN FACTOR

Design trends have begun to signal changes towards redefining the concept of the office building in more human terms. The use of atriums and skylights, exploited for energy efficiency, enhances the enjoyment and use of space, provides comfortable natural illumination and a sense of visual openness. Exterior views and landscaped vistas are available to workers through carefully planned fenestration. Indoor/outdoor landscaping and gardens bring a more direct contact with natural surroundings; improved environmental control adds to user comfort within. Color, shape, form offer aesthetic, sensory appeal, adding to the excitement of a more stimulating work environment.

Employees have begun to expect certain amenities: dining facilities, parking facilities, entertainment and a schedule of activities. Family recreational facilities, game courts, recreational balconies, locker rooms are becoming part of the architectural program, as corporate clients take advantage of the current fitness boom and the insurance benefits of corporate fitness programs. Pedestrian circulation routes become critical elements in the design process; organization and circulation of the structure are a determining factor in the efficiency and comprehensibility of the building on the part of the user.

Urban office needs—function, technology, energy, visual identity—are integrated with civilized amenities, as the new city office building becomes conscious of its contribution to the quality of the urban lifestyle. Placed within the context of its city streetscape, the more peopleoriented office buildings encompass within their programs indoor/outdoor plazas, arcades, malls, atriums, pedestrian circulation routes, encouraging a flow of activities, entertainment, retail and commercial operations and benefits in rhythm with the pulse of the city. Entrances suggest openness, expansiveness; enclosed or open plazas replace the traditional monumental and intimidating lobby.

In the process of redefining the office surroundings in more human terms, architecture and design concepts are clearly responding towards the creation of more humanized work environments.

Noise and Property Value

by Max J. Derbes, Jr., CRE and George H. Cramer II

HISTORY OF STUDY

In recent years much attention has been focused upon environmental factors, particularly in residential areas. In the wake of air traffic noise litigation, increasing concern has followed over automotive vehicle noise, especially along limited access highways. As a result, the Highway Act of 1973 and the Federal Aid Highway Program Manual call for noise abatement measures along certain federallyaided highways where noise exceeds acceptable levels as determined by the Federal Highway Administration.

The Department of Transportation and Development, Office of Highways of the State of Louisiana, felt there was a need for an investigative study to determine the effect, if any, of highway noise on adjacent residential property values. The Office of Highways also desired that a procedure be formulated which could be followed routinely to derive a fair measure of the effect, if any, of noise on property value.

OVERVIEW OF STUDY

General Aims—The purposes of this research as cited in the research plan were to determine, by use of accurate, acceptable practices, the effect, if any, of highway noise on adjacent residential property values; and to provide a set of procedures which could be followed in any situation to give an accurate, fair measure of the effects of noise on property value.

This article is an excerpt from "The Effects of Highway Noise on Residential Property Values in Louisiana," a Louisiana Highway Research Project Monograph published by the Louisiana Department of Transportation and Development, Research and Development Section.

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The findings were to be provided in a format that might be implemented by the Department of Transportation and Development's engineers and appraisers in planning for future highways and in their evaluations of rights-of-way. This format is also useful to the Department's expert witnesses in litigation proceedings.

Method of Procedure—The general method used to determine market effect of noise was as follows:

1) Preliminary noise level (L_{10}) readings were taken in selected areas to determine if noise was above acceptable evels according to the Federal Aid Highway Program Manual.

2) Sales and rental data were analyzed to determine if there was a sufficient volume of data available for comparison of properties close to the noise source and away from it, in order to determine market value effects.

3) Each potential area was examined to determine whether or not it would meet certain selection criteria agreed upon by the Department of Transportation and the appraisers.

4) After the compilation of initial data and inspection of an area or subdivision verified that it would meet all the criteria, a more in-depth noise study was made to determine the noise environment.

5) Sales and rentals of similar properties close to and away from the noise source were compared. Where additional information was needed to assure valid comparisons, interviews were conducted with owners of houses away from the noise source to ascertain the condition of the home at the time of the sale or the particular circumstances of the sale. In many cases, the units were also measured to determine square foot living area.

METHOD OF COMPARISON-SINGLE FAMILY HOUSES

The study makes the following comparisons between homes subject to above average noise levels and others not so affected: individual comparison of sales prices of similar homes, yearly resale percentage increases of similar houses, frequency of resales.

Where a subdivision being studied contained virtually identical home models, the sales were separated by models for purposes of comparison. All sales of a matching model for a year before and after a subject sale near the noise source were used for comparison, adjustment for time being made by using the average monthly resale increase figure for that model. Also adjusted was the lot size differential.

Owners of all subject houses (with the exception of a few who could not be contacted) were interviewed to obtain basic information about the house, such as the number of rooms and special features. Homeowners were also questioned regarding the condition of the house at time of sale, renovations or additions, conditions of sale, and any other pertinent data. If, after time of sale and lot size adjustments, any comparison sale was more than a small percentage above or below the subject sale, a visual field inspection was made. When there was no apparent difference in the homes, the owner of the comparison home was also interviewed.

A different approach was taken in the subdivisions which were developed with homes having substantial variation in design, model, etc. Homes close to and away from the noise source which sold for similar prices at about the same time were contrasted. All homeowners were interviewed with this procedure. All homes were also measured in order to make comparisons on a square foot value basis. This method of comparison was used to avoid making many adjustments to price for individual differences which could affect the objectivity of the study.

Where there was more than one sale of a subject house over the time period studied, the resale increase of the subject was compared with those of matching or similar homes away from the noise source.

Frequency of resales close to the noise source and away from it was compared. The number of sales on a street was divided by the number of developed lots on that street to determine the rate of turnover in homes. The rates of turnover for the noise-affected and non-affected areas were then compared. Any transfers from a succession (estate) were excluded since such a transfer is not a voluntary sale by an individual. Transfers to and from a corporate entity, such as a bank or transfer company, were counted only as one transfer, since the corporation is merely a conduit to transfer the home to another purchaser.

METHOD OF COMPARISON-APARTMENTS

If there is any financial loss in apartments due to high noise level, it must be reflected in either the unit rentals or occupancy of the apartments near the noise source, as compared with similar units in the complex away from the noise source. Therefore, the study compares the apartments close to the noise source with those in the same complex away from the noise as to the rent level of comparative units, their occupancy level, and requests of tenants in noise oriented apartments to move back to units not having the noise.

Because of the scarcity of apartment units in New Orleans and Baton Rouge, many of the apartment complexes which front on either the Interstate Highway or on frontage roads adjacent thereto had such a high occupancy rate that they could only be surveyed from the standpoint of rent levels and move-back requests. Only one unit, Lake Kenilworth, had a sufficient vacancy rate to study in depth the occupancy rate of the units near the noise level as compared with other apartments in the same complex.

Derbes & Cramer: Noise and Property Value

The evidence of the units with high occupancy levels is still considered valid from the standpoint of rent levels, and particularly move-back requests. If the apartment occupants were sufficiently dissatisfied, they would request that they be allowed to move to units away from the noise source as they became vacant.

Apartment units were sought which had a high noise level on a local arterial collector road in New Orleans and in Baton Rouge. None were found which fit the criteria. However, two units were found, which backed into the Interstate Highway with frontage on Veterans Boulevard, with high noise levels from this local road.

Conclusions

GARDEN APARTMENTS

An objective study of the effect of highway noise on the value of apartments is not a simple task.

- The noise levels of many complexes on expressways frequently are not sufficient to qualify as above acceptable levels determined by the Federal Highway Administration.
- 2) Many apartment units, in times of apartment undersupply in a given area, have very high occupancy levels making noise-related vacancy research impossible.
- 3) Owners and managers at times will not cooperate by furnishing rent rolls and other information needed for the study.
- 4) Owner and manager prejudice can influence the results in a particular apartment complex.
- 5) The highway gives prominence and exposure which assist the owners and managers in renting the apartments, at times above levels obtained for similar units in remote locations. Further, these attributes might benefit the occupancy levels in the complex. Yet, at the same time, those units near the noise source can command less rent or have less occupancy.

While no apartment complexes in this study were found on major arterial collectors which were not also on interstate highways, three were found which had frontage on both (two in New Orleans area and one in Baton Rouge). All three had no adverse effect as a result of the noise levels of either the Interstate or local road. Rent levels for similar units were the same for noise oriented and for interior units. There was only one complaint from the local road highway noise study and this was from a party who complained about the noise of the air conditioner. There were no requests for move-backs. There were no vacancy problems in the noise oriented units; however, this is not significant since the complexes were close to 100% occupied.

One apartment complex in Baton Rouge and nine in the New Orleans area fronted on interstate highways and were researched generally; however, detailed studies were not made because all had unusually high occupancy rates.

- 1) The rent levels for noise-oriented units were the same in all cases as with similar units away from the noise.
- 2) In all these units, there was but one request to move and this was motivated by a desire to get into a cheaper, one-bedroom unit from a two-bedroom unit. This is the only move-back request known.
- 3) There were no known move-outs because of the noise.
- 4) Older people apparently prefer the front apartments even with the noise because of security and the fact that they do not have to drive their cars to the rear of the complex.
- 5) Because of the generally high occupancy rates, there were no problems with vacancies in the noise related units.
- 6) The view from the front (living room) of the apartment was apparently more important than the noise problem.
- 7) Proximity to recreational facilities was more important to adults than the noise problem.
- 8) Being removed from the young children's playground was more important than the highway noise.

