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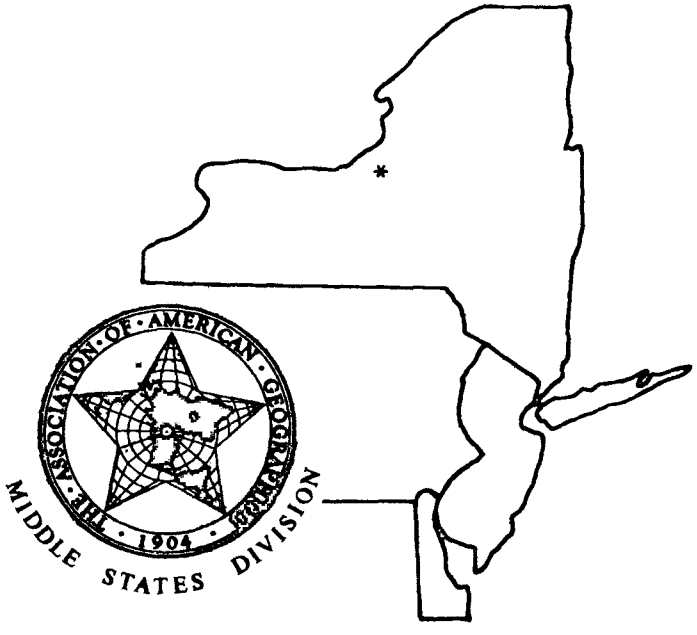

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A note on the preparation of manuscripts for submission to the Proceedings appears on the last two pages.

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PROCEEDINGS

OF THE

MIDDLE STATES DIVISION

ASSOCIATION OF AMERICAN GEOGRAPHERS

VOLUME XII, 1978

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MIDDLE STATES DIVISION, AAG

VOLUME XII 1978

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CONTRIBUTED PAPERS

ABSTRACTS

RESIDENTIAL DENSITY AND THE PROVISION OF SANITARY SEWER SERVICE: CASE STUDY IN ERIE COUNTY, NEW YORK

Jon P. Amato
Buffalo State University College

Samuel Ferraro
Niagara County Economic Development and Planning Department

The post-World War II expansion of suburbia has produced unplanned growth and random development around American metropolitan centers. Urbanization has pushed outward along the periphery of these areas, often bypassing large tracts of vacant land. This "leapfrog" pattern of development results in low density sprawl, which can be a costly and inefficient form of growth. It scatters the places where people work and the homes they live in; it makes them highly dependent upon automobiles and lengthens the trips they have to make. With the increased dependence on the automobile, air pollution increases and unnecessary amounts of energy are consumed.

When commercial and job facilities are so scattered, the kind of concentration that makes possible a high level of urban services is absent. Low-density growth tends to raise site development costs due to the provision of sewer and water service that previously was nonexistent.

Unplanned development also results in inconveniences and higher costs in providing community and social service facilities such as police and fire protection, parks and open space, and cultural centers. Urban development in fringe areas can also consume, or encircle, large tracts of prime agricultural land, eliminating it from productive use.

Local government officials are just beginning to come to grips with scattered growth and its attendant problems. Erie County, N.Y., for example, is in the process of developing a unified policy direction which will encourage almost all future growth to develop in areas served by sanitary sewers. As a matter of procedure, the Erie County Division of Planning initiates its efforts from bases previously established for the region by the Erie and Niagara Counties Regional Residential Density Study published in 1974.(1)

The Regional Planning Board study delineated projected residential densities in the Counties of Erie and Niagara for the year 1990. The projected density pattern for Erie County is illustrated in Figure 1. High density is defined as 10,000 or more people per square mile; medium density as 5,000 to 9,999 people per square mile; and low density as 1,000 to 4,999 people per square mile. Population projections used in the study were made by the New York State Office of Planning Services and the Regional Planning Board.

The foregoing density range was judged by the Erie County Planning Division to be too broad for precisely defining geographic areas which should be serviced with sewers in the future. The main area of concern was in the low-density fringe, generally found in the second tier of townships around Buffalo, viz. Clarence, Lancaster, Elma, Aurora, Orchard Park, and Grand Island. According to standard planning criteria, sanitary sewer service is normally justified, i.e., cost effective, only if residential density is 2,500 or more people per square mile.(2) The low density zone as defined by the Erie and Niagara Counties Regional Planning Board (i.e., 1,000 to 4,999 perople per square mile) would obviously include areas well below the capacity to financially support public sewers, as well as areas approaching or having passed the capacity to support them.

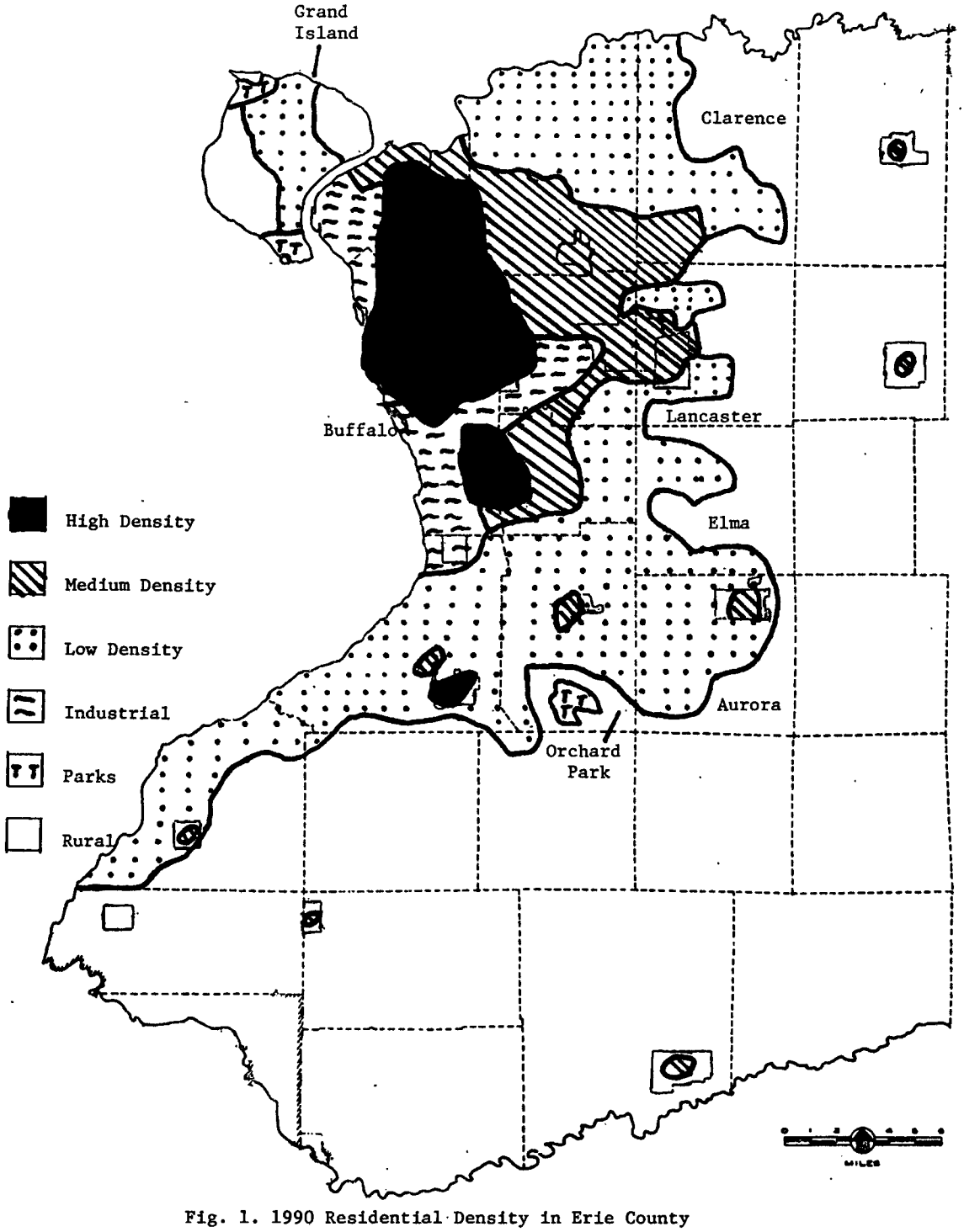

Fig. 1. 1990 Residential Density in Erie County

Source: Erie and Niagara Counties Regional Planning Board, 1974.

Since the Regional Planning Board study was too general in its population delineation to provide a geographic "breakpoint" at the density required for sanitary sewer service, it was necessary to spatially refine the low-density residential zone. The authors, in cooperation with the Erie County Division of Planning, devised a method for delineating the 2,500 population per square mile line. The remainder of this paper focuses on the methodology we employed for this purpose.

Population data used in our study were derived from a 1975 report prepared by the Niagara Frontier Transportation Commission,(3) in which the Census Tracts of each township in Erie and Niagara Counties were divided into Traffic Analysis Zones. The Commission then projected the 1985 population for each zone. The number of Traffic Zones in the study area townships ranges from nine in Aurora to twenty-one in Orchard Park.

We outlined the Traffic Analysis Zones on 1:24,000 scale base maps of each township. We then systematically deleted from the Traffic Zones areas that are not likely to experience population growth, such as steeply sloping land (i.e., slopes of 15% or more), ten year flood plains, state, county, and municipal parks, industrial and commercial areas, and various public and semi-public lands. Land in incorporated villages, major roadways, and existing sewer districts were also deleted. The remaining area in each Traffic Zone was termed "developable land."

We measured the acreage of developable land in each Traffic Analysis Zone by means of an acre grid, and divided this figure by 640 to give the square miles of developable land in each Zone. We then calculated the projected 1985 population per square mile of developable land for each Traffic Zone. Table 1 illustrates an example of the data output for the Township of Lancaster.

TABLE 1. PROJECTED POPULATION DENSITY IN RELATION TO SANITARY SEWER DENSITY, 1985, TOWN OF LANCASTER

Traffic Zone	1985 Population	Developable Acreage	Sqare Miles of Developable Land	Population (1985) per Square Mile Land	1985 Population Density as Percent of Sewer Service Density
(1)	(2)	(3)	(4)	(5)	(6)
350	1740	987	1.5	1160	46
351	601	1515	2.3	261	10
352	3608	1065	1.6	2255	90
357	1870	1332	2.0	935	37
358	3095	2350	3.6	860	34
359	310	1436	2.2	141	6
428	650	1523	2.3	283	11
429	485	2459	3.8	128	5
430	915	2271	3.5	261	10
431	997	2560	4.0	249	10
432	1534	2702	4.2	257	10

Source: Niagara Frontier Transportation Commission, 1975; and Computations by the Authors.

The data in column 5, population per square mile of developable land, give an indication of the extent to which the 1985 population, as projected by the Niagara Frontier Transportation Commission for each Traffic Zone, approaches the density for justifying sanitary sewer service. Traffic Zone 352, for example, with a projection of 2,255 people per sqare mile,

will have 90 percent of the 2,500 people per square mile required to financially support sanitary sewers. Traffic Zone 429, on the other hand, with a projected 1985 population of 128 people per square mile, will have only 5 percent of the necessary density to justify sewer service.

We grouped the 1985 population densities expressed as a percentage of sewer service density in column 6 into three categories: 75 percent or more, 25 percent to 74 percent, and less than 25 percent (Figure 2). The data indicate that several areas in the Town of Orchard Park will have residential densities very close to, or exceeding, sewer density, i.e., 75 percent or more of the minimum number of the 2,500 people per square mile required to support sanitary sewers. Smaller portions of Grand Island, Clarence, and Lancaster fall into this category. Several areas in all six study area townships fall into the 25 percent to 74 percent grouping. It is these areas that exhibit the greatest degree of uncertainty as to the need for sewer service, and consequently require more detailed study of land use trends. With the exception of Orchard Park and Grand Island, most of the developable land in the study area will be well below the capacity to financially support sanitary sewers in 1985, i.e., they will have less than 25 percent of the necessary density to support such service.

It is instructive to compare the residential density pattern we have delineated, based on Niagara Frontier Transportation Commission population projections, with that of the Erie and Niagara Counties Regional Planning Board. Our data indicate that the low-density residential fringe (i.e., the 1,000 people per square mile line) as defined by the Regional Planning Board will not extend as far into the Towns of Clarence, Lancaster, Elma, and Aurora as their study predicts. The significance of this finding is that the Board proposes a sanitary sewerage service area in these towns based on this low-density line. Our results show that most of the area within this line is far from minimum sewer density.

CONCLUSIONS

Our study has provided the Erie County Division of Planning a more precise definition of where the density of residential development could financially support sanitary sewer construction in 1985. In general, it would appear that the areas offering the most promise for concentrated growth are the eastern portion of Grand Island, the southwestern part of Clarence, the western portion of Lancaster, and most of Orchard Park with the exception of the northeastern and southern sectors.

Of equal importance, our findings indicate that substantial areas of Clarence, Lancaster, Elma, and Aurora will probably retain a rural or semi-rural character. It is in these areas that opportunities still exist for the planning of rural land, especially prime farmland and other forms of open space, and for guiding suburban growth and ensuring that it conforms to ecological systems.

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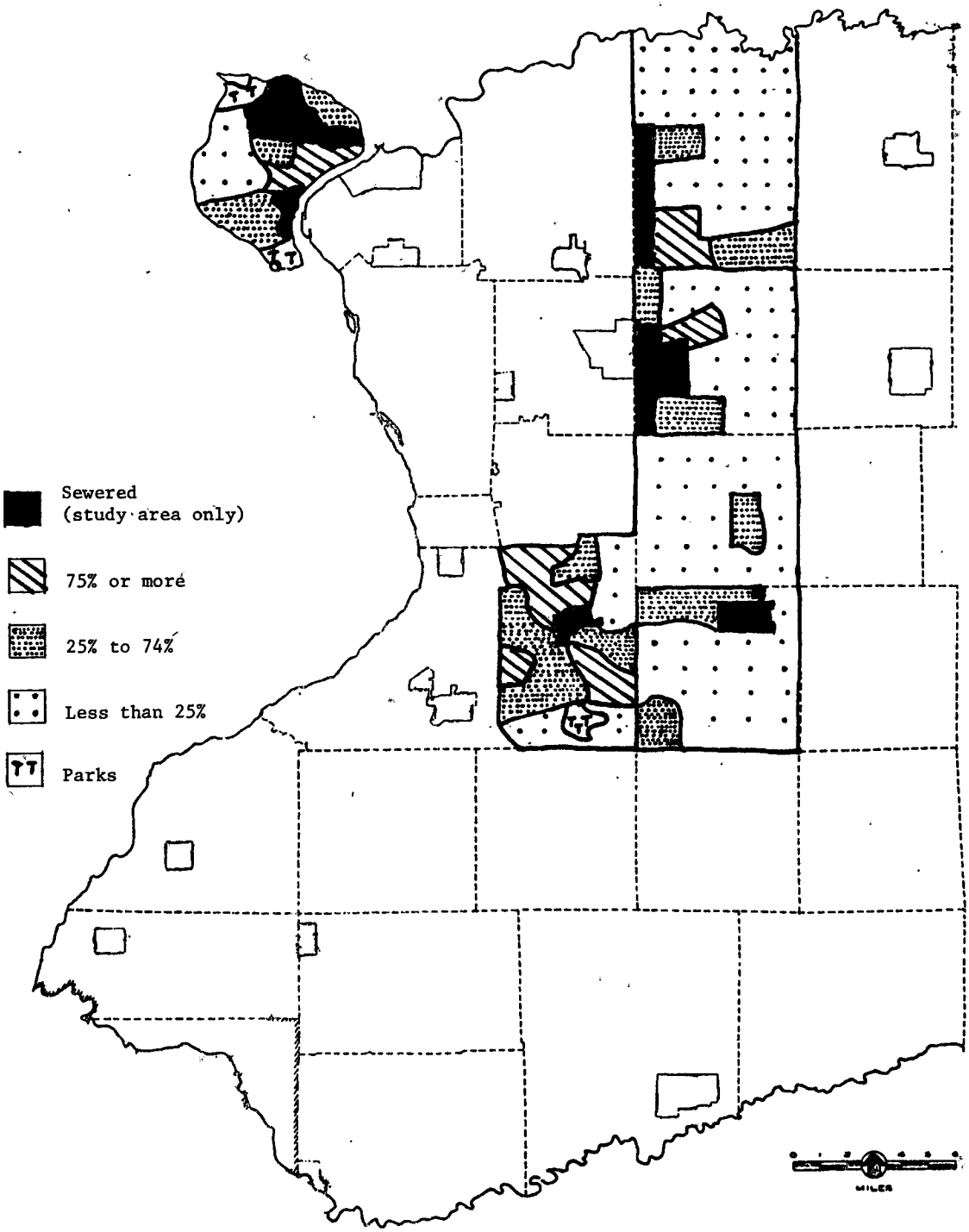

Fig. 2 1985 Population Densities as a Percentage of Sewer Service Density in the Study Area

Source: Niagara Frontier Transportation Commission, 1975; and Computations by Authors.