Lake Kenilworth apartment complex was studied in detail because it had less than 100% occupancy, previously did have a small rent concession for some units on the highway, and owner cooperation was obtained.

- 1) Some of the units facing the highway had a 6.85% rent concession which was eliminated recently without any increase in vacancies over a short time period. The rental obtained for the noise oriented units was the same previously as for similar interior units excepting that the interior units did not have an outside balcony. Interior units with balconies were charged \$17 per month more.
- 2) The occupancy rate for the noise oriented units was high as compared with similar interior units facing concrete parking area, an open canal, and a major street (not the Interstate). The units facing I-10 did have slightly more vacancies than units near the shopping center, interior lake, or interior courtyards. It was concluded that proximity to the noise did not contribute to vacancy ratio of the front units since the occupancy rate on these units was about at the overall average of the complex.
- 3) Points 2, 3, 4, 6, 7 and 9 in the study of the nine New Orleans area units were applicable to Lake Kenilworth Apartments.
- 4) Considering the prominence and exposure of Lake Kenilworth Apartments, it was concluded that the benefits of the highway more than overcame the prior loss of \$17 per unit for some of the noise oriented apartments. Furthermore, occupancy and recent experience with no rent concession tend to prove that the \$17 reduction was due to owner's prejudice. All the other units on I-10 East had no rent concessions.

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In light of the fact that the noise levels of all these complexes were above recommended maximum levels, and the findings of the study, it is concluded that the highway noise in this area does not have an adverse effect on rental income or market value.

SINGLE FAMILY RESIDENTIAL

Selection of suitable subdivisions for testing the effect of highway noise is important if any objective study is to be undertaken. Having a sufficient amount of relevant sales both near and away from the highway at about the same time is mandatory. Those data which require the least amount of adjustment for differences (both physical and economic) give results with the least possibility of error.

Willowdale Subdivision—This is an ideal subdivision to ascertain if high noise level of an interstate highway causes a diminution in value: because of the age of houses (about 15 years), because of the presence of similar models backing into the highway and in the interior, and because of numerous sales both on and off the highway. While 11 of the sales on the highway tend to indicate that the houses in the interior sell for 5.43% more than the houses on the highway, there were seven other sales on the highway which indicate that the interior houses were, in fact, worth 6.92% less on the average. This is after adjustment for time and lot size. Therefore, the sales data do not appear to be sufficient evidence to indicate that there is an adverse effect on the property values because of noise.

The houses backing into the highway over the last six years resold at a frequency rate of 1.99% less than the overall average of resales in the subdivision, which is no indication of dissatisfaction to a point of selling frequently.

The overall percentage of value increase per annum is lower for houses backing into the Interstate by 1.61% per annum according to the criteria of the study; that is, increases over 12.5% annually and under 2.4% were eliminated. Interestingly, two resales were eliminated which would run the average to a plus 1.7% for the houses on the highway, one at 31% annual increase, the other at 13.4%. Since there were only eight houses abutting the highway which resold over the six-year period, this result is not considered significant.

Vineland Subdivision—This is an area of new houses next to Willowdale which face the frontage road alongside the Interstate (therefore, there is noise and view diminution potential). With a limited number of comparables, the sales indicate that the prices obtained, adjusted for price only, favor the interior houses by 2.83%. However, most of this is due to the narrower lots of the houses on the highway.

It was obvious that the houses in this small subdivision had exceptionally high resale values. It is interesting to note that the five sales of houses facing the Interstate frontage road were at an average annual increase of 3.18% higher than the five sales off the highway. Resales on the frontage road were at an average increase of 16.39% per annum and off the frontage road at 13.21% per annum.

Terrytown—This study of new, middle class housing shows that on this busy major arterial collector, the deviation is so small as to be insignificant. This tends to indicate a lack of buyer resistance to the parkway with its traffic and noise. There is only one resale of these relatively new houses on Terry Parkway and it was at a 13.63% annual rate of increase which compares favorably to the resales of four interior houses at an average annual increase of 12.79%. There is no potential for an adequate sales comparison or a frequency of resale comparison because the houses are so new.

Holiday Drive—This study of houses on a busy major arterial collector tends to indicate that the houses in the interior sell for from 1.5% to 2.1% more than the houses on Holiday Drive. This is the result after adjustment for the larger lots on Holiday Drive, for the time of the sales and, to a limited extent, for condition. Because all lots on Holiday Drive were larger than the interior house lots, such a small deviation could easily have come from the lot or time adjustment. Furthermore, it is felt that there is at least this percentage of imperfection in the single family house market.

The resale percentage increase averages slightly higher for the interior houses (.24%) than for the four houses on Holiday Drive. However, it should be pointed out that two of the four sales were eliminated because they were too high (16.77% and 14.35% annual). The houses in this entire subdivision had relatively high resale values. The frequency of sales for Holiday Drive is 10.83% per annum whereas the overall subdivision rate is 11.4%. This is over a six-year period.

Sherwood Forest Boulevard—This heavily traveled street in Baton Rouge with custom homes has a high noise level of 72 dBA, with approximately the same quantity of traffic as Holiday Drive; however, the eight models studied over a three-year period do not show any adverse influence from the noise. The noise levels on Holiday Drive in Algiers (New Orleans) approach 76 dBA because the speed limit of 35 mph is not strictly enforced as the same speed limit is on Sherwood Forest Boulevard.

The comparison of sales on Sherwood Forest Boulevard and sales of houses off the boulevard show very little difference in price per square foot. Of the eight houses studied, it appears that five houses on Sherwood Forest Boulevard sold for 6.5% more than the interior houses before adjustment for the higher price per square foot which the smaller houses should bring. Three houses on Sherwood Forest Boulevard aparently sold for 3.0% less than their interior comparables. Both of these average variances are greatly reduced by the fact that almost consistently smaller houses will sell at a relatively higher square footage price. Therefore, there appears to be no appreciable variance.

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Resale frequency is so small, both for Sherwood Forest Boulevard and the interior houses, that this is not considered a good test in this subdivision. Percentage increases are likewise considered not reliable because of the small size of the sample.

Slidell Country Club Estates—A different method of comparison was used in this super-suburban subdivision. Sales of houses which backed into I-12 were noted, and houses which sold for a similar price away from I-12 were studied. A standard of overall price per square foot was used, and it showed that the houses which backed into I-12 actually sold for an average of \$28.45 per square foot, while the average of the houses in the interior sold for \$26.64, or 6.8% less. This is about par, since some of the houses backing into I-12 were somewhat smaller than their comparables. The average resale price increase was 11.1% per annum for houses backing into I-12, while that for the interior was 9.8%, or 12% less. The frequency of resales of the houses backing into I-12 was just about the same as the average of the houses in the balance of the subdivision for the six-year period.

SUMMARY

The abundance of evidence is that the houses which back into the Interstate Highway in Willowdale Subdivision, Vineland Street and Slidell Country Club Estates neither suffer a price diminution as measured by sales comparisons and resale price increases, nor do they sell any more frequently than houses in the interior.

There is some evidence that some of the houses on the Interstate sell for less if the person taking the sample selects only those houses in this category. However, on an overall basis, those differences in prices are so small as to be inconclusive. For instance, in Willowdale Subdivision on Interstate 10, there were samples which indicated both ways, and the percentage price increases were very close. On Vineland Street, which faces a frontage road alongside I-10, the values were 2.83% lower for those facing the Interstate; however, the lots of these houses were smaller. In the quiet super-suburban community of Slidell, the houses in the Country Club Estates showed no appreciable difference as between those backing into I-12 and those in the interior. For homes on major arterial collectors, the new homes in Terrytown and those in Sherwood Forest in Baton Rouge showed no difference. Holiday Drive in Algiers (New Orleans) did show from 1.4% to 2.5% lesser value than the interior houses; however, the imperfections of the residential single family house market as well as the adjustments taken for the larger lots on Holiday Drive and the time adjustments, could account for this. If there is a true effect on market value on Holiday Drive, at least a part of this is attributed to the fact that the speed limits are not strictly enforced in this residential suburb of New Orleans.

The Appreciation and Volatility of Price in Different Classes of Housing

by Michael G. Ferri and L. Randolph McGee

This paper explores the relationships between the characteristics of housing (age, size, and so on) and changes in the price units over time. Important findings can be summarized briefly at the outset. The price of what must be called the "better unit"—the bigger, or newer, or more luxurious house—is subject to greater change in price than the smaller and less well-appointed house. Furthermore, the price of the better unit is more sensitive to general housing conditions, indicating that the less luxurious unit has greater price stability across the upturns and downturns of the economy.

The analysis was motivated by an unusual gap in the research on housing economics. This research provides abundant information about the relationship between a house's attributes and its price, but there has been little investigation on the association between price changes and characteristics. For example, it is easy to find how much an additional bath may add to the price of a house, but difficult to locate any information about whether houses with more baths might increase faster or change prices more quickly than units with fewer baths.

The research was carried out with tools borrowed from modern portfolio theory and investment analysis. This field has been preoccupied with variation in the prices and returns of financial securities and has devised a set of price change measures that can be very instructive of the cause and degree of price volatility. In fact, some of these measures have already been applied to certain problems in real estate

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economics. This paper complements those earlier efforts and demonstrates the increasing usefulness of portfolio-oriented techniques to the study of housing price movements.

A BRIEF REVIEW OF PORTFOLIO THEORY

The eventual outcome of an investment is never known with certainty. An investor can know, at best, only the list of possible rates of return on his investment and the relative likelihood (or probability) of each rate. The pairing of outcome and probability is a probability distribution, a tool which facilitates investment analysis. The expected return from the investment is given by the mean of the distribution. The project risk is represented by the dispersion of possible outcomes around the mean. Investments with widely flung possible rates of return are risky, in the sense that the investor cannot be very confident about his eventual profits. Projects with possible returns clustered near the mean are relatively safe investments because the investor has only minor uncertainty about the eventual rate.

Though several dispersion measures are available, modern portfolio theory has adopted the standard deviation of returns as its chief measure of dispersion and, hence, investment risk. This theory, associated with the works of Markowitz and Sharpe, views the standard deviation of returns as the total risk of a project. But risk has been refined by partitioning that total risk into two components. The first is unsystematic risk, caused by factors unique to the asset. The unsystematic risk of an equity share, for example, is most usually attributed to the firm's management, capital structure, or to its regulatory environment. Systematic risk is that variation in return which may be caused by factors prevading the entire economy and affecting the returns of all assets. Interest rate movements, inflation, and political events are commonly cited causes of systematic risks in equities.

The separation of total risk into systematic and unsystematic risk is accomplished by means of regression analysis. Regression is a statistical tool for determining how much one variable (the dependent variable) will change in response to a fluctuation in a second variable (the independent variable). When change in the dependent variable is a result of one independent variable, regression amounts to drawing a line through points which are pairs of values of the two variables. Such a line cannot intersect every point, because of random and unpredictable disturbances in the economy. But the line can be drawn so that it is as close as possible to all of the points. The line that minimizes the differences between itself and the various points is the "best" fit and gives an algebraic representation to the relationship between the two variables.

Portfolio analysis utilizes this technique by employing an average market return or the return on some market index as the independent variable and relating it to the return of an individual security. The return from a market index will adequately capture the influence of factors that pervade the economy and cause the prices (and returns) of all assets to vary—the definition of systematic risk. So, the relationship between this market and some security indicates the systematic risk of that security. Any remaining risk is unsystematic, due to factors peculiar to the firm and not to factors that may affect the performance of all firms.

The application of regression analysis to portfolio theory can be further explained by use of the following Equation (1):

(1)
$$R_{it} = \alpha_i + \beta_i R_{mt} + e_t$$

Here, R_i is the return (gathered for a number of periods) of asset i, R_m is the average return on a large number of assets; e is the random shock or disturbance in a time period, and the number of t's or time periods from which the data can be gathered is largely a function of the scope of the inquiry at hand. In analysis of equities, the return on the asset is defined as capital appreciation in the period and any dividend payment in that period divided by the price of the preceding period. The rate of return on the market is defined as the change in the average price of the preceding period. *Equation (2)* gives a formal definition of these rates:

(2) (a)
$$R_{it} = (P_t - P_{t-1} + D_t) / P_{t-1}$$
; and
(b) $R_{mt} = (V_t - V_{t-1} + D^*_t) / V_{t-1}$

where P is the price of the asset, D is its dividend, V is the average value of the group of stocks that make up some index, and D* is the average dividend of the stocks in the index. Standard and Poor's 500 Common Stock Index is commonly used to represent the price of the "market" for equities and the measure of the impact of systematic factors in the economy.

It should be noted that regression analysis will give estimates of the values of α and β in Equation (1). The regression intercept, α , is the average return on asset i when the market is unchanging (or when $R_{mt} = 0$). The slope coefficient is β (commonly called "beta").¹ Beta measures the fluctuation in the asset's return for a given unit of change in the market's average return. Value Line's volatility index for stocks is one practical application of the beta concept. Beta may be formally defined as the covariance between the asset's return and the market's return, divided by the variance of the market's return:

$$\beta_i = \operatorname{Cov}(R_i, R_m) / \sigma R_m^2$$

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Equation (1) is called the capital market line or the market model and is graphically represented by *Exhibit 1*.

EXHIBIT 1

THE MARKET MODEL FOR A HYPOTHETICAL SECURITY



The x's are pairs of R_i and R_m. β is 0.55; α is 0.2.

Beta is an index of the sensitivity of an asset's return to movement in the returns of the entire set of assets to which it is similar and with which it forms a "market." Thus, beta coefficients make possible an ordinal ranking of assets on their systematic risk. Assets with high betas (greater than 1.0) are very sensitive to and actually more volatile than the average asset or the market itself. For example, an asset with a beta of 1.3 will have a change in returns that exceeds that of the market by 30 percent when the market's general value is rising and that fall 30 percent more than the market's overall average when the market is in decline. Assets with betas in the neighborhood of 1.0 have patterns of return that are similar to the market's general movements.

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An asset with a beta of less than 1.0 will be less volatile than the market. That asset will rise less than the market does and fall less than the market does. This asset's systematic risk is said to be relatively low. Betas may be estimated for any interval—week, month, quarter, and so on—for which the necessary data is available. The required data consists simply of returns on the asset and returns on a representative market average.

Portfolio theory supplies two measures of risk—beta and standard deviation—for the analysis of risk and return on housing investments. Standard deviation represents the total variability in the return, and beta gives an ordinal ranking of the assets on their responsiveness to changes in general market conditions. In a later section of this paper, these measures of risk, and a measure of rate of return, will be estimated for different types of housing.

THE MARKET MODEL AND HOUSING

According to some analysts, certain features of housing and real estate argue against the use of the market model. The multitude of localized real estate markets is said to make identifying the "relevant" market, for the application of portfolio analysis, a difficult task. The possibility that local markets are segmented according to the income of buyers and/or the location of individual properties may make identifying the proper market even more difficult. Another troublesome feature of the real estate market is the infrequency of sale of any one unit and the resulting discontinuous price history of particular houses. An additional pitfall may be the long planning horizon of participants in the market who view their purchases as capital assets and not as liquid investments. Finally, the use of the market model requires a great deal of data; real estate data from any specific local market might be insufficient.

The search for the relevant market should be resolved by the following consideration: the appropriate market for evaluating an asset's systematic risk is the largest market in which it and similar assets are traded. Market model studies of equities employ an index of the average price for the nationally unified market for stock, and similar studies of bonds use indexes of the price level in the national market for bonds. The national stock and bond markets are considered relevant in these studies precisely because the price of a stock or bond is unaffected (save for local taxes, perhaps, or minor frictions of transactions costs) by the location of the asset or the participants. Indeed, there is a unified market for bonds and for stocks. But houses are not liquid financial assets. The price of a house is obviously and directly influenced by its locale or region. The appropriate market index would be that index that reflects the average price level of housing in the relevant region or locale. It should be noted that hedonic studies² of the value of individual attributes of housing are confined (generally) to local markets: cities, counties, or metropolitan

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areas. It seems acceptable that studies of the relative price fluctuations and increases of houses with different characteristics should have a similar focus.

Possible segmentation of the local markets along lines of the income of buyers or the location of the units should also be considered in light of the highly successful hedonic studies. Restricted to particular local markets, these studies clearly assume the existence of local arbitragers who drive the marginal prices of attributes to some appropriate level. Another way of stating this crucial assumption is to posit such a variation and richness of incomes and preferences (and other features of assets and participants) that the real estate market becomes continuous for the important characteristics of housing. In either case, the hedonic approach relies on the assumption that the lines of segmentation are not pronounced, or at least not enough to fragment the local market. Thus, it seems proper to conclude that an analysis of the price volatility of housing of different kinds (and attributes) should be based on the same conclusion: that the local market is sufficiently unified to provide unbiased estimates of the price of attributes and of the relative price changes of housing with different attributes.

The frequency with which individual housing units are traded is another concern. Unlike many financial assets, most houses are traded infrequently. The market model cannot be applied to the price history of specific housing units with any ease because that history is not likely to be rich enough in recorded prices. The model can be extended to broadly defined classes of housing, in terms of age or size of a unit for example. A continuous price history can be created for such classes, which could be based on the average price of the particular units in each class that do change hands in a period and across a number of periods. In other words, one can develop the measures of total and systematic risk only for certain types of housing, but not for individual units. One may be able to show, for example, that houses between six and ten years old have greater total and systematic risk than younger houses, but unfortunately it would be close to impossible to estimate the risks of some given seven-yearold unit as opposed to the market risks of a certain three-year-old house.

Extending the market model to housing requires an index of the price of all housing, representing the value of the "market" for housing. On this basis it is possible to define the return, in each period, to housing in general and to specific classifications of housing. It is also possible to define the average return, across a number of periods, for housing and each type of unit. Finally, it is possible to estimate both the total and the systematic deviations in returns (through the use of the market model) for each type of housing.