SPATIAL PATTERNS OF ANTIQUES DEALERS

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State University College at Buffalo

The antiques dealership is a phenomenon which has received scant attention in geographic and economic literature, despite its widespread distribution and large consumer following. This study investigates the spatial patterns of antiques dealers and their locational changes.

Antiques dealerships differ from other kinds of retail units in the nature of the goods acquired and sold. Any item of a certain age can be an antique.(2) Antiques run the gamut from tiny pins to enormous furniture, but the nature of antiques and their infinite variety mean that no one dealer can carry all available antiques. People do not need antiques; they want them. The customer is primarily an impulse buyer, but most items in a shop do not spur the customer to impulse. If one is intent on purchasing a particular item, there is a strong chance that the shop in question does not have it. A dealer may search through his sources, or other dealers, but the process may take a month or a year, or be fruitless. Complementarity rather than competition is a rule among antiques dealers. They acquire their stock by purchase from individuals walking into a shop, private households, estate liquidations, auctions, other dealers, and tips.

Other kinds of retail units buy their goods from wholesalers and have established prices for each item. They are purchased by consumers who have chosen to come into a particular store. The consumer may finally select a competitive brand at the same price, or at another price, in the same store, or at a different store. Thus, the process of supply, demand, and competition, and the need for retail units to be accessible to consumers, contributes to the retail structure of the economy.

DEFINITION OF ANTIQUES

Antiques are defined by the U.S. Customs Service as items at least 100 years of age.(2) Items between 40 and 100 years old are called collectables by dealers. It is virtually impossible to stock only true antiques because they are not plentiful, and good quality collectables are in demand, such as electric lighting fixtures. The term antiques is used by dealers to include collectables and is so used in this study. Because any item can become an antique, there are literally hundreds of thousands of individual items considered antiques or collectables.

PREVIOUS RESEARCH AND METHODOLOGY

Previous studies have been concerned with the location of all tertiary activities of an area. Rogers(3) says that antiques shops are usually clustered to take advantage of customers' desires to browse and compare, and because no dealer can possibly carry a complete range of items. The individual can 'find' what he wants through the benefits of agglomeration. Scott(5) indicates that the pattern of antiques dealers is clustered within the cities of Rome, Amsterdam, and London. Artles(1) and Rogers(3) find that antiques dealers are the most clustered of retail shops in Stockholm. As far as can be discerned, the pattern has not been analyzed in urban and rural areas of the U.S.

Four western New York counties of Niagara, Erie, Chautauqua, and Cattaraugus (Fig. 1) were chosen as the study sites. They include a variety of large and small urban settlements, one large SMSA, and rural landscapes, i.e., areas outside the Buffalo Urbanized Area and other urban centers.

Names and locations of dealers were drawn from directories(4), (6), though many are not listed and do not advertise. Their reputation is spread by word of mouth. Their names were obtained from listed dealers. Only those who handled antiques and collectables were selected for interviewing. A total of 126 dealers were identified. Sixty-nine agreed to be interviewed and fifteen refused. Others could not be reached because of illness or absence.

A structured interview questionnaire was designed and administered by the author. Dealers were asked about the sources of their purchases, the nature of their clientele, why they were so located, and why they changed locations. Interviewing was done during the summer of 1974.

TABLE I

NATURE OF THE DEALERSHIP

	Chautauqua - Cattaraugus Counties	Erie County (except Buffalo)	Buffalo	Niagara County
Single owner operator	9	15	19	1
Husband-wife	17	8	-	1
Non-related partners	1	1	2	2
Business on home property	20	15	1	-
Business elsewhere	3	6	20	4
Other interests				
Yes	15	17	17	2
No	7	5	4	2
Directly related to Antiques	3	2	1	0
Unrelated	12	15	16	2

Source: Personal interviews.

Businesses are individually or jointly owned (Table I), but in no cases are there more than two owners. Location on home property is prevalent outside the Buffalo Urbanized Area, while the use of rented commercial space is the rule in Buffalo. Most dealers have other interests besides the dealership, ranging from clock repair and appraising for insurance purposes, to factory work. Those who don't are retired, on social security, or else their spouse provides additional income. Fifty per cent of the sample have been in business over ten years, and seventy per cent carry a general line of antiques.

DISTRIBUTION OF ANTIQUES SHOPS

The distribution is both dispersed and concentrated (Figs. 2, 3). Twenty-six dealers interviewed in dispersed rural areas indicated that location on or near a major highway is the most important reason for being there. However, twenty of them dealt directly from their homes and lived there before they went into business. Six dealers indicated that it was

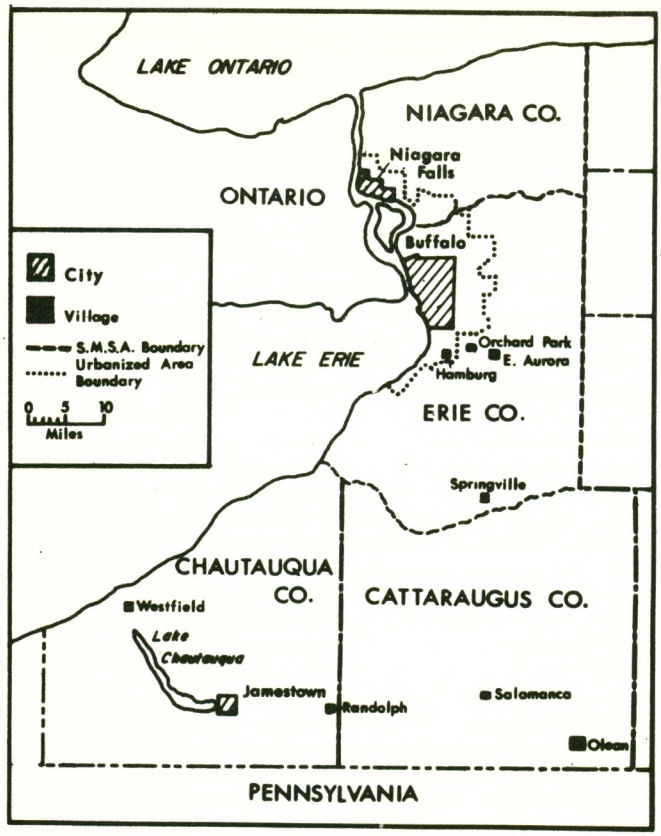

Fig. 1. Study Area

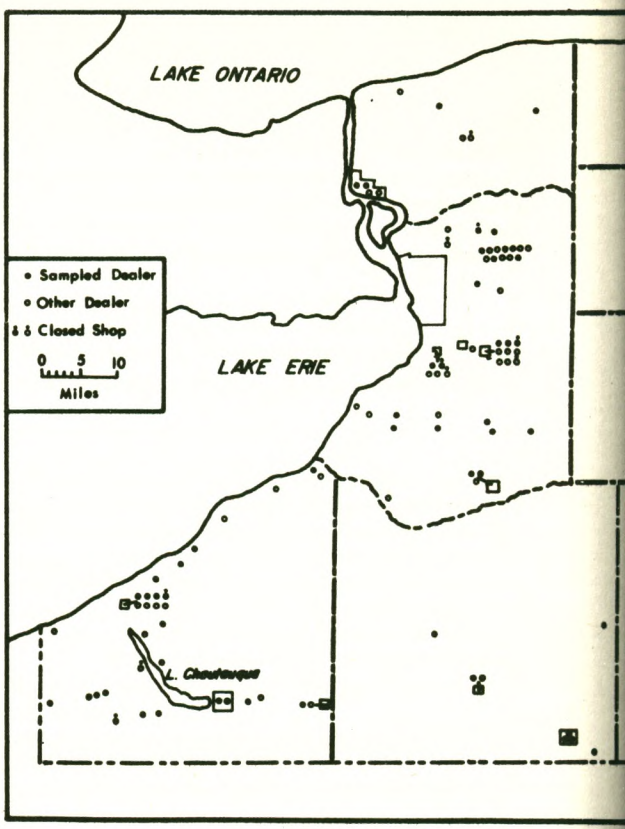

Fig. 2. Distribution of antiques shops in the study area, except Buffalo.

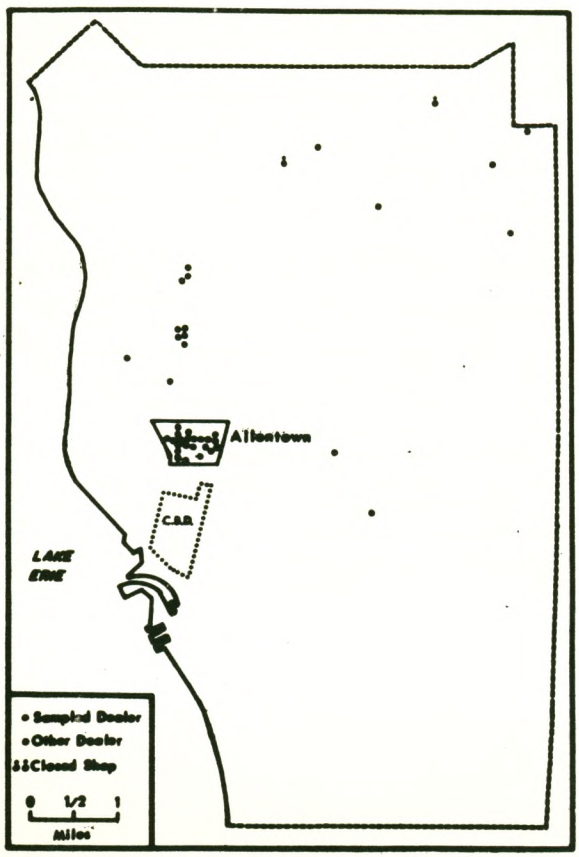

Fig. 3. Distribution of antiques dealerships in Buffalo. Closed shop means open by appointment only.

the only place available when they opened their business. In other interviews, three dealers chose their particular location business because they felt the town in which they located was "a good place to be in." Two dealers inherited the property, so they opened there. Two others are located in buildings they purchased to save from destruction.

A number of dealers northeast of Buffalo (Fig. 2) are on or near a major highway. In East Aurora, Westfield, Olean, Springville, and Randolph, location on or near heavily traveled routes is a major reason for being there, and those interviewed have their shops in their homes.

The concentration of dealers in Buffalo (Fig. 3) is within the so-called Allentown area, where twenty-two dealers exist within an eight-block range. The small groupings one mile to the north are part of a mix of specialty shops functionally tied to Allentown. It is a renovated area within the city, its commercial renaissance in the form of antiques shops, art galleries, and boutiques. Dealers within this agglomeration indicated a desire to be near each other, the availability of sufficient commercial space at reasonable rents, and the walk-in traffic from the metropolitan area which is attracted to the array of specialty shops. Interviewees dispersed elsewhere in the city were concerned with the availability of sufficient space and relatively modest rents.

The small number of dealers in Niagara Falls is due to the tourist business. Souvenir shops are the most popular, advertising goods embossed with "Niagara Falls."

PAST AND ANTICIPATED LOCATIONAL SHIFTS

The majority of moves from an original location to the present one occurred with Buffalo dealers (60%), though the highest proportion (100%) was in Niagara Falls. Buffalo dealers moved 1) because of the necessity for more or less space, 2) to be near other dealers in Allentown, or 3) because they violated local zoning laws. The situation in Niagara Falls is different. Sampled and non-sampled dealers were forced out of downtown because of massive urban renewal. Other reasons for moving were varied in the remainder of the study area, from purchasing historic buildings to save them from destruction, to trouble with the landlord, moving closer to kin, or moving because of poor health. Two Buffalo dealers indicated a move in the near future because of encroaching blight.

THE CLIENTELE

Much of the antiques business in the study area is considered wholesale. Dealers from the South and Southwest journey to the Northeast in spring and autumn to purchase antiques by the truckload and return home to sell them for substantial profits. Dealers interviewed referred to the South and Southwest as 'deficit regions.' There are not enough antiques to supply consumer demand in those areas.

Most dealers interviewed (95%) said that purchases by outside dealers made the difference between profit and none. There is not enough local demand for all items in a shop, and many customer requests cannot be fulfilled at once because the item is not in stock. Buffalo dealers do not depend as much on out-of-state buyers as do other sampled dealers (Table 2), but rather on walk-in traffic.

TABLE 2

NUMBER OF DEALERS INDICATING WHOLESALE SALES AS A PROPORTION OF TOTAL SALES, BY AREA

	0-20%	21-40%	41-60%	61-80%	Over 80%	Don't Know
Chautauqua-Cattaraugus Cos.	4	2	5	5	6	1
Erie Co. Except Buffalo	2	3	2	8	5	1
Buffalo	2	6	6	5	1	1
Niagara Co.	-	-	-	1	3	-

Source: Personal Interviews

SUMMARY

The nature of antiques is such that dealers do not compete as do other retailers. Location near one another may assist customers who wish to browse, but outside Allentown, the majority of sales are made by outside dealers willing to buy any and all decent items they can transport back home; most of them being dealers from the former Dixie states. In short,the antiques business is not locally oriented. Thus, location of shops in the study area is not dependent upon maximum accessibility to population as in other retail units.

Sufficient space is a prerequisite for location. The agglomeration in Buffalo's Allentown is not only in an area considered culturally and economically vibrant, but dealers have taken advantage of the abundant commercial space available. A majority of dealers interviewed indicated closeness to major highways as necessary, though less than one-fourth directly abut them.