Long planning horizon of many participants in the real estate market is another problem. However, numerous markets share this characteristic also, and many buyers of bonds, stocks, and other assets anticipate a long holding period. But each of these markets eventually becomes continuous, both in terms of supply and demand, precisely and especially because few participants have the *same* plans. The multitude of preferences regarding time creates trading in which one can find few sharp cleavages and in which continuity is the rule. Another feature of all markets is the existence of arbitragers who can alter any anticipated holding period for obvious gains from special transactions. There are many brokers, Realtors, and financial institutions who fit this description and who would supply needed continuity in demand and supply of housing in the rare event that the greatly varied horizons of the multitude of participants do not provide a continuous market.

DATA AND INDEXES OF HOUSING PRICES

The data for this project consist of 2,746 observations on the sale of single-family, detached, residential units in Lexington (Fayette County), Kentucky, over the interval from January 1971 to December 1975. The data have been previously employed in a study of hedonic prices and hedonic indexes.³ Each observation in this set contains information on several important characteristics of the basic housing unit. Of particular importance in the following tests are: 1) age in years, 2) the presence or absence of central air conditioning unit, 3) residential space in square footage, 4) the size of the lot in square footage, 5) the presence or absence of a garage, 6) the number of baths, in terms of half-baths (1.0, 1.5, etc.), 7) sale price in dollars, and 8) the time of sale in months (and quarters) and years. The data were gathered from the Multiple Listing Service of the Board of Realtors of Lexington, and represent a very large sample of the recorded sales in this period of time.

From this data, 24 quarterly-price indexes were created which cover the period from 1971-I to 1975-IV. The value of any index in a quarter is the mean sale price of the group of houses of a particular type sold in the quarter. One index is the average price of all units sold; this grand mean functions as the index of the value of the market for housing. Five indexes were created on the basis of the age of the house. There are price indexes for housing that is less than or equal to five years old, housing aged between six and ten years, and so on. Two price indexes were created on the basis of the presence of a central air conditioning unit; one index plots the average price of houses that have such a unit and the other index pertains to the price of houses without this amenity. Two indexes pertain to the presence of a garage. Three pairs of average prices were created on the basis of the size of a house or its residential space. In each pair, houses were assigned to one or the other of the indexes on the basis of whether they have more or less than 1200 square feet, 1350 square feet, and 1500 square feet, respectively. Two pairs of averages were based on the number of baths: for the first pair, the dividing line was 1.5 baths; for the second, the

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distinction was whether the house had more than two full baths. Finally, two pairs of indexes were created according to whether the size of the lot exceeds 10,000 square feet and 12,000 square feet. It was not possible to create additional, clearly-defined classes of housing because of insufficient data. As it is, the samples on which these various indexes were built overlap one another since one unit's price might be included in five or ten or more of the indexes. This poses no problem, however, because comparisons of risk and return will be made only within the mutually exclusive categories determined by the individual characteristics. The aim is to find the amount of risk inherent in individual characteristics.

Each index is used to create a quarterly rate of return. The formula for this rate of return is given by

(3)
$$R_t = (P_t - P_{t-1}) / P_{t-1}$$

where P is the average price, or indexed value, and the subscript denotes the present or the previous period. This index ignores any periodic payments, whether they are outflows in the form of maintenance or taxes, or inflows in the form of tax savings. Such payments may differ, of course, according to the age, appointments, or size of the house, but are difficult to measure in any consistent manner. Further, several studies of the market model reveal that price changes (capital gains) are the driving force in the rate of return and represent the bulk of systematic variations in returns.

A rate of return was computed for the entire market, labeled H_m . A similar rate was constructed for each of the other indexes which deal with the houses of a particular type. The rates will be labeled H_i —there are 23 of them. For the five years (1971 to 1975), 19 quarterly rates of return were compiled for each index. These observations were used to estimate the linear relationships of the market model:

(4) $H_{it} = \alpha + \beta_i H_{mt}$, t = 1971-1 to 1975-IV

These observed rates of return were also used to compute the standard deviation and the mean quarterly return for each index. These statistics are reported in *Exhibit 2*, along with the size of the sample in each category and, the R^2 for the regression. The size of samples in the types of housing preclude domination by any one category of the entire market. Further, no alpha was reported because no estimate was significantly different from zero.

RISK AND RETURN FROM TYPES OF HOUSING

The statistics reported in Exhibit 2 should be interpreted in the following manner. Houses that are less than five years old, for

EXHIBIT 2

RISK AND RETURN ON TYPES OF HOUSING: 1971-II to 1975-IV; LEXINGTON, KENTUCKY (1)

Type of House	Sample Size	Risk			Regression Statistics (3)
		Systematic (2) (Estimated Beta)	Total (%) Standard Deviation of Returns	Mean Return (%)	Explanatory Power — R ²
AGE, IN YEARS					
5 or less 6-1()	819 716	.75 (.22)* 1.33 (.24)*	8.9 12.6	$2.1 \\ 3.2$.414 .653
11-15 16-20 21 and more	$\frac{500}{322}$	1.45 (.25)* 03 (.45) 04 (.45)	$13.7 \\ 14.2 \\ 14.3$	$2.9 \\ 4.2 \\ 3.1$.660 .000 .000
CENTRAL AIR					
Yes No	$1,415 \\ 831$	1.03 (.26)* .73 (.17)*	11.3 7.7	$1.7 \\ 1.8$.485 .522
RESIDENTIAL SPACE, IN SQUARE FEET					
- 1200 - 1200 - 1350	1,237 1,509 1,497	.34 (.27) .82 (.11)* .39 (.24)	8.7 7.2 8.1	$ \begin{array}{r} 1.9 \\ 2.3 \\ 2.1 \end{array} $.088 .751 135
- 1350 - 1500 - 1500	1,249 1,814 932	$\begin{array}{c} 1.01 \ (.14)^{*} \\ .33 \ (.23) \\ 1.00 \ (.16)^{*} \end{array}$	8.9 7.6 9.1	2.5 2.1 2.5	.767 .110 .711
LOT SIZE, IN SQUARE FEET					
- 10,000 - 10,000 - 12,000 - 12,000	1,413 1,333 1,895 851	.84 (.21)* .49 (.13)* .92 (.09)* .43 (.22)*	9.1 5.6 7.6 7.7	2.8 2.6 2.5 2.6	.491 .448 .858 176
GARAGE				- ,,,	
Yes No	$1,665 \\ 1,081$	1.37 (.10)* .13 (.34)	$ \begin{array}{c} 10.9 \\ 10.7 \end{array} $	$3.1 \\ 2.3$.918 .008
BATHS					
-1.5 -1.5 -2.0 +2.0	$932 \\ 1,814 \\ 335 \\ 2,411$.79 (.22)* .25 (.17) .96 (.25)* .43 (.09)*	$9.4 \\ 5.8 \\ 10.8 \\ 4.3$	2.2 2.4 2.7 2.4	.412 .109 .462 .882
AVERAGE FOR ENTIRE MARKET	2,746	1.00	7.6	2.4	_

(1) No alpha estimate was statistically significant.

(2) Numbers in parentheses give standard error of estimate;

* denotes significant statistical relationship at 5% level of confidence.

(3) Additional information about the statistical results (such as the Durbin-Watson statistics) can be obtained directly from the authors.

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example, have a beta of .75, indicating that a 1.0 percent rise in the average price of housing leads to an increase of 75 basis points in the average price of relatively new units. Houses with garages have a mean quarterly return of 3.1 percent. Houses with central air units have a total risk (standard deviation) of 11.3 percent per quarter.

The results of *Exhibit 2* appear to suggest that houses with what should be considered attractive features have greater systematic risk than houses without those characteristics. For example, younger houses (those aged less than 15 years) have greater betas than the older units. The younger units have betas that range between .75 and 1.45; the older houses have betas quite close to zero. Houses equipped with central air conditioning units are riskier, in the systematic sense, than houses without those facilities. The beta of the first group is 1.03, and the beta of the second is only .73. The association between higher systematic risk and attractiveness of the unit asserts itself under each definition of size of the house and with regard to the size of the lot. And it should be noted that houses with more baths have larger betas (.79) for houses with more than one and one-half baths and .96 for units with more than two baths) than houses with fewer such facilities (.25 and .43, respectively). Houses with garages have greater systematic return risk (beta is 1.37) than houses without garages (beta of .13). The one ambiguity arises in the case of age, where very young houses (those less than five years old) are less risky (their beta is .75) than units whose age ranges from six to sixteen years (beta of these units is at least 1.33). A possible explanation for the higher betas of the moderately aged units is that there is an optimal age for houses, an age where seasoning, maturity, and vintage (the time and technique of construction) compensate for the greater depreciation of the older unit. If this explanation is plausible, then it can be concluded that the systematic risk of housing appears to grow with the addition of desirable characteristics and attributes: larger size, more facilities, and so on. The price movements of the better houses, in short, are more responsive to changes in the returns on the entire market, and the price changes of the less attractive houses are insulated to some extent from market conditions. For selected types of housing, these relationships are graphed in *Exhibit 3*.