All dealers depend on other sources of income, and for almost one-half of those interviewed, the business is a hobby. Profit maximization is not the major concern with many dealers, and it is difficult to attain. Antiques are luxuries, not necessities, and with the exception of outside dealers who come to buy anything of value, it is almost impossible to satisfy customers' initial requests for items.

Previous research pointed out the clustering within the urban centers of Stockholm, London, Amsterdam, and Rome(1, 3, 5). The Allentown agglomeration within Buffalo is similar. Why is clustering so extreme in a certain locale within these cities? Is there a uniqueness to it, or are other kinds of specialty shops found in these cities in large numbers as in Allentown? No comparisons can be made presently. This study is preliminary. Further investigation needs to be conducted.

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GENTRIFICATION IN NEW YORK CITY

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Herbert H. Lehman College of the City University of New York

Gentrification is transforming neighborhoods in central cities across America. Older, usually late-19th century middle class residential districts which have suffered decline are being "discovered" and renovated by new young middle class groups. Renovators are often professionals above average in education and income, and prefer living exciting urbane lives to starting families in the suburbs. They include young singles, homosexuals, couples unmarried but living together, and childless married couples. The working class or poor who had inherited the declining housing are thus now outbid for it, and are pushed out. Capitol Hill in Washington, D.C., Society Hill and Fairmount in Philadelphia, Brooklyn Heights in New York, Chicago's Near North Side, Capitol Hill in seattle, and several neighborhoods in San Francisco exemplify the process.(1) Gentrification has been identified in Western European cities too.(2)

In New York City middle class residential revival has not been confined to older originally residential neighborhoods. Older industrial buildings too are being converted to chic residences.(3) It is well known that manufacturing has been leaving the central areas of American cities for decades. Reduced demand for industrial space has created high vacancy rates in older business properties. At the same time increasing professional and office-type employment in the central city generates pressures for convenient housing. Thus in New York City, and in Manhattan in particular, nonresidential buildings are being converted to residential uses at a rapid rate.

Manhattan has long been one of the world's greatest concentrations of industrial jobs. New York City offers over three million jobs, 17 per cent of which (544,200) are industrial. Manhattan contains today 306,298 industrial jobs, some 56 per cent of the City's total industrial jobs and almost 10 per cent of total New York City employment. More than three-quarters of Manhattan's industrial jobs are located within the island's Central Business District (CBD), that is, that 9 1/2 square miles of the island south of 59th Street. This CBD area contains 4,354 industrial buildings, and, as of September 1977, already 1,023 of them, or 23.5 per cent, had undergone total or partial conversion to residential use. This conversion has created an estimated 10,000 new dwelling units in the past decade.(4)

A number of these conversions have taken advantage of a special New York City tax concession. Section J-51-2.5 of the New York City Administrative Code gives tax abatements and exemptions to certain properties if converted into housing. The first J-51 law was passed in 1955 to help owners of existing apartment buildings. If an owner improved his building--rewired it, fixed the windows, or put in new plumbing--the City granted a proportionate reduction in his real estate taxes. Between 1955 and 1975 over 250,000 apartments were rehabilitated in New York City by private owners taking advantage of that J-51 benefit.

In January 1976 the law was expanded to include nonresidential buildings converted into multiple-unit dwellings. An increase in the City's assessed valuation of the property due to the cost of conversion can be exempted from City real estate taxes for twelve years. The owner still has to pay taxes at the old assessed valuation, but even these may be abated for a period of from nine to twenty years. The old valuation tax is abated each year at the rate of 8 1/3 per cent of the "reasonable construction

costs" of the conversion work; the total amount abated cannot be greater than 90 per cent of those reasonable costs. "Certified Reasonable Costs" (CRC) are carefully defined by the City. The owner may pay more for any conversion item than the CRC lists establish, in order to create a more luxurious converted residential building, but his abatement will not be increased. Many people optimistically think that the new J-51 law will encourage structurally sound converted units, newly enlivened neighborhoods, decreased vacancies in existing structures, better maintained buildings, and an increased housing supply.

Many problems, however, are growing out of the gentrification-like conversion of industrial neighborhoods. A number of these stem from the fact that the process is occurring faster than the City can control it, or even monitor it. Many conversions are taking place in parts of the CBD the City does not want to become residential.

The City's basic land use policy was articulated in the New York City Zoning Resolution of 1961. It maps specific City zones restricted to specific uses (commercial, manufacturing, or residential), and it defines incentives and restrictions in order to encourage the uniform development intended for each zone. Since 1961 amendments have allowed only a few zones of mixed manufacturing and residential uses to develop. These zones were meant to allow large combined living and working space for artists, although many of these desirable enormous loft apartments are in fact occupied by nonartists. The Zoning Resolution is enforced by the Buildings Department, and variances can be granted only by the City's Board of Standards and Appeals. A Certificate of Occupancy confirms that a residential building meets all City criteria for health (sufficient light, ventiliation, plumbing, etc.) and safety (electric wiring, fire escapes, etc.). Without such a Certificate, it is illegal to inhabit a building.

Conversion in Manhattan is taking place much too fast to observe all of these formal processes. As of September 1977, Certificates of Occupancy had been issued to only 8.5 per cent of all the actual 1,023 conversions; all the rest (91.5 per cent) were illegal! In fact 23.2 per cent of all conversions in the CBD were even in zones in which conversions are not allowed anyway.(5) Thus illegal conversions are sabotaging the City's Zoning Resolution land use plans. This creation of new unplanned residential neighborhoods creates demands for new service establishments (grocery stores, shops, etc.) and new public services (park space, fire and police protection, etc.).

Once a conversion is completed the City is unwilling or unable to force out the new illegal tenants. These new tenants are not politically powerless. Recent surveys indicate that these residents are typically young, well paid and well educated, i.e., gentry. The median age of conversion residents is 31.8 years (the median of the City population is 44.4 years); the median household income is $21,783 per year (the City median is $9,724); and 74.2 per cent of these residents have at least a college degree (compared to 10.6 per cent of all City residents). Some 56 per cent of the converted unit occupants are employed in managerial, professional or technical positions; for the whole City, 21 per cent have these top occupations.(6) These residents are often able to appeal to the Board of Standards and Appeals for a Certificate of Occupancy after the fact of occupancy. Of all conversions which are legal, a great many are in fact legal only because of obtaining zoning variances ex post facto. Even after obtaining a zoning variance, these buildings may not meet City minimum building standards of fire, electrical, gas, plumbing and other mechanical services. One might expect such a wealthy, highly educated tenant population to observe health and safety standards carefully but they have been victimized in some cases by low con-

version standards. Disadvantages of living in a technically illegal building include the constant threat of eviction, lack of the protection of any City or State housing laws, and even difficulty in obtaining liability, fire, or theft insurance coverage.(7)

The rapid conversion of industrial properties has become a significant threat to the City's industrial job base. Conversion of underutilized industrial buildings usually raises local property values. As property owners see the potential value of their industrial properties rise, they raise rents and drive out the remaining industries in order to convert. The result is an accelerating net loss of job opportunities in the City.

Public policy must strike a delicate balance. It must encourage the conversion of vacated industrial properties, but it must not allow conversion to become so profitable as to drive out economic industries. Another City goal is, of course, uniform land use in each of the zones defined in 1961.

Today many Manhattan industrialists think J-51 is driving them out of the City. The garment and printing industries, both characterized by relatively small shops, are most seriously affected. Representatives of industry and of labor unions, recently testifying before the City Council, have accused the law of encouraging "cannibalization of New York's industrial base and the erosion of its economy as the price of increasing its housing stock." "J-51 is a crime," said a representative of the printing industry. "If this reconversion continues at this rate," said another witness, "New York will be abandoned as an industrial city."(8) The sharp contrast between the high incomes and education levels of the new residential tenants on the one hand, and the unfortunate positions of the industrial workers they put out of work on the other, must be noticed.

Although J-51 has drawn the most angry criticism from industrialists, that law alone certainly cannot be said to be responsible for the conversions. In fact only 4 per cent of all conversions have taken advantage of J-51. Industrialists, however, have demanded a similar program of tax advantages for conversions to industry, or for re-investment in industrial properties. That might be a beneficial program. Certainly something must be done to retain manufacturing in the City. New York City has already lost 400,000 manufacturing jobs since 1960. While the City's economy is increasingly oriented to office-type employment, hundreds of thousands of less skilled and less educated City residents' best hopes for job opportunity still remain in industrial employment.

Residential redevelopment of industrial and commercial buildings in the central city is accelerating. This activity results from major changes in the City's economic base. At present these conversion activities are largely unregulated, thus undermining City land use policies, creating dangers to public health and safety, and threatening the City's remaining industrial base. The City must significantly reassess its policies to cope with this large scale urban redevelopment.

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THE EFFECTS OF THE NEW YORK CITY FISCAL CRISIS OF NEW YORK AND THE MUNICIPAL CREDIT MARKET

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New York City's inability to borrow money in 1975 from private money markets propagated extravagent fears, even the city's bankruptcy and consequent deprival of services to its citizens, as well as the collapse of the municipal bond market for all cities in the United States. Three years later New York City is still on the brink of bankruptcy but it and other cities continue to exist and to provide services to their citizens. The actual effects of the first major fiscal crisis can provide insight into the operations of New York City and the spatial interconnections among it and other cities. The immediate effect on New York City was its loss of sovereignity to a state-controlled Emergency Financial Control Board (EFCB) which was established "to enforce austerity and control the city's revenue, flow(1) and thus encourage the faltering bond sales of the Municipal Assistance Corporation." MAC is an independent agency set up "to meet New York City's immediate needs for cash and to curb its financial appetites.(2). Since the city was still unable to bridge the time gap between its expenditures and its receipts, the federal program scheduled to last three years and subject to certain stipulations about the city's financial policy.

In the ensuing three years considerable news coverage was given to service cutbacks, layoffs and rehirings of public employees, "found" budget money, continued fiscal juggling, the loss and gain of jobs in private industry and questionable ethical practices of the banks in selling city bonds just before the fiscal crisis. Although these events were well publicized, it is still not clear whether any real changes did occur. In order to identify some of the results of the fiscal crisis, an examination will be made of the distribution of public money within New York City just before and just after the first fiscal as well as the diffusion of these effects on the borrowing powers of the nation's 24 next largest cities. Data are from fiscal years 1974-5 and 1975-6 and are not deflated; the time period is very short and current government and market decisions on municipal financing are generally based on current dollar values.

THE EFFECTS OF THE FISCAL CRISIS ON NEW YORK CITY'S DISTRIBUTION OF PUBLIC MONEY

Although New York City's total revenues and expenditures increased between 1974-5 and 1975-6, changes in particular expenditures and revenues produced interesting patterns. The city depended less on intergovernmental aid and more on revenues from its own sources, i.e., taxes and user charges.(3) The city apparently was being more diligent in collecting fines and taxes. However the city spent less money on services considered necessary to attract and keep the middle class: education, hospitals, libraries, and highways. Yet it increased expenditures on police and fire protection, health services, sanitation (all supported by powerful unions) and public welfare. It also decreased expenditures on items vital to a city's continued growth: capital outlay, sewerage facilities, and housing and urban renewal. Despite great protests of its inability to provide its citizens with services, the city's spending patterns appeared to continue to benefit the union constituency and welfare recipients at the expense of the middle class and infrastructure of the city.

Although the city imposed a wage freeze of three years on all municipal employees and also laid off several thousand workers in 1975, the re-

sults were not consistent. Many non-union and non-civil service employees did get wage increases; three-quarters of the 34,000 civil service and blue collar workers laid off in New York City's 1975 fiscal crisis were found by a survey of the New York State Legislative Institute to be back on the municipal payroll by the beginning of 1976.(4) In addition the city agreed to a "'no cost contract' that would contain no increase in either wages or fringe benefits" but instead would contain a "cost-of-living escalator to be financed by independently measured savings measured through productivity."(5) In general the municipal workers were not so badly hurt by the fiscal crisis as had first been publicized. But the level of services to the citizens of New York City did decline. It was found that from the beginning of 1974 to December 1976 that police were making one-third fewer arrests, street resurfacing was nearly halted, there was garbage in the streets, 30 percent of the sanitation trucks were out of commission, 20 percent fewer children were enrolled in day care centers (probably with greatest effects on people of lower income), and the number of teachers was down to the levels of the 1960's. However despite the loss of 5000 policemen and 2000 firemen, police and fire services overall were found to be maintained.(6)

New York City's debt and borrowing patterns also showed some interesting changes. Its total borrowing doubled and its gross debt outstanding increased by 3.5 percent while its debt redemption quadrupled. This increase in debt redemption was largely the result of the city bond holders being forced to exchange their short term bonds for long term MAC bonds. These numbers, then, do not represent real debt redemption. The combination of the city's lowered credit rating and resulting need to pay higher interest rates with its great increase in actual money borrowed was reflected in much larger interest payments on the general debt. These interest payments increased more quickly than other city expenditures.

THE DIFFUSION OF THE EFFECTS OF THE FISCAL CRISIS ON BORROWING CAPABILITIES OF OTHER CITIES

A lessening of investor confidence in the safety of a city's debt could be reflected in a rise in the interest rate charged and in the growth in the amount of interest paid with respect to other expenditures. It could also be reflected ultimately in the inability of a city to float new issues at any interest rate. Interest rates on municipal bonds do not only parallel the fiscal health of cities; they are also intricately involved with the nation's economy as a whole. Because of New York City's importance and size, it was feared that its troubles might have caused changes in the market climate for other cities' issues as well as its own. In September 1975 (just before the major crisis resulting in the formation of the EFCB) "the market for New York City securities had virtually dried up" and "prices of tax exempt notes and bonds issued by government bodies outside New York City had also dropped." In addition, the "weakness in corporate bonds and recent stock market slump were also being attributed at least partly to the city's problems."(7) Some Congressional leaders were concerned that New York City's default would make other cities unable to borrow money and then lead to a chain of municipal crises.(8)

The fiscal crisis did have some effect on interest rates paid on municipal bonds. Interest rates on muncipal bonds (Moody's Investor's Service Aaa rated municiapls, Standard and Poor's high grade municipals and The Weekly Bond Buyer's 20 municipals) generally paralleled those on corporate and federal government long term bonds.(9) But interest rates on municipal issues either rose more than or did not decline as much as their counterparts in the last half of 1975.(3) Moody's listing of municipal bond yield averages indicated that the average municipal rate increased

from July to November of 1975 with interest rates on more poorly rated bonds rising faster than those on more highly rated bonds. However in 1976 interest rates on municipal bonds followed a downward trend and also declined more quickly than other bond types.(3)

An experimental equation fitted by least-squares regression using monthly data from 1970 to the present suggests that the 1975 New York City crisis may have caused a divergence from the normal relationship between interest rate on municipal bonds and that on high-grade corporate bonds.In the equation, the corporate bond yield was used to explain the movements of the average yield on Standard and Poor's high-grade municipal issues. The insertion of a dummy variable to represent the effect of the 1975 crisis raised the adjusted R^2 of the equation from .62 to .65. The dummy variable was defined to be zero throughout the period except from May 1975 to December 1975 when it was defined to be 1. The estimated coefficient for this dummy variable was 0.45, and it was significantly different from zero at the 99 percent confidence level. This suggests that the crisis die cause a temporary buldge in the yields which the market required on municipal debt.

Difficulties in floating municipal issues and the general lack of interest in municipals by the market were reflected in the decline in bids and issues of bonds worth at least $1 million and of total state and municipal borrowings in the last half of 1975; the decline was not regular however.(3) But Moody's ratings of major cities were not adversely affected. There were some minor changes, including improvements in ratings.(10) The nation's populace as a whole showed its concern of increased government borrowing by defeating 93 percent of all bond proposals on ballots on Election Day 1975.(11)

Despite these fluctuations in the interest rate, 15 of the 25 largest cities in the United States were able to increase their outstanding debt in 1975-6, and 11 of them actually accelerated their net borrowing from 1974-5 to 1975-6. In addition, most of these cities were paying less interest on their general debt as a percentage of total expenditures in 1975-6 than in 1974-5. Of those borrowing less money and those with lower gross debt outstanding in 1975-6 than 1974-5, most also had a corresponding decline in their interest payments as a proportion of their total expenditures.(3) Cleveland, St. Louis, and Jacksonville were the only cities with lower gross debt outstanding but making proportionately larger interest payments; these three plus New York City and Washington, D.C. borrowed less money in 1975-6 than 1974-5 but had to make greater interest payments. These five cities had borrowed large amounts of money in 1974-5 when interest rates were comparatively high, reflecting the nationwide interest pattern. Cleveland and St. Louis difficulties were unrelated to New York City; they had been identified in 1973 as having fiscal problems by the Advisory Commission on Intergovernmental Relations, largely from deficit spending and the refusal of their citizens of tax increases.(12) Jacksonville's borrowing was probably used to help in the city's successful revitalization.(13)

Although at first New York City's problems led to increased interest rates and less money floated, within a few months, New York's effects were minimal; cities ratings were not hurt and their costs of borrowing money did not grow more quickly than other municipal costs. By November 1976, the volume of new tax-exempt bonds sold by cities and states reached a record high while interest costs declined. Some of this decline was believed due to a drop in the inflation rate and also the belief that the financial problems of large eastern cities were being solved.(14) There was also a general decline in interest rates in late 1975 to 1976.

IMPLICATIONS FOR THE FUTURE

Although New York City did not, in name or strict definition of the word default on its debts, fear still exists that if it were to do so, the effects would be widespread. The Federal Reserve Board reported that "954 banks in 33 states held $2.017 billion in New York City obligations, $1.476 billion in New York State obligations and $2.997 billion in New York State agency securities." The value of these obligations was equal to more than 50 percent of equity capital for 234 of these banks, which were not confined to the New York region but were located in 29 states across the county, and 20 to 50 percent of capital for 718 banks in 33 states.(15) A default forcing the banks to write off or significantly write down their holdings of New York debt issues could thus have seriously impaired the capital position of a large number of banks, possibly injuring public confidence in the stability of the banking system. However banks and the economy in general are stronger now than in 1974-5 and could probably better stand a shock.

New York City is trying to correct some of its fiscal problems with limited success. The combination of past generosity and the many diverse peoples and interests and their demands complicates the problems. Reforms of all sorts, including welfare and employee benefits, are necessary. But these reforms will take a long time; drastic cutbacks have not been possible in New York City. In order to help New York City continue to function as the nation's primary city and to prevent problems for the bond market and the nation's economy, both federal assistance and more fiscal austerity by New York City (combined with economic growth) are needed.

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SUBURB AND SLUM: CHILDREN DRAW THEIR WORLDS

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> Children will also use crayons and paints to great advantages so that given enough time and trust the observer (become viewer) can see on paper, in outline and in colors and shapes, all sorts of suggestive, provocative, and instructive things...What do they see, then - see in their mind's eye, see casually or intensely, see and through pictures enable others to see?
>
> Robert Coles, Migrants, Sharecroppers, Mountaineers (Boston: Little, Brown and Co., 1968), p. 92,93.

To the geographer, the environment which the middle-class suburban New Jersey child inhabits constrasts vividly on almost any dimension with the habitat of the child of the South Bronx. The manicured lawns and tidy, single family homes of suburban Wayne seem antipodal to the abandoned tenements and vacant, garbage-strewn lots of that quintessential American slum, The South Bronx.

To investigate whether these contrasts are as evident to the children who inhabit these environments and to explore how their residential experience influences both their perceptions of home neighborhoods, and their concepts of ideal, utopian neighborhoods, children at two shcools were asked to draw pictures both of their home area, and of the place they would like to live if they could design it themselves. Some of the questions to be explored were: do the South Bronx children "see" the negative attributes - the danger, squalor and poverty of their surroundings, or does the familiarity of home territory allow a softer, more "rose tinted" hue? Do the children of Wayne agree with a conventional adult view of their environment as being "child centered," privileged, safe, and comfortable, or do their utopias reflect desires different from those which can be found in their real environment? Do the children of the two, very different, places have similar images of utopia?

While few geographers have used drawings as evidence reflecting how the environment is perceived in childhood, there is a considerable body of literature in psychology on the interpretation of children's drawings, especially on developmental aspects.(1) Although there are unresolved questions concerning the extent to which children's drawings reflect their efforts to replicate an image which is conceptualized in their mind(2), there is agreement over the fact that children's drawings contain a wealth of data about how they see their world. "The reluctance to verbalize often contrasts with the ease with which a child will respond to crayon and paper and unwittingly express what he will not or cannot reveal in words."(3) Obviously, the interpretation of children's drawings can be done at various levels of sophistication depending on the training and sensitivity of the analyst. The present authors claim no particular interpretational expertise other than that of a geographer and planners sympathetic to children's ways of communicating. There is never only a single possible explanation - "no matter what the doctor makes of a picture, there are often other possible interpretations."(4) The child's explanation of her own work is often the most reliable and complete, but Coles also stresses that these drawings have an authority of their own, "...not subject to all the qualifications and interpretations and explanations and translations that in this

age have made any statement, however clear cut, direct and to the point, something to be deciphered only by a certified oracle."(5)

Geographers have relied, for some time, on maps drawn by children to supply data about spatial learning processes, and have, more recently, begun to use the paintings of professional artists as a "mirror" to explore cultural influences on landscape perception. Children's maps and drawings have also been used to explore their notions of home and neighborhood. "The memories of adults are no substitute for direct observation of what children themselves see and do."(8) While the adult can never truly view the world through the eyes of childhood, drawings allow us glimpses of their world, albeit through a glass, darkly.

THE CHILDREN AND THEIR ENVIRONS

Wayne, New Jersey, is in many ways a typical, middle to upper-middle class suburban town of well maintained, single family homes, green lawns, two-car garages, well equipped recreation areas, and enclosed shopping malls. The school which our artists attend is set in a residential neighborhood among trees, grass and fields. It is large, with numerous facilities. The children are 4th and 5th graders in a well-equipped open classroom. They exhibit a normal range of ability, though none were severly handicapped. Prior to our visit, the children had recently completed a project on cities which included some map making. This cartographic exposure is evident in their drawings.

In contrast, the South Bronx vies for the dubious distinction of being the worst slum in the U.S. Its physical appearance, dilapidated tenements, rubble-strewn vacant lots, boarded-up stores, burned out shells - has become familiar, through the media, even to those who have never been there. Ample documentation exists of the poverty, unemployment, drug addiction, crime and despair of this place. The school we visited is on a garbage and rubble-strewn street. Next door to the school is a vacant lot usually inhabited by addicts and derelicts. Across the street is a small playground in which the only green is in the graffitti which decorates the concrete walls. Most of the children in the bilingual 4th grade class we visited are Puerto Rican, many being recent mainland arrivals. Typically the "learning" problems they experience are attributable to language difficulties. Arranged "traditionally", this class emphasizes basic skills, although coincidentally they also had recently been discussing the city, their neighborhood and its problems. Most of these children are what is euphemistically called "underprivileged." They come from homes where lack of income sometimes precludes such basic necessities as food, clothing and adequate shelter.

THE DRAWINGS OF PRESENT NEIGHBORHOODS

The children of Wayne competently drew their neighborhoods with a high degree of conventional realism. Most drew houses, some of lots, with streets, trees, woods, lakes and streams. There are very few people or cars in these representations, perhaps because many children made maps rather than pictures. The most striking intragroup difference is between the sexes. Girls drew much smaller neighborhoods than boys; they usually limited their map to a few houses or a maximum of two blocks. Boys, on the other hand, portrayed larger areas (three or more blocks) and emphasized landmarks and structures other than houses. The constricted home range of girls, noted by other researchers, is evident.(9)

The pictures drawn by children in the South Bronx are not distinguishable by sex. The most striking contrasts are between "realistic" and "idealistic" representations. The "realistic" drawings include garbage and burnt out buildings, tenements with fire escapes, hydrants, vehicles, and

other paraphenalia of the urban scene. While some high rise buildings were topped with steep-pitched, suburban roofs, nevertheless, these are clearly urban places. In contrast to the Wayne drawings, these are highly populated. The impression is one of crowds, activity, traffic and noise. Several children drew conventional suburban scenes which bear little resemblance to their objective environment. Perhaps this was the kind of house they could "draw best," or perhaps the children did not want us to think they lived in an ugly place. Possibly they may even want to maintain that illusion for themselves.

UTOPIAN ENVIRONMENTS

> If we would only truly watch and hear children, be alert to...the drawing and painting they do, we could learn not only about their daydreams, their fantasies, their obscure or at least unstated strivings or doubts but also about their more outward attitudes and feelings, which so often are explicitly there, waiting to be recognized by the rest of us, who are so convinced of what is right or best or possible for "them," the children.(10)

Cole, among others, has used children's drawings as a way of exploring their desires and hopes. There is little question that children often possess more spontaneous creativity and are less bound to existing solutions than are adults.

The themes which frequently recur in the pictures of the Wayne children were privacy, individual ownership of property and the desire for entertainment and recreation. Each person inhabits a single house, but the artist's house is biggest and best. If accomodated at all, parents and siblings usually have separate, more modest residences. Sometimes a "palace commune" allows the artist to live with friends but to inhabit the best suite of rooms. The neighborhood is replete with a wide assortment of diversions - roller skating rinks, pin-ball game rooms, skateboard trails, dude ranches, dancing schools, candylands, and so on. Children often specified that these facilities were owned by themselves. Some sex differences were apparent, girls stressing individual residences and stores while boys included more places for physical venture. A number of girls, probably imitating each other, drew houses for themselves and friends and married them off to television stars. Mr. and Mrs. Shaun Cassidy live next door to the John Travoltas in these girls' dreams. Clearly, the children were thinking largely in terms of more of the things they have now which they enjoy, such as private property and recreational facilities.

The pictures by children in the South Bronx were, for the most part, quite pragmatic. Most described places which already exist. Their ideal is to live in a better place than that which they now occupy, but they are hardly demanding...three themes predominate: return to places they know or have heard about, modest improvements to their present neighborhood, and an emphasis on open space and "beautification." A third of the children drew another real place - Puerto Rico - as their ideal, represented either by a tropical island, or in one case, simply by the Puerto Rican flag! Other children drew parks with trees and flowers. One girl's house was inscribed with the word "Love", another had a movie screen in her park. Some children, including several who had drawn a suburban scene for their present neighborhood, pictured high rise apartments as their ideal. The teacher suggested these probably represent housing projects which constitute an improvement over the tenement housing in which the children now live. Another boy showed people picking up litter. He said he'd like to stay where he

lives if it could be cleaned and repaid. In another utopia the clouds are raining dollar bills!

The brevity of this paper cannot do justice to the richness of these childrens' observations and dreams. Suffice it to say that the environmental aspirations of the two groups display obvious contrasts. Not unexpectedly, their desires for the future seem conditioned by their past and present experiences.

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THE NEED FOR INCREASED EMPHASIS ON RURAL DEVELOPMENT IN INDONESIA

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Like many developing countries, Indonesia faces enormous problems of development compounded by rapid population growth. An impressive national economic growth rate over the past ten years has accentuated a number of these problems, including excessive urbanization and a widening and increasingly obvious gap between rich and poor, both among regions and among individuals. To help deal with these problems, it is argued that primary emphasis now needs to be placed on rural development. A rise in rural standards of living, improved agricultural methods, and increased employment opportunities in rural areas through the encouragement of cottage industries could help not only to absorb the continued increase in population, but, by making life in rural areas more attractive, also to reduce the number of rural-to-urban migrants. Towns and cities could then have more chance of being able to provide adequate facilities and services for their burgeoning populations. In addition, there is the potential that greater equity could be achieved in the distribution of the fruits of development.

POPULATION GROWTH AND ITS CONSEQUENCES

The tremendous annual increase in population size underlies many of Indonesia's problems. With such a large population base--Indonesia's population is approximately 135 million, making it the fifth most populous country in the world--a growth rate of over 2.0% a year means an annual increase of over 2 1/2 million people. Despite a recent rise in the marriage age and the growing success of family planning (an estimated 10 million women have been provided with family planning assistance), the large numbers of young people presently entering their reproductive years mean that the population will inevitably continue to expand for at least another generation or two. A recent projection anticipates a population of over 200 million by the year 2000.(1)

Perhaps even more significant than the actual numbers is the spatial distribution of population in Indonesia. Almost 65% of Indonesia's population, or about 85 million people, now live on Java, an island approximately the size of New York State. It is this already excessively high population that is growing by about 2 million a year.

The obvious question is where and how these increasing numbers of people are to live. The government's transmigration program of resettling Javanese in the more sparsely populated Outer Islands affects comparatively few people--in fact, less than one fifth of the average annual population increase in Java alone. Much of the population growth occurs in the rural areas, where most of the population lives (in 1971 Indonesia was classified as only 17.3% urban, although the definition of urban is largely administrative and as such omits many areas of high population density). Yet the rural areas in overcrowded Java are clearly unable to absorb increasing numbers in agricultural activities. Extension of agriculture into unsuitable, steeply sloping watershed areas with consequent soil erosion, silting of irrigation systems, and ecological disruption has been well documented.(2) In addition, according to the 1971 census, over 85% of Java'a population (outside of Jakarta) still used firewood for cooking--firewood obtained largely at the cost of extensive deforestation of the mountainous watershed areas.(3) It has been estimated that less than 12% of Java re-

mains wooded, a figure which includes the teak and other forest plantations.(4)

Yet migration to the cities is no panacea. Industrial growth has not kept pace with population increase, and the number of jobseekers far outnumbers the supply of jobs available. At least one million young Indonesians enter the labor force each year, but without the employment to absorb and use them profitably. Many rural-to-urban migrants end up on the fringe of society as destitute squatters, hawking goods or finding other marginal jobs. Housing and sanitation conditions and the provision of education and other services are woefully inadequate.