Total risk, represented by the standard deviation of returns, is also presented in *Exhibit 2*. In some cases—most notably those associated with air conditioning, the presence of a garage, the number of baths, and size of lot—total risk follows the pattern already observed in the relationships of systematic risk, that is, total risk is greater among the more attractive units. For example, the standard deviation of returns in housing with central air is 11.3 percent, while the total risk of unit without central air is 7.7 percent. In two of the three cases associated with residential space (according to whether or not the unit has more than 1350 or more than 1500 square feet), the same pattern is evident. However, in the case of age and of the remaining comparison by residential space, total risk is larger for what would be the less-

EXHIBIT 3

CAPITAL MARKET LINES FOR SEVERAL TYPES OF HOUSING: 1971-II to 1975-IV



- 1. Houses aged between 11 and 15 years: $H_i = 1.45 H_{mt}$
- 2. Houses aged less than 6 years: H_i = .75 H_{mt}
- 3. Houses with air conditioning: H_i = 1.03 H_{mt}
- 4. Houses without central air: $H_i = .73 H_{mt}$
- 5. Houses larger than 1200 square feet: $H_i = .92 \ H_{mt}$
- 6. Houses of less than 1200 square feet: $\rm H_{i}$ = .43 $\rm H_{mt}$

Note: No estimate produced a significant intercept (α) .

attractive unit. The standard deviation of returns for housing that is smaller than 1200 square feet is 8.7 percent, while the standard deviation in returns for larger housing is 7.2 percent. Also, the standard deviation in returns rises with the age of a house and reaches its highest point with the oldest units, those whose age exceeds 20 years. Though the evidence is not entirely consistent, it does seem to point to a positive association between total return variation and the attributes of size and luxury that make a house attractive.

Exhibit 2 also contains data on the mean returns to classes of housing. Portfolio theory suggests that mean returns should be positively related to systematic risk, or possibly to total risk. But the pattern of

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returns does not seem to follow that of systematic variation or of total variation. Houses with central air units, for example, have lower mean returns (1.7 percent per quarter) than houses without such facilities (whose mean return is 1.8 percent), even though the latter type has lower systematic and less total risk than the former. By contrast larger houses, which are riskier in the systematic sense, have greater returns (2.4 percent on average) than do the smaller units which have mean returns near 2.1 percent. Wooden houses, which are less risky in both senses, post lower returns than other types of housing. In general, though all returns to all classes of housing are high these statistics do not present evidence to suggest what causes the difference in returns among the various kinds of units.

CONCLUSIONS AND IMPLICATIONS

Some tools of modern portfolio analysis have been applied to the price appreciation and the price volatility of housing. According to the study, the house which must be called the more attractive (i.e., the unit with greater size, more facilities, and so on) has more potential for price increases and for price fluctuations than the less well-appointed and smaller house. The greater price variability is of the marketrelated or systematic type. The result is readily explainable in terms of the shelter value of the units. The bigger and better equipped units provide shelter, as do the more modest houses; but the better units also provide an increment of luxury that the less well-appointed houses do not supply. The value of this additional luxury is more dependent upon market conditions—the level of income and the basic rate of interest-than is the value of shelter alone. Therefore, the more luxury a unit offers, the more sensitive it is to market forces. The percentage price changes in the less well-equipped units are smaller, relative to the market's movements, because the value of shelter (which constitutes a greater part of their overall value) is less susceptible to these market fluctuations.

The results strongly suggest that the better housing units are likely to increase in price during an upswing in the market faster than the average of all houses and than the units of lesser quality. During a period of decline in housing prices, however, the lower quality houses can be expected to experience relatively less decrease in price than either housing in general or the better kind of house. Thus, the less well equipped and smaller units offer some safety of principal.

More than just the marginal value of selected attributes of housing at some point in time can be learned. The potential price increase (or decrease) and the possible market-related price fluctuations of different classes of housing, where classes are based on the amount of certain quantifiable attributes (such as age, size, etc.) or on the presence and absence of certain qualitative characteristics (such as central air units, garages, and so on), can be tracked. The tools and
analytical reach of real estate economics (and finance) can be enhanced, it appears, by recognition of this new and until now neglected capability.

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1. Risk may be partitioned in the following way:

a) Var(Ri) the total risk of the ith asset;

b) = $Var(\alpha_i + \beta_j R_m + e);$

e) $Var(\beta_i R_m) + Var(e)$, since the $Var(\alpha) = 0$;

d) $\beta_i^2 \times \text{Var}(\mathbf{R}_m) + \text{Var}(e)$, since β_i is a constant; and

e) = systematic risk + unsystematic risk

- 2. A complete description of the data and its sources, as well as of the price effect of each characteristic, is available in Ferri.
- 3. Hedonic studies are efforts to statistically determine the implied price of selected characteristics of housing. The price of a house is, in fact, the total of all prices paid for all aspects of the unit: its size, its amenities, its age, and so on. Hedonic studies relate the total price to the amount of each of the major characteristics in the unit and derive the price which the buyer has paid for each of those attributes. Ferri and Kain and Quigley offer examples of this kind of analysis of real estate values.

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The Graduated Payment Loan: Implications for Mortgage Lenders

by James E. McNulty

In the past few years there has been a virtual flood of new information and innovation in the field of alternative mortgage instruments (AMIs). One of the most interesting ideas is the graduated payment mortgage (GPM) which allows home buyers to make much lower monthly payments in the early years of the loan. This article draws on the extensive body of recent research and experience to bring out the practical questions lenders might wish to be aware of if they were to attempt to implement and market their own GPM program.

Three developments are particularly noteworthy in this regard. The first is the publication of the Federal Home Loan Bank Board's Alternative Mortgage Instruments Research Study (AMIRS).¹ This comprehensive three-volume report contains 22 research papers dealing with many aspects of alternative mortgages. The second development, also described in the AMIRS report, is the incorporation of a graduated payment plan into the FHA mortgage program. This program has exhibited rapid growth after only two years of operation. The latest development is a set of regulations allowing federally chartered savings and loan associations to write GPMs.

The term GPM can apply to any mortgage in which the initial monthly payments are set at a level below that necessary to pay off the loan (i.e. below the payments on a standard level-payment loan). Payments then increase over time at a predetermined rate, eventually rising above what they would be on the level-payment loan. In most cases the payments eventually stabilize at a level modestly above the payment on the standard mortgage. *Figure 1* illustrates this by presenting typical monthly payments on two GPM plans actually authorized and currently being offered under the FHA's GPM pro-

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MONTHLY PAYMENTS ON A 9½%, \$40,000 MORTGAGE WITH A 30 YEAR TERM STANDARD LEVEL PAYMENT MORTGAGE AND SELECTED FHA GRADUATED PAYMENT PLANS



YEARS

Source, Adapted from AMIRS, Chapter V.

gram, known within HUD as their Section 245 program. This plan began operating in 1976 on an experimental basis, but it is now a regular FHA loan program.

The solid line in *Figure 1* shows the monthly payment on a standard level-payment FHA loan of \$40,000 with a 30 year term and an interest rate of $9\frac{1}{2}$ %. This payment of \$336 (excluding the additional $\frac{1}{2}$ percentage point insurance premium) is, of course, fixed for the life of the loan. Under FHA's GPM Plan III, monthly payments begin at \$255, which is a full 24% below the payments on the standard mortgage; payments then increase at a rate of $7\frac{1}{2}$ % per year and stabilize at \$366 after five years. Payments are level during the year,

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with the increase going into effect each year on the anniversary date of the mortgage. The dotted line on the chart shows an alternative GPM plan known as Plan V in the FHA program, in which payments increase at 3% per year for 10 years. According to Chester Foster, who helped develop the HUD GPM program, the 7½% annual increase represents "the best estimate of a tolerable payment burden consistent with anticipated increases in income that the majority of families in the target population could reasonably expect to afford" (AMIRS, chapter V, p. 5). Plans with 2½%, 3% and 5% rates of graduation were then added to broaden consumer choice. Incidentally, while the higher payments in the latter years of the mortgage might appear to be a deterrent to potential borrowers, Foster points out that these payments are about the same as what they would be on a 25-year mortgage.

"NEGATIVE AMORTIZATION"

At 91/2% interest it would take about \$317 per month ($[.095 \times $40,000]$ 12) just to pay interest on the loan. Since both GPM plans shown here have initial payments below \$317, both involve what is known as "negative amortization," a process whereby this unpaid interest is added to the loan amount, resulting in an increase in the loan balance in the early years of the mortgage. In both the GPM plans shown in Figure 1, the loan amount eventually increases from \$40,000 to about \$42,000 before beginning to decline. This feature makes the GPM somewhat riskier for the lender than the standard mortgage. HUD first dealt with this problem by requiring considerably higher down payments, but these requirements have been liberalized; negative amortization is now permitted up to 97% of the original appraised value. Down payments under the GPM are still somewhat greater than under the standard FHA mortgage, but experience has indicated that there are many borrowers quite willing to come up with the extra down payment in order to take advantage of the lower required payments in the earlier years of the loan.

The Federal Home Loan Bank Board (FHLB) issued regulations in December, 1978 which authorized a number of AMIs, including the GPM. According to the regulations, S&Ls would be permitted to utilize a variety of payment plans including the 7.5% five-year and the 3% tenyear plans shown, as well as a number of intermediate schedules. FHLB also specified that any borrower, offered an alternative instrument, must also be offered a standard mortgage and be shown a written side-by-side comparison of rates, terms and payment schedules under the AMI and the standard mortgage. Borrowers must be clearly informed of their right to choose a standard mortgage at a later date should they be eligible for such a loan under the organization's normal underwriting standards.