In addition, the rapid growth of cities creates a downward spiral of cumulative causation which accentuates existing problems. Since almost all investment (apart from that in timber and mineral extraction) occurs in urban areas (and a full 27% of all investment between 1967 and 1976 was in Jakarta alone), the cities attract job-seekers from areas in the immediate rural hinterland and from further away far in excess of new industry's ability to employ them.(5) Those unable to obtain employment, and particularly those who have been educated in the expectation of acquiring a good job commensurate with their education, put pressure on the government through their disaffection, criticism, and mounting frustration. In an attempt to diffuse this tension, further investment in urban areas is encouraged, and the spiral of increased immigrants, frustrated expectations, political tensions, and renewed efforts to attract investment continues. This trend is particularly noticeable in the rapid growth of Jakarta's population, from 1.6 million in 1950 to 2.9 million in 1961, 4.6 million in 1971, and an estimated 5.6 million in 1975.(6) In an attempt to interrupt this sequence, Jakarta even tried for a while to close its boundaries to job-seeking immigrants while its governor attempted to develop and improve conditions within the city--but with limited success.(7)

Meanwhile, it has been found that most urban development projects (including widening roads, paving streets and paths, and providing street lighting under neighborhood improvement programs) may hurt rather than help those for whom they are intended, for example by raising property values and thus inducing people to sell and move to less expensive, inadequate, inaccessible locations further out.(8)

NATIONAL AND REGIONAL DEVELOPMENT

The first Five Year Development Plan (Repelita I, 1969-73) was directed at stabilizing and developing the total national economy. Although it encouraged the rehabilitation of rural infrastructure, it focused primarily on efficiency of growth through sectoral development. Indonesia attained an average national GDP growth rate of 7% a year(9), but this considerable success was achieved at the cost of growing inequalities in regional rates of economic growth.

The second Five Year Development Plan (Repelita II, 1974-78) aimed at correcting some of this regional imbalance by pursuing a goal of equity and focusing on regional development. The country was divided into a hierarchy of development regions, with 10 major and 71 minor growth centers designated throughout the archipelago. These were designed to stimulate local development and carry the spread effects of that development into their rural hinterlands, by promoting adequate forward and backward linkages.

Nevertheless, it is interesting to notice that although industrial estates have been planned for Medan (North Sumatra), Semarang and Cilacap

(Central Java), Ujung Pandang (South Sulawesi), Samarinda (West Kalimantan) and Rungkut in Surabaya (East Java), no less than 10 adjacent districts have been designated for new industrial estates in the suburbs of Jakarta, in addition to Pulogadung which is already in existence.(10).

THE NEED FOR SMALL-SCALE RURAL DEVELOPMENT

However, although development of Indonesia's rich resources--petroleum, copper, nickel, tin, timber, rubber, coffee, etc.--may help Indonesia's overall national growth rate, and although the establishment of industrial estates and growth centers throughout the country may promote development and increase regional domestic production, the majority of the population remains bypassed by such developments, and the gap between rich and poor may even be accentuated. This latter condition is particularly visible in urban areas, where the wealth of the few contrasts sharply with the grinding poverty and slums of the majority. In addition, Indonesia is no longer able to feed its own population, but is expected to import 2.7 million tons of rice this year. An estimated 60% of Indonesia's population is malnourished, and it has been found that one child in five in Java now dies before the age of five.(11)

These problems, together with the feeling that the military, businessmen, and the technocrats who devised the country's development policy have entrenched themselves in their secure, wealthy positions, have led to growing disenchantment and frustration particularly among students and intellectuals in Java--tensions which have erupted on several recent occasions.

The case for greater emphasis on rural development can be made on several grounds. It would benefit the majority of the population, who will continue to live at a comparatively low standard of living in the rural areas, where the greatest population growth is also expected. It could relieve some of the pressure on overloaded ecological and sociological systems. By providing employment opportunities in rural areas, it could reduce rural-to-urban migration and ameliorate gravely deficient urban conditions while alleviating urban demands on the rural environment to support the urban life-style.

Already the Indonesian government has made strides in trying to upgrade village life through improvement grants for primary schools, the establishment of rural health and family planning clinics, and encouragement of local village associations, cooperatives, and development banks. However, there are further possibilities that have been found workable in other developing countries which have potential for adoption or wider acceptance in Indonesia. These include the production of biogas from domestic sewage for lighting and possibly even for cooking, the wider provision of pure drinking water in central village locations, and increased development of aquaculture. There is room for further intensification of agriculture through intercropping and sequent cropping, the reduction of crop losses through better control of rodents and insect pests, better harvesting and storage methods, and even simple food preserving through neighborhood canning of local produce. Greater use could possibly be made of agricultural residues, such as rice and corn straw, coconut husks, and sugar cane bagasse as sources of fuel or animal feed as well as of fertilizer.(12) The emphasis, as elsewhere in the developing world, needs to be on appropriate technology which is labor intensive.

The growth of labor-intensive cottage industries in rural areas also has considerable potential. These include both craft industries which

capitalize on traditional skills (such as batik - and jewelry - making, leather-working, embroidery, and wood-carving) and the simple production of basic necessities (such as cooking utensils, furniture, and clothing). It is possible that encouragement of cottage industries in rural areas would bring the benefits of development (steady employment, improved standards of living, etc.) to more people than the proposed establishment of the industrial estates in the suburbs of Jakarta and other large cities.

Rural development has enormous potential but faces enormous problems. Much of the wealth of local knowledge and initiative available in rural areas remains to be tapped, and the traditions of mutual help (gotongroyong) encouraged and expanded. Yet effective implementation of rural development entails the solution of numerous problems, such as the conservatism of rural communities and bureaucratic over-regulation and corruption. A further need is to ensure greater equity in the distribution of the fruits of development than has been possible thus far. In summary, ingenuity is needed to find ways of releasing latent ideas and energies to benefit rural populations and, through them, the nation as a whole.

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THE MEASUREMENT OF SEGREGATION IN THE MULTI-GROUP CONTEXT

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Urban scholars have long recognized that residential segregation may be operationalized in an almost limitless number of ways. They have also become resigned to the notion that all operational indices emasculate the phenomenon to generate a simple index which may be used comparatively. The dissimilarity index (DI) is no exception. For any pair of social groups it isolates the proportion of group A and/or B that must move into the subareas which are disproportionately represented by the other group, assuming that no one in the other group moved out of these subareas.(1) Despite this narrow focus, the DI clearly has facilitated comparative research, in part because of its freedom from built-in mathematical relationships to particular variable studied as correlates of segregation.

But the DI also possesses disadvantages. When more than two groups are being studied, a matrix of such indices between all possible pairs must be calculated to generate a summary measure of an urban area's overall degree of segregation. It is a cumbersome procedure. This has stimulated efforts to devise alternatives. Farley employs eta squared to isolate the proportion of total variance in socioeconomic status within an urbanized area that may be attributed to "between-tract" variance.(2) But eta squared cannot be employed in the context of ethnic or family type groups which represent nominal categories, or even in the case of occupational groups unless prestige scores are assigned to the categories.

Cone index which can be applied to such categories is the residential differentiation index (RDI) applied by Morgan to socioeconomic segregation in British urban areas.(3) This measure has two other attractive features. Conceptually, it is closely related to the widely employed DI. But it may be expressed as a single quantitative value in situations involving more than two social groups without calculating separate indices for all possible pairs.

But what, precisely, is the relationship between the information conveyed by the RDI and the DI about the spatial segregation of a set of social groups? It is the tension between the RDI's distinctiveness from, yet close resemblance to, the more familiar DI which provides the focus for the present paper.

THE RESIDENTIAL DIFFERENTIATION INDEX

First it is necessary to describe briefly the measurement strategy represented by the RDI. Initially, the distribution of n social groups over r census tracts is conceptualized as an n x r contingency table. Then, marginal frequencies are used to calculate the numbers of each social group that would be expected to occupy each tract if there were no segregation. The actual and expected values may then be compared to yield the proportion needing to change tracts to generate an unsegregated distribution. Unfortunately, such a measure is sensitive to both the distribution of the groups over the tracts and the distribution of the population over the groups. But this may be remedied by expressing the crude index as a fraction of the proportion that would have to move to attain an even distribution from a hypothetical totally segregated distribution of those social groups.

Now we may compare the properties of the RDI and the DI. The three

simplified cases illustrated in Table 1 will be used. The three cases have one important property in common. The degree of segregation between a particular pair of groups, as measured by the DI, is identical. This is necessarily true since the percentage distribution of the groups over the tracts is unchanged. In each case, the unweighted average of the DI's between all possible pairs equals 33.3

But the RDI conveys a different impression. It isolates three differing degrees of segregation. Apparently Case 3 is only 63 percent as segregated as Case 2. Given this discrepancy, it is tempting to ask which procedure is the more correct. But it is more useful to ask why the discrepancy occurs and what it demonstrates about these alternative approaches to isolating degrees of residential segregation. Such information will then allow us to decide which approach is the more appropriate in a particular research context.

It is clear from these cases that the RDI is sensitive to the proportional representation of the individual groups. More specifically, it is sensitive to interactions between a subgroup's relative size and its spatial segregation fromthe others. Increases in a highly segregated group's relative size will raise the RDI even if the degree of segregation between all pairs of groups remains the same.

This is not meant to be an indictment of the measure. When social groups are ranked upon some status scale, segregation indices between each group and all others generally conform to a 'U' shaped curve. This is logical since intermediate groups have relatively small (and extreme groups relatively large) average social distances from the rest. Thus it is not unreasonable to portray a community whose population is disproportionately concentrated in the extreme status groups as more segregated than one whose population has greater intermediate status representation even if pairwise DI's are identical. Similarly, communities in which intermediate status groups are growing in relative terms over time may be viewed as becoming less segregated even if pairwise dissimilarity indices remain constant. But surely it is desirable to be able to isolate the relative contribution of these two alternative mechanisms to observed variations in segregation levels.

PARTITIONING SUCH EFFECTS

It would be convenient if we could simply compare the value of the RDI to the unweighted average from a matrix of pairwise DI's in order to partition such effects. But Case 1 demonstrates that the RDI does not equal the value generated by such a procedure when more than two groups are involved, even in the special case of equal subgroup representation. However, Cases 1 through 3 demonstrate one possible means of isolating the component effects involved.

Suppose we wish to know how much of the difference in degree of residential segregation observed between Cases 2 and 3 (.13) to attribute to the greater representation of extreme status groups, with high segregation levels, in Case 2. By transofrming these two cases back to the first (equal group representation) we discover that all of it is. The general strategy, then, involves two steps. First, we transofrm the observed distributions to forms which retain the same proportional distributions of the groups over the subareas but contain equal representation of the groups within the entire population. Then we calculate a second set of adjusted RDI's for these hypothetical distributions.

The second adjusted index measures the magnitude of segregation independent of group size effects. The difference between the two indices may be conceptualized as the component of residential segregation attributable to intergroup size effects. The sign will be positive when groups with greater than average segregation from the remainder of the population are disproportionately represented in the total population. It will be negative when such groups are underrepresented. The same principle would apply in cases where the groups employed are ethnic, age or family status groups rather than socioeconomic ones.

Table 2 illustrates the results of applying this partitioning strategy to socioeconomic segregation in a small sample of American metropolitan areas. The eleven moderate-sized (200,000 - 300,000 population) urban areas were selected to provide a broad range of family income class distributions. At one extreme, in Johnstown and Erie only about one-third of all families fell into two broadly defined "tails" of the family income distribution (less than $5,000; $15,000 and over) in 1970. By contrast, about 60 percent fell into these income classes in Stamford and 47 percent in Huntsville. Moreover, in Huntsville the number of families in each tail was approximately equal while in Stamford there were seven times as many families in the upper income category as there were in the lower. Thus this set of communities should enable us to isolate the approximate upper limit of the "group size effect" we might anticipate in a set of American urban areas, at least in the context of income segregation.

Comparison of the RDI's and adjusted RDI's suggests that if one's focus is simply upon overall patterning, the group size effect on the RDI is modest. The two series are highly intercorrelated ($r = .85$). Only in the case of Stamford do community rankings vary by more than one position. But the modest differences present do demonstrate the utility of the RDI. It

TABLE 2

INCOME SEGREGATION IN SELECTED METROPOLITAN AREA

METROPOLITAN	RDI	ADJUSTED RDI	DIFFERENCE	PERCENT IN EXTREME INCOME GROUPS
Huntsville, Ala.	30.5	32.1	-1.6	47.4
Stamford, Conn.	28.6	26.7	1.8	59.9
Baton Rouge, La.	26.1	29.4	-3.3	42.8
Macon, Ga.	24.1	29.7	-5.6	41.7
Colorado Springs, Colo.	22.7	28.1	-5.4	37.0
Stockton, Calif.	21.1	24.4	-3.3	40.2
Spokane, Wash.	20.8	26.5	-5.7	38.0
Lowell, Mass.	18.4	25.7	-7.3	35.5
Huntington-Ashland W. Va.-Kty.-Ohio	18.2	24.2	-6.0	39.0
Erie, Pa.	17.1	24.3	-7.2	31.3
Johnstown, Pa.	15.4	22.0	-6.6	33.6

picks up the unusual positive contribution to income segregation in Stamford attributable to the disproportionately large representation of upper income groups. It also captures how the two mechanisms jointly produce very different income segregation outcomes in Huntsville, the most segregated and Johnstown, the least segregated, community. If we ignore one of these

TABLE 1

THREE HYPOTHETICAL DISTRIBUTIONS OF SOCIOECONOMIC GROUPS

	Case 1					Case 2					Case 3				
Tract	SEG 1	SEG 2	SEG 3	SEG 4	Total	SEG 1	SEG 2	SEG 3	SEG 4	Total	SEG 1	SEG 2	SEG 3	SEG 4	Total
1	40	30	20	10	100	80	15	10	10	115	20	60	20	5	105
2	40	30	20	10	100	80	15	10	10	115	20	60	20	5	105
3	40	30	20	10	100	80	15	10	10	115	20	60	20	5	105
4	40	30	20	10	100	80	15	10	10	115	20	60	20	5	105
5	40	30	20	10	100	80	15	10	10	115	20	60	20	5	105
6	10	20	30	40	100	20	10	15	40	85	5	40	30	20	95
7	10	20	30	40	100	20	10	15	40	85	5	40	30	20	95
8	10	20	30	40	100	20	10	15	40	85	5	40	30	20	95
9	10	20	30	40	100	20	10	15	40	85	5	40	30	20	95
10	10	20	30	40	100	20	10	15	40	85	5	40	30	20	95
Total	250	250	250	250	1000	500	125	125	250	1000	125	500	250	125	1000
	RDI = .27					RDI = .35					RDI = .22				

mechanisms (the adjusted RDI's), the range of outcomes is compressed substantially.

But if one's focus is upon the role of the income distribution upon income segregation the effect is substantially greater. The RDI values suggest that income segregation is clearly a function of the income distribution ($r = .85$). Communities with higher representation of extreme income groups display greater income segregation. But the correlation between the adjusted RDI's and the income distribution measure is only .46. This perspective revises considerably our assessment of the income distribution's intergroup segregation role. The reason for this is clarified by Table 2. It is the difference between the two indices for any community which is most closely related to the income distribution ($r = .95$). This is precisely what was earlier identified as the component of residential segregation attributable to intergroup size effects. Thus, for such analysis adjusted RDI values only should be employed.

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INSTITUTIONAL ACCESSIBILITY AND THE ROLE OF THE POTENTIAL MODEL IN EXPLAINING STUDENT TRANSIENT MIGRATIONS

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A disturbing trend has become apparent in higher education during recent years as proportionately fewer individuals have opted for continuing their education after high school. This reduction in enrollments has been well recognized in New York State where, during the early part of the admissions period for the fall 1978 semester, applications for the State University of New York (SUNY) were down 18 percent in comparison with the same period a year earlier. The present situation has created a serious situation for SUNY administrators because each institution's budget is indirectly tied to the size of its student body. Fortunately, during these times of enrollment and budgetary stress, the geographer can play a role of some importance. The techniques of spatial analysis may be utilized to provide a better understanding of the enrollment distributional configurations and the forces that shape them. This information may then be used by administrators to produce recruiting techniques that will increase enrollments and so permit the colleges to better meet their budgetary goals. The aim of this paper, therefore, is to utilize the techniques developed in the studies of large scale migrations to increase our knowledge of the forces that shape college enrollment patterns.

In this study the enrollment patterns of full-time college students were represented as the spatial manifestations of temporary or transient migrations. In analyzing similar behavioral patterns, Hagerstrand determined that the relationship between the levels of migration intensity and the distances traversed, when measured by the potential model (P/D^X), varied through time. Of significance in Hagerstrand's Swedish study was the reduction of the weighting of the distance variable, a change that indicated increased interaction brought about by better modes of transportation, improved nodal accessibility, higher standards of living and the like.(1) Further research has determined that changes in the degree of interaction between a series of nodes may vary spatially with the less accessible locations being identified by higher distance exponents in the potential model. (2) Thus although the role and format of the potential model in explaining migration patterns varies over time and space, it does improve our comprehension of the spatial mechanisms underlying such forms of interaction.

HYPOTHESES AND METHODOLOGY

To better understand the transient migration patterns of students within the SUNY system and so produce an improved information base for recruitment operations, the interaction concepts outlined above had to be tested for this data set. It was hypothesized, therefore, that: 1) the more accessible colleges in the SUNY system would be less influenced by the distance variable in the potential model than the less accessible ones; 2) that the degree to which the distance exponent in the potential model be raised to maximize its explanation of the transient migration patterns would be greater for the less accessible institutions; and 3) that the influence of the distance variable would be reduced through time so that the degree to which the exponent needed to be raised to maximize the predictability of the potential model would be reduced also, thus reflecting the decreasing frictional effect of distance.

To test the hypotheses it was necessary to determine the relative location of all the SUNY colleges in the State. Desire line distances from

the central point of each county to each college were measured. On this isotrophic surface the institution with the highest total desire line distance (Plattsburgh) was taken to represent the relatively inaccessible institutions while Oneonta, with the lowest reading, was used as a test case for the more accessible locations.

For each institution several formats of the potential model were established ($P/D^{0.1 - 3.5}$) for the years 1960 to 1975; i.e., the exponent on D was allowed to vary from 0.1 to 3.5. Each format of the potential model for each year under investigation was correlated with the number of students attending each college from each county in the State. This procedure permitted an assessment of the relative influence of distance upon each institution's enrollment pattern through time. To illustrate the temporal trends of the explanation levels of the potential models, Figures 1 and 2 were produced for the years 1960, 1965, 1970 and 1975. In addition, correlation matrices were constructed to determine the relative significance of the population and distance variables in explaining the transient student migration patterns through time before they were combined in the potential model permutations.

RESULTS

Correlation matrices measuring the relationship betwen the distance of each county from each college and the number of students whose permanent address was so located for each institution during the 1960 to 1975 era conclusively upheld hypothesis 1. For Plattsburgh the correlation coefficients were significantly higher in each year than for Oneonta (Fisher's 'Z' test, one tailed at the 0.05 level) ranging from -0.2751 to -0.4591, while for Onenota the range was -0.0128 to +0.1681.

The predictive abilities of the potential model formats for each college have been summarized in Figures 1 and 2. For Plattsburgh the high frictional effect of distance upon the spatial structure of the transient migration can be seen with the increasing level of explanation of the patterns as the distance exponent increased from 0.1 to around 2.0. This finding confirms hypothesis 1 and when compared to Figure 2 indicates the greater explanatory influence of the distance variable in the potential model for this relatively isolated location. In the case of Oneonta, Figure 2, the convex configuration of the potential model trend lines was gradually reduced to one taking on the characteristic of a slope trending from high to low with the increasing value of the distance exponent. This particular reduction in the importance of the distance exponent value would indicate that the influence of the distance variable has been so reduced in significance that its role in explaining the transient migration patterns of the Oneonta students had an negating effect upon the population variable. Further, it suggested that for this centrally located college the influence of distance was of no significant value at the present time and that the population size of the home county of students played the dominant role in explaining the spatial patterns of transient student migrations for this accessible location.

The distance and population variables were then combined in a potential model format (P/D^{X}) with the distance exponent being raised sequentially from 0.1 to 3.5 for each year under review. Correlation analyses were performed to determine which format of the potential model best explained the transient migration patterns of the students attending these institutions. Over the 15 year period the exponent of the distance variable, which best explained the transient migration patterns of Plattsburgh students, varied from a high of 2.0 to a low of 1.7, while for Oneonta the variation was much wider, 2.3 to 0.1. The widely fluctuating distance exponent for Oneonta,

which was also higher than that for Plattsburgh during the 1960's, must cause hypothesis 2 to be rejected.

Figures 1 and 2 illustrate the temporal trends in the explanation levels of the transient migration patterns of students attending Plattsburgh and Oneonta. For Plattsburgh the peak value or highest level of explanation of the potential model declined from 82.30 percent (coefficient of determination) for the $P/D^{2.0}$ format in 1960, to 57.70 percent in 1975 utilizing $P/D^{1.7}$. Although this decline was relatively regular over the time period it was not deemed statistically significant as measured by the Fisher's 'Z' test, one tailed, at the 0.05 level. In the case of Oneonta, the peak levels of explanation (coefficients of determination) fluctuated widely from year to year with no clear trend being indicated; 1960 $P/D^{2.3}$ = 33.71 percent; 1970 $P/D^{1.9}$ = 11.00 percent; and 1974 $P/D^{0.1}$ = 33.81 percent. Once again the one tailed Fisher's 'Z' test indicated that there was no statistically significant difference between these fluctuation levels and thus the first part of hypothesis 3 must be rejected.

Finally, it had been hypothesized that the distance exponent best describing the frictional effect of distance in the potential model would decline throughout the period under investigation. In the case of Plattsburgh this trend did occur but only during the first half of the 1960's (2.0 down to 1.7); the remainder of the period produced shallow irregular flucturations of between 1.9 and 1.7. To add to the complexity of the situation, the exponent of distance that best explained the transient migration patterns for Oneonta hovered within the range of 2.3 to 1.9 throughout the 1960's, dropping abruptly to 0.1 in the 1970's. The hypothesis, therefore, could not be accepted totally for these institutions; however, it is probable that the time period covered in the study was of a too limited duration, a factor that could not be overcome as reliable comparative data are not available prior to 1960.

CONCLUSION

This analysis has indicated that the influence of distance in the structuring of student transient migrations is significantly greater for peripherally located colleges than for those with more central locations. The role played by the distance exponent and its changing value through time was unclear. No recognizable pattern could be determined, however, the 15 year time frame of the study may not have been of sufficient length from these variables to manifest themselves.

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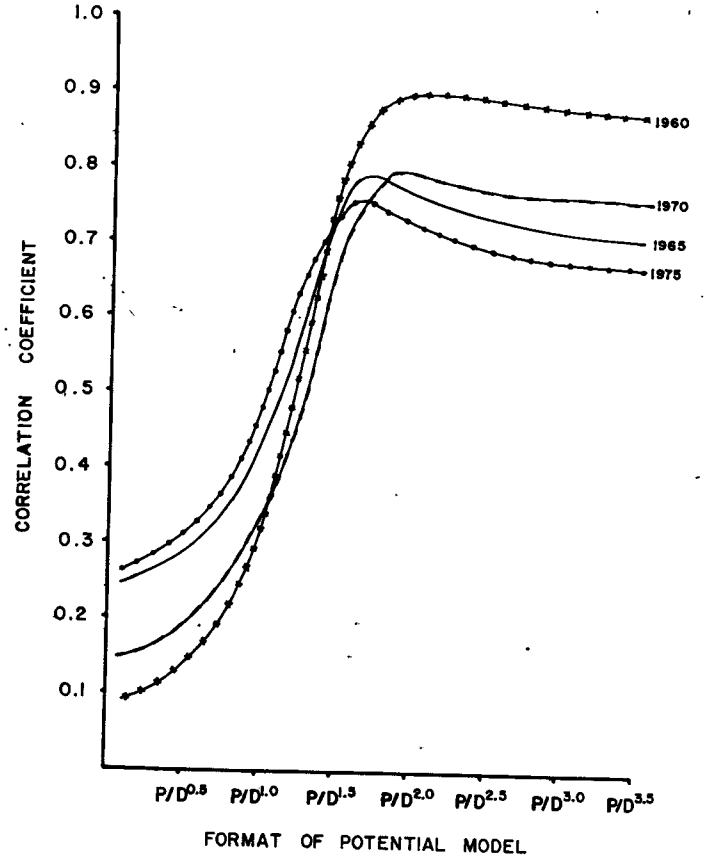

FIGURE 1, PLATTSBURGH

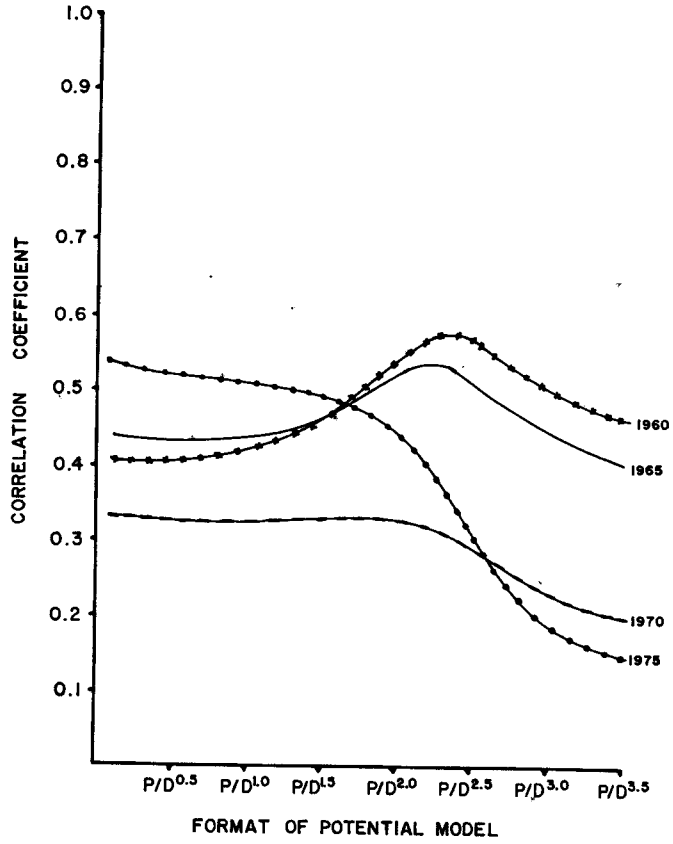

FIGURE 2, ONEONTA

CRIME COGNITIONS OF THOSE WITH AND WITHOUT CRIME EXPERIENCE

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Public awareness of and interest in crime have been increased through the media and public officials' statements.(1) Public concern has been followed by social scientist interest in crime. In an effort to understand the spatial implications and ecological niches of crime occurrences, social scientists have undertaken crime studies.

CRIME LITERAUTRE IN THE SOCIAL SCIENCES

Several foci emerge in social science crime literature. Problems with current crime statistics are illuminated by Wolfgang, Phillips, and Beattie. A historical perspective and reporting problems, new risk rate calculations, and uniformity are the respective interests of these researchers.(2) Early socially-oriented crime studies examined the criminal, with criminal behavior theories being advanced. Individual choice and genetic predisposition were at issue in these works.(3) More recently, social scientists have focused upon criminal activity and its locational, social and psychological implications. The early childhood years, degrees of internal emotional upheaval, and lack of negative reinforcement for wrongdoing have been expounded in an effort to explain criminal development and behavior.(4)

Ecological niches in a social system and the reaction of the individual to these niches have been examined by psychologists; the more frustrated the individual, the more probable criminal activity becomes.(5) Differentials in crime rates may be expected on the basis of different social areas within the city and the resultant impacts upon individuals.(6)

The distribution of crime has been handled by geographers within several frameworks. Emphases on climatic conditions and differentials in rural and urban occurrences(7) were followed by studies of the spatial distribution of crime in distinct socio-economic regions. Harries, for example, has attempted explanation of variations in crime by relating social variables to crime rates. He also notes differentials in social organization as factors in urban crime, and explains that city size and crime occurrences are correlated positively. Examining factors of minority groups, genders, and ages of populations involved, he establishes four categories of cities on the bases of the amounts of violet and general crimes present.(8)

A result of the recent sociological-psychological-geographical-ecological perspective has been the elimination of the credibility of earlier works. Wolfgang, for example, examining racial and social components of crime, concluded that involvement in crime is not genetically predetermined.(9) The thrust of contemporary research has been explanation of the determinants of criminal behavior expressed in socio-economic terms in an areally comparative framework. There are few studies of those exposed to crime and the behavioral responses of the potential crime victims which would elucidate the relationships between the threat or fear of crime and the spatial behavior of the urban dweller. The behavioral geographer's approach is capable of yielding heretofore masked responses of the population to crime occurrence. In order to handle adequately the question of crime in a behavioral context, the responses of the individual must be examined. Steering away from the classicial schools toward a potential victim-behavioral philosophy, this author attempts to explain the views of those who are exposed to crime instead of the behaviors and rationales of

crime perpetrators. It is believed that the attitudes toward major crimes will be the result of previous personal experience, previous training, and information flow to each individual regarding crime. The major index crimes identified by the F.B.I. are the crimes discussed here.

THE STUDY AREA AND DATA BASE AND METHODOLOGY

Reston, Virginia, a suburban community approximately twenty miles northwest of Washington, D.C. was the study area.(10) A random sampling of 600 households (33% return rate) furnished the data base for this study. The respondents were predominantly married and male. A majority of the households had earnings of $20,000 or more; over 75 percent held at least a bachelor's degree. A slight majority (55%) of this population had no previous association with crime. Of those with prior association most were victims only (90%); of those with previous experience 2 percent were criminals only, while nearly 6 percent had experience both as criminals and victims. Those who were both victims and criminals had been involved as criminals in either drug use, shoplifting, or both.

Information was solicited from the sample via mailed questionnaire. In addition to the demographic variables requested, questions were included which probed the attitudes of individuals toward crime severity and influences of the media on attitudes concerning severity of crimes using a Likert Scale. The data were analyzed using multidimensional scaling to reveal the dimensions along which crime are viewed.