A few S&Ls and commercial banks are currently offering GPMs under the FHA program and, according to a 1977 survey, at least three statechartered associations have developed or are experimenting with their own conventional GPM plans (AMIRS, chapter II, p.3). The FHA plan, primarily offered through mortgage bankers, got off to a slow start for a number of legal and technical reasons. Only about 800 firm commitments were issued in all of 1977. However, volume increased rapidly in 1978 with about 38,000 firm commitments issued during the first eight months of the year, which appears to signify quite an impressive level of demand at this stage in the history of the program. Based on a small sample of 1977 applications, Foster reports that over 60% of the GPM borrowers were choosing Plan III—the plan with the $7\frac{1}{2}\%$ rate of graduation. (A later report showed over 70% of the borrowers choosing Plan III.) This is not surprising since the approximate 24% difference between the initial payments under Plan III and payments under the standard mortgage could mean as much as \$100 or more per month in the first year of the mortgage. The next most popular plan (chosen by about 20% of the sample households) was Plan II, with a 5% rate of graduation for five years. Interestingly, the plans which increase payment for 10 years have had very little use, despite the built-in low increments.

WHO BORROWS UNDER GPMs?

Other characteristics of GPM borrowers are also noteworthy. Based on this same sample, it was determined that three out of four users of the plan were first-time homebuyers, that GPM-users were slightly younger than borrowers under the standard FHA mortgage, that their average incomes were about 15% lower (\$15,556 vs. \$18,312). Despite their lower incomes, GPM borrowers came up with a larger down payment (9.5% vs. 7%) and took out a larger mortgage (\$31,445 vs. \$28,170) than borrowers under the standard plan. A later tabulation of the complete results for 1977 confirms these sample-based results.²

A comprehensive survey of consumer attitudes and preferences concerning AMIs was done by researchers at the MIT-Harvard Joint Center for Urban Studies as part of the AMIRS project (AMIRS, chapter III). Three separate but interrelated surveys were conducted—a telephone survey to provide an overview of consumer attitudes, a more comprehensive mail survey based on a sample of responses to the telephone survey, and a set of intensive panel discussions with selected groups of individuals. Several specific findings may be of interest to managers of member associations as they consider developing and marketing GPMs. When first faced with the GPM concept in the telephone survey, 63% indicated their skepticism or lack of interest by stating a specific preference for the standard mortgage; 25% expressed a favorable response (i.e. a choice of the GPM over the

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standard mortgage) and 12% were indifferent. The results of the mail survey were slightly better with 43% of the respondents rating the GPM as their first choice and 57% choosing the standard mortgage. In the mail survey, the respondents were also asked if they would be "very" concerned, "somewhat" concerned or "not at all" concerned about certain potential problems with the GPM, such as the possibility that their income would not keep pace with the required payments, the fact that the total payment will be larger over the life of the loan, and the negative amortization feature. Generally, about half of the respondents answered "very concerned" to each of these questions, and only about one respondent in eight answered "not at all concerned." These results confirm what one might have expected: while there is definite interest in the concept, GPMs are clearly not for everyone. The standard mortgage will still have an important role to play in the homebuying process.

Interest in the GPM was expressed most frequently by younger households, who also expressed the least concern about its negative features. The figures below show the percentages in various age classes who expressed a preference for the GPM over the standard mortgage:³

All Households	25%
Under 35	30%
35-54	19%
Over 55	16%

The percentage choosing the GPM was as high as 45% for young (under 35) renters who could not afford to buy at the time of the survey. On the crucial question as to whether they would be concerned about their income keeping pace with the payments, only 30% to 35% of young households answered "very concerned," as compared to 51% for all households and even higher percentages among certain groups.

INTEREST EXPRESSED BY LOW-INCOME HOUSEHOLDS

Low and moderate income households appear to be a group toward which an association could direct its GPM marketing efforts: there was clearly interest in the concept among some of the low and moderate income individuals who responded to the survey. Nonetheless, in answering the income growth question, 73% to 83% of these respondents indicated that they would be "very concerned" about this aspect of the GPM. Respondents were also asked about their attitudes toward homeownership. Of all groups surveyed, lower income households attached the greatest value to the fact that homeownership stabilizes housing costs over time. Considering these results together, it would appear that many of these households may be more comfortable with the standard mortgage. However, a small but significant number of low and moderate income households in the survey did like the GPM concept, so it is possible that a properly designed GPM could still be of some significant benefit to this segment of the population.

There was some interest in GPMs among middle-aged, upper middle income households, but this was again limited somewhat by economic considerations. In the mail survey about two-thirds of this category chose the standard mortgage (compared with 57% for the entire sample). Furthermore, about 41% answered "very concerned" in regard to the income growth question, which was well above that shown by the younger households (although still below the sample average). The Harvard-MIT researchers suggest that, on balance, middle-aged, upper middle income households appear to prefer a declining ratio of mortgage payments to income over time in order to provide for other claims on their budgets. It appears that GPMs could be successfully marketed to this segment of the population, although they would not constitute the primary market for such loans.

Concluding the demographic analysis, the researchers found a very strong preference for the standard mortgage among older households, and less interest in the GPM here than in almost any group in the population.

CONCLUSION

In general, the results indicate that lenders who offer the GPM will almost certainly find their primary market among younger households with good income expectations, with some additional demand coming from middle-aged, upper middle income households and low and moderate income households. Since the GPM concept is somewhat new to many people, it is encouraging to note that the Harvard-MIT researchers found that interest in the concept increased with exposure. Clearly, lenders who want to offer GPMs, and are willing to do the educational and counselling work necessary to market them, could experience significant demand for this type of loan. In other words, while a potential demand exists for these loans, lenders will have to uncover it through various promotional and educational efforts. Based on the FHA experience, the GPM plan with the lowest initial payments and resultant high rates of graduation is in greatest demand. This is also the most risky of the GPM plans, since it produces the greatest negative amortization and would normally require greater increases in future income for the borrower; as lenders attempt to determine what type of GPM to offer, they will probably want to keep this point in mind. Each lending institution will need to do its own analysis of potential risks and returns as it determines whether to stick with the standard mortgage, to utilize the FHA plan, or to develop its own conventional GPM program.

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Measurement of the Effectiveness of Use-Value Taxation

by Jerry T. Ferguson

This article has two objectives: to establish a methodology to gauge the effectiveness of use-value taxation as a way of preserving farmland and other low density uses, and to apply the methodology to a study area as an illustration.

The study of the four Virginia localities that implemented the program in 1972 (Fauquier, Loudoun, Prince William, and Virginia Beach), and thus have had time to show some results, examines the relationship of preferential assessment and farm conversion. Using land-use statistics from the last agricultural census completed in 1976, the research utilizes time series analysis to show that *no significant departure* from the past trend has occurred in any of the four localities under study. This statement is based on significance levels of 0.05 and smaller. These results occur despite the fact that economic conditions were generally more favorable for farmers than in the 1950s and 1960s. The paper establishes some of these conditions.

A second type of statistical analysis, a paired-difference test, *does* show that the conversion rate over the last agricultural census period for the four study localities is significantly smaller than for their immediate neighbors without use-value taxation. This test result is valid for a level of significance of 0.01 (99% confidence). Although this test is weaker because it does not establish the relationship of preferential assessment to a conversion rate in the individual counties, it does provide an indication that the four counties have fared

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better as a group since instituting the program than have their neighboring local governments.

The research concludes that additional measures, such as the transfer or lease of development rights, are needed to reach the stated goals of the General Assembly of Virginia of preserving prime farmland and promoting a more orderly development.

By the end of 1978, over four-fifths of the states in the U.S. and several provinces of Canada had some form of preferential property tax treatment of farmland. Many also accord similar treatment to commercial forests and certain other uses of land, such as golf courses and parcels with scenic public easements. The preferential approach takes varied forms, such as using a lower fraction of market value (Tennessee) or allowing a credit against state income taxes if the amount of the property tax exceeds a certain percentage of farm income (Michigan). The most common technique, however, is the use of a different evaluation method for farmland than for other properties; this method is called land-use or use-value taxation.

The justification for preferential assessment is that the influence of developmental potential drives up value of the land and the property tax on it. Eventually, the tax increase becomes so great that farm income is reduced to the point that the land will be sold. The use-value approach ignores the developmental potential by capitalizing the actual farm income (or some average income for acreage in the county or state) into an assessed value for tax purposes.

To be given such special treatment, the owner must usually register with local tax officials and agree to have the land remain as a farm for a specified period. Most often, he must pay back some or all of the tax savings with interest when the land is converted to other uses.