The investigation focuses initially on the cognized dimensions of the entire group of respondents. Attention is then given to two components of this group -- those with and those without prior association with crime -- to uncover between-group differences in cognized severity. Examination is then made of the stated influences on the attitudes of the media on attitudes of these respondents toward crime.

THE HYPOTHESES

It was hypothesized that: 1) the greater the likelihood of personal injury the more likely a crime would be considered serious. That is, murder would be regarded as the most serious of the crimes and auto theft as the least serious, with the remaining crimes falling on a continuum somewhere between these poles; 2) persons with previous experience with crime will have a different view of the seriousness of crime than individuals with no prior experience; 3) mass media contribute to the development of individuals' attitudes toward crimes. The most influential media are television and newspapers.

CRIME COGNITIONS

The views of Reston residents are: 1) that crimes may be differentiated in terms of their respective amounts of violence; 2) the degree to which each was capable of disrupting a victim's lifestyle varies; and 3) a higher rate of occurrence tends to result in that crime being viewed as severe.(10) The contention of the first hypothesis that crimes would be judged severe strictly on the basis of potential for violence or injury was not confirmed by the analysis.

The views of the respective groups - those with and those without previous crime experience - were similar to the views of the entire population. Crimes were judged severe based, in part, upon possible personal injury. Those with previous exposure were inclined to regard burglary as

a more severe crime. Those with previous exposure were more likely to consider both severity and frequency than the group with no previous exposure.

The theme of exposure to crime in terms of frequency and nature of each crime was carried over to dimension three. The responses were not substantially different along these dimensions for the respective groups, in as much as the same crimes clustered together. The projection onto each axis was slightly different.(10)

The dimensions along which those who had prior exposure to crime view the inputs to their attitude formation are quite interesting.(10) Personal experience is listed as the number one attitude influence in unidimensional space, movies are at the other pole.

Dimension two affords another glance at how these means of communication influence attitude formation. Called the human actors/non-human actors dimension, this reveals the importance of humans. Dimension three represents the glorified/factual dimension or the differences between accounts gained from news reporters or personal experience as opposed to those learned from less reliable sources.(10)

CONCLUSIONS AND FURTHER RESEARCH

The amount of bodily harm inflicted, frequency of occurrence, feeling of degree of exposure, and the disruption to the victim's daily routine appear to be dimensions along which crimes are viewed. Those with prior association tend to view both violent and high-frequency crimes as severe, while those with no prior association appear to differentiate between crimes solely on the basis of violence for the first dimension. The frequency of occurrence appears to play a role as well in the second and third dimensions of both groups.

In terms of influence by the media on attitude formation, it appears that those with prior association feel that daily contact, human factors and factual reporting are the most influential dimensions along which the media are viewed.

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A SPATIAL ANALYSIS OF URBAN VEGETATION

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The urban environment represents an extreme case of man's modification of nature. Dense street patterns, large paved areas, construction projects, and air and water pollution may slow or prevent the growth of living organisms. These stressful situations result in the elimination of certain plants and animals that have not been able to adapt to the new environment. The urban ecosystem is, therefore often characterized by different plant and animal populations than those found in natural ecosystems.

The purpose of this research is to examine urban plant life forms, both natural and planted. As a result of this analysis, a classification scheme for urban vegetation has been devised. A spatial approach to a classification of urban vegetation appears to have been neglected because the study of vegetation has largely been undertaken by non-geographers. Our contemporary world is becoming increasingly urbanized. The concentration of large populations in urban areas requires that we understand the interrelations that exist between man and nature in these areas. A classification scheme provides an orderly approach to any particular problem. By understanding and classifying the distribution of plants in the city, we may eventually use that information to determine ways in which the urban environment may be made more aesthetically amenable to man.

Attempts to classify urban vegetation have not been altogether lacking. One scheme is presented by Detwyler(2) and includes four categories:

1. The interstitial forest
2. Parks and green zones
3. Gardens
4. Lawns and interstitial grasslands.

This classification system reflects primarily vegetation form, rather than areas of the city where vegetation types might be found. This is important because we need to know what restrictions are placed upon plant growth throughout the city in order to understand what plants will grow where.

The distribution of plants in the city is governed by numerous factors. These have been thoroughly reviewed by Schmid (3,4) and by Detwyler.(2) These factors include the modification of climate and of soils that is caused by urbanization; construction projects which habitually result in the removal of all vegetation at the project site; epidemic diseases such as dutch elm; plant selection made by the landscape architects and of the urban residents who are responsible for introducing vegetation into the environment; the presence of high concentrations of pollutants such as ozone or nitrogen oxides. Each of these factors may act alone or may combine with the others to damage or kill vegetation.

In spite of the roles played by each of these factors in the existence of plants in the city, a more important factor appears to be landuse. Plant growth is restricted by the presence of numerous buildings and by the dense street network. Open spaces are at a minimum in areas where buildings, streets and parking lots are numerous, but the amount of open space increases as these densities begin to decrease. It would, therefore, seem that a vegetation - landuse relationship should be examined.

The classification system presented here is based essentially upon the land use within the urban area. The plan incorporates the characteristics of form presented by Detwyler(2) as well as elements of other standard vegetation classifications, such as individual form, relative form and formation types. These elements have been reviewed by deLaubenfels.(1) Other factors involved are the urban stress conditions described previously.

Six vegetation zones have been identified from field observations carried out in Syracuse, New York:

1. The CBD Zone
2. The Weed Zone
3. The Residential Zone
4. The Industrial Zone
5. The Vacant Zone
6. The Park Zone

In each zone a unique type of vegetation predominates. The classification represents a first order approximation of vegetation zones. As a result, there may exist within the broader categories small areas which appear to belong in another zone. Each zone will not be examined individually in order to point out the differences in vegetation type to be found throughout the city.

The most obvious vegetation zone corresponds primarily to the Central Business District. This zone is not necessarily confined to the downtown area alone, but may extend out from the central area along certain streets that have commercial characteristics similar to those found in the downtown area.

In the CBD, little open land is available for plants to establish themselves. Furthermore, it is in the CBD that air pollution concentrations are highest due to automobile emissions. These conditions create a zone of extreme stress in which vegetation has great difficulty in surviving.

Any tree found in the zone is probably planted. Trees which are most tolerant of CBD conditions include the Ailanthus(Tree of Heaven), the London Plane Tree, the Red Maple, and the American Ash. Trees such as these have been found to be particularly resistant to pollution.

Natural plants that exist in the CBD zone are primarily weeds, herbs, and mosses that force their way into cracks in the pavement. They are not found in abundance because of the lack of unpaved areas but individual plants can be found without much difficulty. The weeds found in the CBD zone are the same as those found in other areas of the city as well as in the surrounding countryside. Some of the weeds commonly found in urban areas are Bindseed, Plantain, Ragweed, and Chicory.

There are some lawns in the CBD but they are small and do not exist in great number. They seem to be present only in front of municipal buildings where they provide an aesthetically pleasing atmosphere.

The CBD zone clearly resembles the desert in other vegetation classifications. It is a zone of extreme stress, one that is dominated by a few hardy species and by human-introducted and sustained plants that can only remain for a relatively short time.

Land-use characteristics become modified as one moves away from the CBD. Surrounding the CBD there appears to exist an area which is characterized by large parking lots, undeveloped lots, and areas of abandoned single or multiple-family dwellings. This is an area that is subject to a high degree of urban renewal, but it contains a unique vegetation type which permits it to be classified as a second vegetation zone. The con-

struction involved in urban renewal projects creates a stressful environment. However, once completed, the newly built buildings are surrounded by flower beds, small lawns and planted trees. At the same time, next to these new buildings there are often undeveloped lots which are taken over by weeds and herbs. The predominance of weeds is attributed to the capability to reproduce quickly and to spread themselves thoroughly.

In non-renewed areas, houses may be surrounded by unkept lawns or flower beds where weeds have begun to predominate. Trees are often absent due to the ravages of time and of disease.

This second zone surrounds the CBD. It is characterized by a distinctive vegetation pattern and as such should be considered a separate vegetation zone. Due to the disturbed nature of the area, weeds are the predominant vegetation type. For lack of a land-use term to describe this area, this zone is referred to as the "weed zone."

The third zone corresponds to the residential area. In general, the density of trees per unit area is higher than anywhere else in the city. Not only are there more trees, but the trees are healthier. The pollution levels are often lower than in the CBD, though salt still remains somewhat of a problem in areas where it is applied to melt snow on roadways and sidewalks. While houses, sidewalks and streets provide restrictions to growth, trees generally benefit from greater open spaces which allow them greater freedom to reproduce naturally.

The residential zone may be divided into several sub-areas. The division of the residential area in terms of vegetation differences is done on the basis of the age of the buildings within the zone. In the case of Syracuse, two such sub-divisions were identified. The boundary line between these two areas is drawn so as to separate pre-1900 and post-1900 development. The houses in the older area are set together, with less yard space. This will make the canopy less dense. In addition, the older trees found in this area will have been removed because of disease or because of age.

In the newer areas the space between the houses is greater and the problems with old dying trees are less important. These conditions allow for a better developed interstitial forest.

The fourth major vegetation area corresponds to the industrial warehouse zone. The paved conditions resemble the land-use conditions of the CBD, but the vegetation is much less regimented. The lack of trees is greater than in the weed zones although those trees that are found there are likely to have a natural origin. As in the CBD and the weed zone, weeds grow through cracks in the pavement, around the paved lots, and along the roadsides which, unlike most other zones, are not planted with grass. There are lawn areas in this zone but they are only found in small bands around the main office buildings.

There exist areas within the city where vegetation for some reason or another has not been greatly modified by humans. These large undeveloped vacant tracts are void of all buildings and unaffected by many of the urban stresses. As a result, they are characterized by what appears to be natural vegetation and they are referred to in the classification as vacant areas because of the absence of human influence. These sectors are often located along stream courses or on the fringes of the city where certain conditions may render them undesirable for develeopment. Vegetation of all kinds grows in abundance, including many species of trees, herbs, weeds, grasses, vines,

and bushes.

The park zone is characterized by open green space which has been subjected to different amounts of landscaping. Some areas contain large buildings, such as dormitories or classroom buildings, while other areas are cemeteries, where buildings are generally not present. Still other portions of the park zone are parks or recreation areas where buildings are usually absent.

The parks zone, then, is characterized in some places by all the features of the typical seasonal forest, while in others it looks more like a grassland. Each of these areas within the park zone is mostly devoted to providing green space. Gardening practices structure minor vegetation characteristics, and eliminate the weeds which are found in other zones. Much of the vegetation has been planted, especially the lawns or flowers, but some trees may have a natural origin.

The vegetation characteristics of urban areas may be described according to numerous systems, though no definitive scheme appears to have been put forth. The vegetation classification method proposed here is based upon urban land-use zones. However, while land-use is the major variable involved in the distribution of vegetation throughout the city, there are other elements which must also be examined in this spatial analysis. Once these variables are all assessed, the classification system may then be devised. The establishment of such a classification system will also bring about the creation of a terminology appropriate to urban vegetation which, as Schmid(4) points out, is lacking. An urban vegetation classification would then be of use not only to researchers who would find it a basis for further study, but also to city planners and managers. By knowing the conditions which govern the presence and growth of vegetation, the planners would be able to take the vegetation into account when establishing urban management strategies. Plant distribution could then become a criterion for the creation of zoning laws, or ordinances could be enacted to protect what may be regarded as an important urban resource. This study has proposed a basic classification system, but other field studies are required to refine this scheme. Once a more general model is created, along with its associated terminology, city planners will be able to put it to use to enhance the urban environment.

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PSYCHOLOGICAL IMPACT OF FLOOD CONTROL PROGRAMS: A BROOME COUNTY EXAMPLE

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Recent work in flood hazard perception has drifted away from perception studies towards a more applied geography of reducing immediate risks. It has been stressed that education of the flood plain resident to the initial eminence of a potential hazard and to long range prevention is imperative to reducing impact risk.

Along with increasing an individual's awareness of the potential hazard, methods of reducing potential flood impact and damage to the household have been cited. G.F. White(1) proposed two such measures - physical flood control measures and federally sponsored flood insurance. These are currently being undertaken as a governmental response to the flooding problem. The purpose of this study is to evaluate the impacts both responses have had on the perceived flood risks in Broome County, New York.

These programs are substantiated by the relative frequency of damaging floods in the Broome County area. Given the uncertain, yet common, occurrence of creek flooding we should expect, as Kates shows,(2) a greater perception of flood controls precedes a shift in perception of flooding risks. Other studies have substantiated Burton and Kates' contention that "there seems to be little or no significant effect in hazard perception by ...level of social class or education..."(3,4) Awareness of these available programs is yet to be tested in this vein within geographical literature.

Similar perception studies have shown that as the distance from an urban center increases there exists a greater feeling towards environment as true 'wilderness'. Philipsborn states that "with this increase in wilderness perception there is a similar increase in hazard awareness."(5) This seems to indicate discontinuous scales of awareness and perceived hazards along a rural to urban continuum.

Elsewhere, perception studies have examined the role of personal values or attitudes on the process of perception formulation. In natural hazards research the attitude of fate or luck is often encountered. Sewell found that internality, man's control of his own destiny, "appeared to be a better predictor of perceptions and attitudes"(6) than externality.

This study utilized this prior information in the evaluation of the perception of flood control measures testing the following hypotheses: 1) that the continuum from lowest awareness to highest with respect to those programs and from lowest perceived risk to highest will follow those flows:

more internal ⟶ more external ⟶ (Locus of Control) (7)
urban dwellers ⟶ suburban ⟶ rural dwellers
high socio-economic status ⟶ low

and 2) these control programs are lightly regarded, however flood insurance is more widely appreciated and used.

THE CREEKS

This study encompassed the flood plains of two major creeks in Broome County, New York: the Choconut and the Nanticoke. The Choconut flows north from its source in Pennsylvania approximately seven miles through Broome

County. The Nanticoke is perhaps the largest stream in the county, flowing over twenty miles from its source in the foothills in Northern Broome, emptying into the Susquehanna River.

These creeks were selected on the basis of the heterogeneity of the residential structure of their flood plains and secondly for incidence of physical flood control measures. Both creeks have been extensively revitalized, within the last ten years, by stream widening, rip-rapping, and construction of watershed dams. Whereas urban areas have been protected by flood walls for over thirty years, this is a rather recent phenomena in suburban and rural districts. Lastly, area residents have been made aware of the flooding problem by deaths incurred with recent floods.

METHODOLOGY AND ANALYSIS

The data for analysis of flood control awareness and perceived risk was gathered through a hand-delivered, mail back, non-renumerative survey. Two hundred questionnaires were randomly distributed in all residential environments of the two creeks. Forty completed questionnaires were returned, resulting in a 20% return rate. For purposes of analysis, 36 of the most fully completed questionnaires were used.

Analysis was performed using MANOVA, a multivariate analysis of variances, and univariate analysis of variance. Due to the nature of the data and the relatively small sample matrix achieved, this method was deemed the most useful statistical test for analyzing the relationships hypothesized.