The program supposedly benefits all citizens of the state in several ways: with a *retained* "green space" or breathing room around urban areas; a more orderly or slower developmental rate in the county; and even a cheaper or more plentiful food supply. The last advantage is related to the fact that over 60% of all vegetables in the United States are grown within SMSAs (Standard Metropolitan Statistical Area) on relatively small farms near the urban market.¹

Therefore, if land-use taxation is to be justified on a basis other than tax relief, it must influence landowner decisions concerning the conversion of farms and forests to housing developments and other urban uses. The problem is finding a method to evaluate the effect of preferential assessment and to show quantitative evidence of its accomplishments. This study establishes the secular trend of farmland conversion in four Virginia counties prior to their adopting usevalue assessments. By projecting this trend to a year when the agricultural census is taken, a quantitative comparison is possible between the conversion rate based on past data and the actual rate for the period. Any significant difference between the rates, applicable to the period over which differential assessment has been implemented, is assumed to be evidence of a definite and positive influence of preferential assessment. If the actual rate falls within the confidence limits established for the trend, however, the supposition is that no significant relationship exists between the conversion rate and landuse taxation. In addition, the losses in farmland from the four counties are compared with losses in neighboring counties without programs for any substantial difference. The results of the two tests form the basis of a conclusion about the land-use control capability of use-value taxation.

Prior to this quantitative analysis, consideration is given to the techniques and outcomes of several other studies concerning the effectiveness of use-value taxation and to the computation of descriptive statistics of use transformation in Virginia.

OTHER APPROACHES TO EVALUATION

Two reports have attempted to demonstrate the influence of preferential assessment on land use by the responses of landowners enrolled in the program. Koch, Morrill, and Hausamann interviewed 311 participating New Jersey farm owners and found that 40% felt that the plan has enabled them to continue farming, including 44 farmers who turned down offers of sale despite believing a fair price was offered.² The questionnaire approach was employed also by Barron and Thompson in the state of Washington, but with fewer favorable responses—only 19% of over 1,000 believing that the program there has enabled them to maintain agricultural or forestry use or has influenced their decisions to sell land or convert its use.³

Sowens and Thirsk established a model to explain the development pattern of land.⁴ The independent variables are quantitatively measurable characteristics of land chosen for development. When the property taxation variable is tested for significance greater than zero, it is shown to contribute nothing to the explanation. They conclude that property tax is only a minor consideration in development decisions.

The main problem with the reports based on participant questionnaires is transforming the responses into the effect on low density land use. The 40% of New Jersey landowners that reported they would have sold might have found the market price of another farm or residential home unattractive. Furthermore, they might have sold to other farmers. Yet, it is dangerous to conclude that the only 19% favorable response in Washington means no effect on land-use patterns. The farmland or forestland held by the 190 or so owners that was not sold might have significantly affected the conversion rate in the test areas.

The regression model approaches the problem of evaluation from the viewpoint of the urban developer. While the property tax may be a

negligible influence on the decision to buy, it may be an important factor in the decision to sell. Compared to development costs and profit potential, the tax is relatively small; compared to farm income, it is often large—an average of 17.3% of average money income for farmers.⁵

The contention is that the most reliable indication of the land-use influence of differential assessment is the amount of change in farm and forestry acreage converted to other uses, not the opinions of present landowners.

LAND CONVERSION RATES

There are several rates of change that may reflect the extent of land conversion. For example, *Table 1* shows the overall annual percentage change for a 50-year period in the four study areas. The difference in acreage is expressed in terms of 1920 as the base year.

However, the time series data are expressed as percentages of the total acreage of each country. Any change from year to year is relative to this total acreage as reported for 1920 when the Agricultural Census began. The result of this approach is shown in *Table 2*.

Various statistics illustrate that the decrease in farmland has been increasing since the 1950s. This situation is characteristic of much of the United States, the Middle-Atlantic states especially. The time series matched to such data must show a nonlinear trend line, suggestive of a parabolic relationship.

TABLE 1

CHANGES IN FARM ACREAGE FOR SELECTED VIRGINIA COUNTIES, 1920-1970

	Farm A	ereage		
County	1920	1970	Total Percentage Change	Average Annual Percentage Change
Fauquier	379,779	252,086	- 61.42	- 1.23
Loudoun	305,906	216,574	- 29.20	- 0.58
Prince William	162,245	53,594	- 66.97	- 1 34
Virginia Beach	94,544	52,486	- 44.49	- 0.89

Source: Virginia Cooperative Crop Reporting Service, County Farm Statistics (Richmond: Statistical Reporting Service, July 1973).

TIME SERIES ANALYSIS

Table 2 shows the farm statistics used for the regression analysis. For a time series, the year is the independent variable; the farm acreage percentage is the dependent variable.

Of the relatively simple equations involving just one independent

TABLE 2

FARM ACREAGE IN SELECTED VIRGINIA COUNTIES EXPRESSED AS PERCENTAGE OF TOTAL ACREAGE FOR THE YEARS 1920-1970

	Fauqu	ier	Loude	iun	Prince W	/illiam	Virginia	Beach
Year	Acreage Thousands	Sagea	Acreage Thousands	Tagea	Acreage Thousands	agea	Acreage Thousands	"age ⁰
1920	379.8	89.9	305.9	92.5	162.2	73.1	94.5	57.0
1925	333.1	78.9	281.7	85.2	136.9	61.7	104.5	63.0
1930	344.9	81.7	283.5	85.7	125.4	56.5	90.1	54.3
1935	372.6	88.2	297.6	89.9	150.5	67.8	91.6	55.3
1940	358.2	84.8	279.2	84.4	124.3	56.0	87.6	52.9
1945	353.4	83.7	305.1	92.2	130.2	58.6	.93.1	56.2
1950	315.6	74.7	290.3	87.7	108.6	55.7	92.4	55.7
1955	309.0	73.2	277.2	83.4	98.2	47.4	78.5	47.4
1960	324.7	76.9	252.7	76.4	89.3	36.4	60.4	36.4
1965	292.8	69.3	234.2	70.8	69.0	38.0	63.0	38,0
1970	252.1	59.7	216.6	65.4	62.6	31.7	52,5	31,2

^aPercentages are calculated from unrounded figures.

Source: Derived from data of Virginia Cooperative Crop Reporting Service, County Farm Statistics (Richmond: Statistical Reporting Service, July 1973).

variable, the parabola provides better fit to the change in the percentages than does the arithmetic straight line or logarithmic straight line. The standard error of estimate is lower; the coefficient of determination, higher. Furthermore, the percentages have no extreme values that can unduly influence the parabola. The second purported disadvantage of this curve—that it can become unreasonably steep if projected far in the future—is not relevant to its use in this analysis because the intended projection is but one future period.⁶

The four equations that result from the regression analysis and other pertinent statistical measures are shown in *Table 3*.

TABLE 3

REGRESSION EQUATIONS AND STATISTICAL MEASURES FOR PERCENTAGE CHANGES OF FARM ACREAGE IN SELECTED VIRGINIA COUNTIES, 1920-1970

County	Regression Equation (Percentages)	Standard Error of the Estimate (Percentage Points)	Coefficient of Determination (Percentage)	Durbin- Watson Statistic
Fauquier	84.70 ± 0.88 (X) $- 0.31$ (X ²)	4.84	79.5	2.30
Loudoun	$87.01 + 2.25 (X) - 0.43 (X^2)$	3.89	84.0	2.09
Prince William	$68.00 + 1.48 (X) - 0.26 (X^2)$	4.74	91.3	1.45
Virginia Beach	57.76 ± 0.93 (X) = 0.36 (X ²)	3.89	88.1	2.09

Source: Regression Analysis of data from Table 2.

The use of the equations can be demonstrated by a projection for Fauguier County. The 1975 census would be the eleventh period in the series; the 1980 census would be the twelfth, and so on. The estimate for 1975 would be found by the following substitutions:

 $84.70 \pm 0.88 (11) - 0.31 (11)^2 = 56.87\%$

The 95% confidence interval is found by multiplying the forecast error by the appropriate t-score "value for eight degrees of freedom":⁷

56.87 + 5.33 (1.895) = 56.87% to 66.97% for Fauquier.

The 66.97 is termed a "critical value" because if the actual census percentage is greater, the difference *cannot* be attributed to chance deviation. In other words, the percentage lies outside the range of the estimated trend and the actual conversion rate is less than expected. The usual procedure calls for establishing a test hypothesis so that there is no significant difference between the estimated and actual rates; this statement can be rejected if the actual rate is outside (higher than) the confidence interval. The alternate hypothesis (that the census rate is higher) is accepted.

Likewise, the predicted values by the regression equations are as follows:

County	Predicted %
Fauquier	56.87
Loudoun	59.73
Prince William	20.26
Virginia Beach	24.43

This compares with the census figures from the Agricultural Reporting Service for 1975 as follows:

County	Acreage	% of Total Acreage
Fauquier	246,596	58.44
Loudoun	214,944	64.96
Prince William	53,594	24.13
Virginia Beach	42,734	25.78

The range for a 95% confidence interval with 11 observations and 8 degrees of freedom are indicated as:

County	Indicated Interval	(0.05 significance)
Fauquier	56.87 + (1.895) 5.33	66.97
Loudoun	$59.73 \pm (1.895) 4.63$	68.50
Prince William	20.26 + (1.895) 5.64	30.95
Virginia Beach	24.43 + (1.895) 4.63	33.20

In each case, the census acreage is expressed as a percentage of 1920 acreage and does not exceed the critical values associated with the 0.05 level of significance. While the results of these tests are more fully

explored in the conclusions of the study, they show that the actual data for 1975 indicate no substantial departure from the past trend. The most apparent exogenous factor related to a difference is usevalue taxation, and there is no statistical evidence of a lesser conversion rate than past data indicate.

STANDARD ERROR OF A FORECAST

The inference that there is no significant change of trend in any of the four counties is generally based on the various standard errors. In actuality, the proper concept of probable or expected error involves a slightly different statistical measure, the standard error of fore-cast—the limits within which a new observation can be expected to lie. "It takes into account the sampling error in the regression line itself and is obtained by combining the standard error and the standard error of the regression life."⁸

For a large sample, this approach does not greatly affect the standard error unless the prediction is being made far into the future. In this instance, the sample size is 11—the number of five-year intervals for which data are available. This relatively small sample causes the forecast error to exceed the standard error by nearly 20%. The resulting increases are as follows:

County	Standard Error	Standard Error of Forecast
Fauquier	4.48	5.33
Loudoun	3.89	4.63
Prince William	4.74	5.64
Virginia Beach	3.89	4.63

Because the new parameter is larger than the standard error, the critical values are increased when the hypothesis of no significant change is tested. However, if the standard error were used to establish the critical values, the result would be the same: the hypothesis cannot be rejected at the 0.05 level of significance.

Figure 1 to Figure 4 illustrate that the actual 1975 census data points (percentage of acreage farmed) shown by the \boxdot lie well within the intervals bounded by the critical values associated with a level of significance of 0.05.

CROSS-SECTIONAL DATA

The chi square test and time series analysis have examined data for significant change within the localities, yet there is further evidence of the differences in the conversion rates associated with implementation of preferential assessment. If rates are computed for all neighboring localities to the four study areas, a "paired-difference" test is possible.⁹ This is a simple example of a blocking design in which

FAUQUIER





Source: Derived from data in USDA census for 1975

pairing is planned, not randomized.¹⁰ The percentages are the decreases in farm acreage from 1969 to 1974, expressed relative to the total acreage in the county. The test matches the percentage from each of the four counties with ones from neighboring counties that have not yet implemented a program. The results are shown in *Table 4*.

The average of the differences (\overline{d}) is 0.0276; and the standard deviation (S_d) is 0.0336, with the standard error found by (S_d/\sqrt{n}) dividing this figure by the square root of the number of pairings. This estimate is 0.0106. The hypothesis of no significant difference between the rates in program and nonprogram counties can be tested by the following procedure:¹¹

$$\frac{d-0}{\text{Standard error}} = t$$

LOUDON

Percentage of county used as farmland using 1920 as base period acreage & showing least-squares trend



Source: Derived from data in USDA census for 1975

TABLE 4

SELECTED PAIRINGS OF FARMLAND CONVERSION RATES IN VIRGINIA COUNTIES, 1974

Neighboring Nonprogram Locality	Conversion Rate 1969-1974 (Percentage)	Program County	Conversion Rate 1969-1974 (Percentage)	Difference in Rates (Percentage)
Stafford	.0448	Fauquier	.0367	.0081
Culpeper	.0623	Fauquier	.0367	.0256
Rappahannock	.0661	Fauquier	.0.367	.0294
Fairfax	.0524	Fauquier	.0367	.0157
Warren	.1241	Loudoun	.0049	.1192
Fairfax	.0524	Loudoun	.0049	.0475
Culpeper	.0630	Prince William	.0406	.0224
Stafford	.0448	Prince William	.0406	.0042
Fairfax	.0524	Prince William	.0406	.0118
Chesapeake	.0510	Virginia Beach	.0588	(.0078)

Source: Derived from data contained in Census of Agriculture, 1974, Virginia, Vol. 1 (Washington: U.S. Department of Commerce, 1977).

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PRINCE WILLIAM

Percentage of county used as farmland using 1920 as base period acreage & showing least-squares trend



If the calculated "t" value is greater than the critical value of "t" for a two-tailed statistical test, significance level of 0.05 and nine degrees of freedom, the hypothesis is rejected. The calculated value is 2.59; the critical value is 2.306. The inference is that the average conversion rate in program counties is less than that for nonprogram counties.

CONCLUSIONS

Two dissimilar statistical tests have shown apparently conflicting evidence of the relationship of the use-value taxation program to loss of farm acreage, yet the differences are not pronounced when the approaches of the tests are examined. The regression analysis of the time series does not say that no possible benefit exists; it says that the positive difference between the actual farm acreage and that projected

VIRGINIA BEACH Percentage of county used as farmland using 1920 as base period acreage & showing least-squares trend



by the 50-year trend is not large enough, in any of the four counties, to be statistically significant. The comparison is between the past (when there was no program) and the relative present (when there is) for each jurisdiction.

The paired-difference test compares only one interval, 1970-1975, for the study areas with that of immediate nonprogram neighbors. The result would indicate that the four use-value taxation counties as a group have lost statistically-significant less acreage. If compared individually, the difference would probably be less pronounced.

The conclusion is that the loss of farmland will continue at an increasing rate for the near future in these four counties, although at a slightly lesser rate than those nearby areas with no program. Because the aim of the Virginia legislature was to preserve prime farmland and forestland, the use-value program cannot be counted successful in the areas studied. Farmland is not being preserved; it is being converted

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more slowly in these counties. But the good fit provided by the parabola illustrates the loss to be at an increasing rate. While there is a limit to this acceleration of loss as the remaining acreage becomes smaller, the inescapable answer is that other remedies, such as purchasing or renting development rights, are needed to slow these increasing losses.

The value of this study is that it offers some means to assess the potential effect of land-use taxation. The indication is that the Virginia counties are better off with the program than without, yet it is not significantly slowing the conversion rate. The nonfarmers, who must shoulder an additional tax burden, receive few of the advantages that were given for passage of the legislation. For them, the revenue lost would be better spent in the acquisition of land for parks and in the obtainment of public easements.

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- For a discussion of this characteristic of polynomial regressions, see John Neter and William Wasserman, Applied Linear Statistical Models (Homewood, IL: Richard D. Irwin, Inc., 1974), p. 274-275.
- 7. William A. Spurr and Charles P. Bonini, *Statistical Analysis for Business Decisions* (Homewood, IL: Richard D. Irwin, Inc. 1973), p. 293-294. The degrees of freedom are based on the possible deviations when the variance is measured. Because three constants are used in the estimation of the curvilinear regression line, three degrees of freedom are lost (n-3, where n is equal to the number of five-year intervals).
- 8. Mendenhall, *op. cit.*, p. 275. The expected forecast error is found by multiplying the standard error by $1 + \frac{1}{1 + (X_{P} \overline{X})^{2}}$

$$\sqrt{\frac{1+\frac{1}{n}+\frac{(Xp-X)^2}{(X_1-X)^2}}}$$
 where

(a) n = sample size, (b) Xp = the number of the forecast intervals (I1), (c) \overline{X} = the average of the X values (5), and (d) X₁ = each of the X values (0, 1, 2, 3, ... 10).

- 9. Mendenhall, Ibid., pp. 237-239.
- 10. The use of a rate in more than one pairing is acceptable when a different match occurs.
- 11. Mendenhall, op. cit., p. 238.

Letter to the Editor

OPTIMAL HOLDING PERIOD

Regarding the recent papers on the optimal holding period for income producing properties ("When Should Real Estate Be Sold?": A Comment, by Austin J. Jaffe, "A Reply to Jaffe" by Jack P. Friedman, and "Optimal Holding Period Analysis: Much Ado About Not Much" by Austin J. Jaffe; all in Summer 1979 *Real Estate Issues*), it is my belief that there are as many "optimum" holding periods as there are types, sizes and locations of real property. Furthermore, through the years in my own investment portfolio and assisting clients in maximizing returns in their own portfolios, I have found that there is no such thing as an "optimum holding period" unless there is a "substitute offered."

It is the *replacement*—the substitute and inherent future benefits —that are to be considered, weighed and balanced against *current benefits* being derived at a given time. In other words, one of my favorite proverbs might go something like this: "What profiteth a man to gain the tripling of his investment only to find the marketplace void of equal opportunities." And I would like to quote George Washington as he spoke to his stepson, Custis, "Son, never sell your lands unless you have found another investment that is equal to or better than the investment you now own, as inflation is upon us."

Real estate is not stock which can be traded at will in three minutes. It is something that must be properly managed, maintained and nurtured to its maximum according to the abilities of the owner. This is a people business. We cannot sit back and state that five, ten, fifteen or twenty years is the maximum holding period of any investment property. People change. Their finances, their ability to cope with problems, their degrees of success both financially and politically, vary from the top of the arc of a pendulum to the reverse peak. We have experienced an eager purchaser wishing to acquire our investment real estate. He has come from a much lesser investment else he would not have his enthusiasm in high gear.

For my own portfolio and my select number of clients' portfolios, I would recommend that we stay on the constant lookout for properties psychologically and financially compatible to the individual. It profits us not to sell our real estate if it is a "projected optimum"; rather, we must determine if the marketplace will give up an opportunity that will afford at least benefits equal to what we are giving up. I maintain that from day of purchase, all my real estate, whether it be in what I call my "A" bag (which is more or less for keeps) or my "Z" bag (which is strictly for interim holding properties), is for sale!

> Robert L. Hess, Realtor Tacoma, Washington

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