Based on the MANOVA results, the urban, suburban, and rural residential populations are significantly different in multivariate space ($F = 2.90$, significant at the .05 level, $R^2 = .66$). This is based on eight independent variables; perceived distance from the creek, attitude-score on Rotter's Internal-External Locus of Control, current flood risk, risk prior to flood controls, flood control induced altered risk, protection rating, age, and education (income omitted due to poor response on that question). Univariate analysis showed two variables significant at the .05 level: distance and flood risk. Rural dwellers perceived their household as being closest to the creek, urban dwellers the farthest. In terms of flood risk suburban dwellers rated the risk as being highest, rural close but lower, and for urban dwellers the risk was substantially lower. Rotter's test proved to be insignificant with respect to differing between urban, suburban and rural dwellers. Univariate results show no heterogeneity of socio-economic status between types of residence amongst the sample study.

Table 1 gives a complete listing of all MANOVA and univariate analysis of variance with their respective significance levels. From Table 1 we see again a relationship between perceived flood risk and type of residence. Also evident is a significant relationship betwen flood risk and perceived prior risk. Those that had scored present risk in the lowest or two highest categories perceived the prior risk as the same whereas the middle two were classified significantly higher prior to flood control measures. Socio-economic and also attitudinal (Rotter's Test-Internal-External Locus of Control) variables were shown to be insignificant with respect to present and prior flood risks. The overall shift in perception of flooding risks, for the total sample, from prior to present was a very small drop.

This raises the question of awareness of flood control measures.

TABLE 1. Results of Variance Analysis

Dependent Variables	Independent Variables	MANOVA Significant at	Univariate Analysis Significant at
Residence	All	.05 R^2 = .66	---
"	Distance, flood risk	--	.05
Age	Protection	--	.05
Education	Attitude	--	.05
Flood Risk	All	.01 R^2 = .73	---
Flood Risk	Residence, prior risk	--	.01
Prior Risk	Flood Risk	--	.05
Altered Risk	All	.05 R^2 = .69	---
Altered Risk	Residence, education	--	.05
Protection	All	.01 R^2 = .77	---
"	Residence, distance	--	.01
	Attitude, flood risk	--	.01

TABLE 2. Incidence of Flood Insurance Protection

Residence	% of Residents Insured
Urban	0
Suburban	60
Rural	33
Total Sample	37.5

We viewed the analysis of awareness in three ways: 1) incidence of flood insurance; 2) knowledge of physical flood control measures; and 3) protection rating - incorporating both 1 and 2. Table 2 shows the incidence of insurance on the total sample population. Of those responding positively, 60% carried governmental subsidized policies only, 37% carried insurance with a private firm, and 20% carried both. Sixty-one percent of the total sample population had knowledge of at least one type of physical flood control on their creek. This statistic drops sharply to 15% having knowledge of two or more such measures.

Overall the total sample population defined total protection as insufficient, further indicating a general lack of awareness of flood control measures available. From Table 1 we see that the protection rating differs significantly across the sample population in multivariate space. Four independent variables registered significantly with respect to univariate analysis; residence perceived distance, attitudinal score and perceived flood risk. Rural and suburban dwellers scored nearly the same whereas urban dwellers rated the protection significantly greater. This can be accounted for by their proximity and familiarity with flood walls through the urban sector. The results also show that as perceived distance from the creek increases, the protection ratings also increases. Aside from education (see Table 1), protection was the only dependent variable upon which attitude was significant. As can be expected, the more externally oriented person (fate ruling) perceived the available protection significantly less sufficient than one internally oriented. And further, as perceived risk increases, the perception of protection decreases. Again we found no evidence of the significance of socio-economic variables upon this awareness variables.

CONCLUSION

This study concurs with Burton and Kates as to the effect of socio-economic variables upon the perception of natural hazards. It is also evident that socio-economic variables are not valid determinants of awareness for minimizing potential hazard damage. Awareness and perceived risk do however assume a discontinuous scale along the rural to urban continuum. This is perhaps best explained by the historic existence of the urban flood wall. Attitude was found to play an important role in awareness, yet not in perceived risk. The overall picture does not indicate a shift in perceived risk due to increased awareness as Kates states.

Again education of the populance must be stressed to not only increase their awareness but also increase participation in programs such as the federally sponsored flood insurance. As evidenced from the perception of risk and incidence of insurance coverage, the rural areas should be saturated with an awareness of these programs. It may well be the case that the incidence of insurance coverage is greater in the suburbs because of a greater spending capability (insufficient response dictated that income be omitted as a variable), if so, then a less exclusive insurance program is necessary.

This study indicates a great need for education to increase awareness of flood control. It is hoped that attitudinal variables will be further studied with respect to awareness and that the relationship between awareness and perceived risk will become more clear in natural hazards research.

ACKNOWLEDGEMENTS

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THE SUITABILITY OF DREDGE SPOIL AS BEACH FILL AT BERKELEY TOWNSHIP, NEW JERSEY

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This paper presents the results of a case study of a dredging and beach fill operation performed during the winter of 1977-78. An earlier study presented an overview of the potential for using spoil from maintenance dredging of the New Jersey Intracoastal Waterway as a beach nourishment source.(1) Our study provides a more comprehensive investigation of the use of this back bay sand for beach nourishment to see if such operations would be desirable in the future.

The present operation was not specifically designed to supply beach fill but rather to act as an inexpensive means of disposal for 141,516 cubic meters of spoil dredged from Barnegat Bay during the laying of a sewage pipeline by the Ocean County Sewerage Authority (OCSA) (Figure I). It was active from 12/6/77 to 2/6/78, and, after a storm-caused interruption, it was continued from 3/15/78 to 3/30/78.

The dredged spoil was approximately 70% sand and 30% fine material including peat, organic silt and clay.(2) It was hypothesized that the high sand content would enhance beach accumulation. Unfortunately, the fine organic material had potential for adverse environmental impacts. These included leaving the beach with an unnatural appearance (which would have temporary adverse effects on the tourist industry) and adverse effects on shell and finfish due to increased turbidity and pollutants in the surf zone.

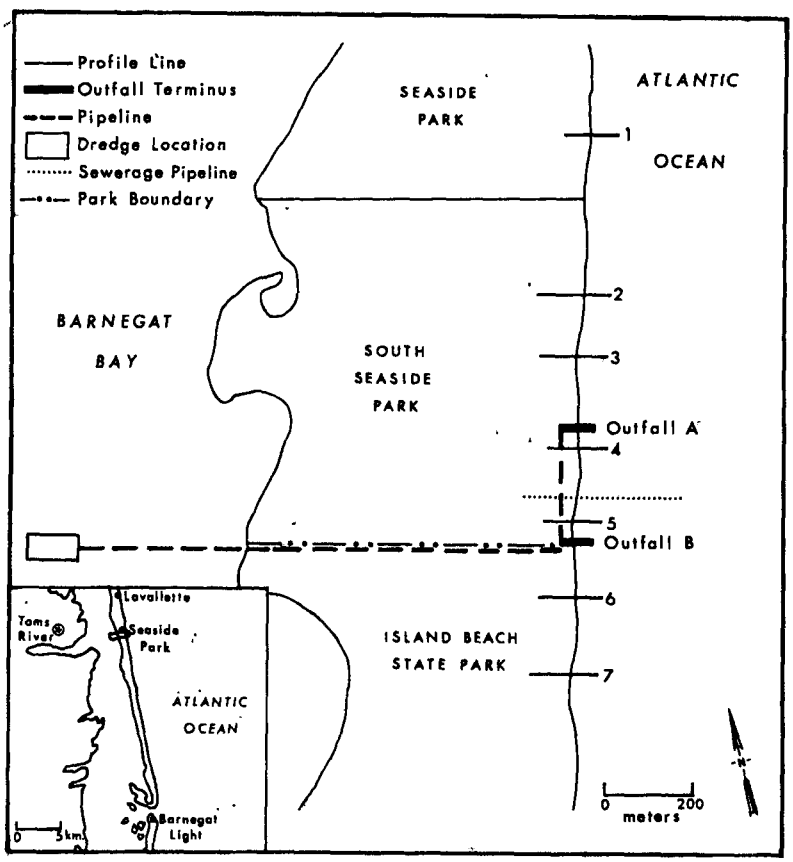

Figure 1. Location of spoiling operation.

BEACH CHANGES

Beach profile data were collected by leveling along seven profile lines (Figure 1) which were used to determine changes in beach width (Table 1).

The data show that there was little change in the location of the beach on the profiles farthest from the outfalls (Sites 1 and 7) up to the time the operation was concluded (11/18/77 to 2/22/78). In contrast, there was conspicuous accretion on the central profiles (Sites 3-6). Site 2 which is somewhat farther away from the outfall pipes showed slightly less accretion. This indicates that the operation was at least a short term success from the standpoint of beach nourishment.

Table 1. Width of beach in meters along profile lines seaward to mean high water/foreshore contact.

	Date	1	2	3	4	5	6	7
Prespoil	11/18/77	57	88	76	68	73	39	45
	12/2/77	59	-	-	-	-	38	-
Spoil	1/19/78	57	88	92	77	89	91	38
	2/22/78	50	101	98	98	92	58	39
Post spoil	4/6/78	-	89	89	76	117	82	53
	6/2/78	36	77	94	60	73	71	46

The sand was rapidly reworked after the disposal operation. Between 2/22/78 and 4/6/78 there was considerable accretion on the sites south of the sewer line where a sheet pile bulkhead formed a temporary barrier perpendicular to the shoreline and interfered with the northerly longshore transport of sand. This accretion could be attributed to normal wave action moving sediments into the area from the south and need not have been due to the pumping of the sand. Site 4, immediately in the lee of the structure, showed the most erosion. Sites 2 and 3, farther away also showed some erosion. In the next month, there was erosion on all profiles except Site 3.

Changes in beach width from 11/18/77 to 6/2/78 illustrate the result of the disposal operation. There was net erosion on most of the sites to the north of the outfall bulkhead (Site 3 being the only exception). Erosion on the sites closest to the outfall (Sites 2 and 4) was not as great as at Site 1, indicating that the operation possibly had a localized effect. No net erosion occurred on the beaches to the south of the bulkhead, and the data for Site 6 reveal net accretion. This suggests that the operation had a more beneficial effect on the beaches to the south of the bulkhead.

CHANGES IN WATER QUALITY

Measurements were taken by OCSA personnel at five evenly spaced sites between the two outfall pipes to determine the level of pollutants in the dredge spoil (Table 2). All testing conforms to methods described in Standard Methods for Examination of Water and Wastewater.(3)

Most water quality values during the disposal operation are not unusual for the sample area. The major exceptions are the values taken directly at the active outfall on 2/2/78 which are all significantly different, indicating an influx of poor quality water from the bay. The great variations in outfall samples is attributed to varying concentrations of these materials at the dredging site.

The pH values did not change throughout the study period (except as noted for the 2/2/78 sample). Salinity levels measured directly at the outfall are low but the data from other sampling locations reveal that there is a rapid dispersion. (Fortunately, many coastal organisms have a great tolerance to wide salinity ranges.) High coliform counts were recorded in only one sample and this was prior to the pumping operation. (Coliforms were measured as total coliforms but fecal counts are more specific indicators of bacterial contamination.) Spoil data indicate a slight increase in coliforms but since the Sewerage Authority did not measure coliforms at the outfall pipes, especially on 2/2/78 when the poorest water quality was recorded, it is difficult to prove that this increase was attributed to the disposal operation. Sewerage outfalls located in the ocean may also be possible sources, especially since coliforms survive longer in the winter. The values for biological oxygen demand (BOD) appear to be higher during pumping, probably due to an increase in organic material from the bay. Admittedly, this conclusion is partially based upon the high values monitored at the active outfall on 2/2/78. These values may also be associated with significant algal and plankton bloom fluctuations that historically occur during the late winter months. Similarly, high levels in post spoil samples indicate the occurrence of normal spring blooms.(7) Nearly all measured heavy metal concentrations exceeded typical seawater concentrations. In addition, copper and zinc levels were usually above minimum risk concentrations and iron was often above maximum acceptable levels for marine biota (Table 2). This information suggests the general poor quality of the area's coastal waters. Outfall data on 2/2/78 was significantly higher than the data recorded at the other outfalls.

It is difficult to assess the degree to which water quality data indicates a hazard to people because Federal and State water quality standards have not been well defined for bathers. If these data are representative, adverse effects, if any, will only be present intermittently at the immediate location of the active outfall and will reach background levels a short distance away. It

TABLE 2. Average water quality variables of sample sites.

Date	Temp (°C)	pH	Salinity % (mg./l.)	Total Coliforms (per 100 ml)	BOD_5 (g./kg.)	Heavy Metals (mg./l.) Copper	Zinc	Chromium	Iron	Lead
Prespoil Data										
11/3/77	14.0	7.9	29.4	3.2	1.4	.028*	.107*	0.000	1.500**	0.000
11/10		7.5	25.6							
11/17	12.5	7.9	30.8	1.8	3.4					
11/28	8.5	8.0	30.9	6.2	1.9					
12/1	10.0	7.9	27.6	92.4+	.1	.042*	.005	.045	.420**	0.000
Spoil Data										
12/6	8.0	7.9	28.0	14.6	4.9					
12/14	4.5	7.7	29.7	4.6	2.5					
12/21	7.5	7.9	28.0	13.8	5.6					
12/28	3.5	7.9	31.7		3.9					
1/5/78	4.5	7.9	31.2	24.6	2.3					
1/19		7.9	30.0	24.0						
(outfall B)		7.8	14.5	1.0						
1/26	5.0	7.9	30.8	13.8	4.8	.031*	.049*	.041*	.173**	0.000
2/2	.3	7.8	27.8	<1.0	7.4	.014**	.051**	.092	9.984**	0.000**
(outfall B)		8.9	14.5		11.7	.328*	8.720*	.841**	555.490*	.246
3/27	6.0	8.0	27.0	14.8	7.1	.023*	.101*	.045	.198**	0.000
(outfall B)	6.0	8.0	17.2		6.9	.019	.144	.023	.374	0.000
Post Spoil Data										
4/5	7.0	7.9	30.4		4.6	.019*	.025*	.023	.235**	0.000
4/18	9.0	8.1	30.9	1.2	6.9	.024*	.035*	.012	1.951*	0.000
5/19						.023	.016	.023	.124	0.000
Typical Sea Water Concentrations[4]						.003	.010	.00005	.010	.00003

* above minimum risk concentrations; ** above maximum acceptable concentrations[5]; + above approved growing area standards for shellfish cultivation.[6]

is assumed that because nearshore fish and crustaceans are mobile, and important commercial shellfish concentrations are farther offshore, they can escape these localized problem areas. Further, inshore fish populations are minimal at this time of the year.

AESTHETICS

A questionnaire was developed and administered to residents and visitors in the area. The questions and tabulated responses are presented in Table 3.

TABLE 3. Responses to questionnaire tabulated according to respondent's observation of actual spoiling process. N=100

	Observed spoiling N=25			Did not observe spoiling N=75		
	Yes	No	Don't Know	Yes	No	Don't Know
Q1. Resident of Area?	24	1		46	29	
Q2. Are you familiar with spoil operation?	24	1		28	47	
Q3. Is beach spoiling a better disposal method than marsh dumping?	13	10	2	31	21	33
Q4. Do N.J. beaches need more sand?	13	11	1	46	18	11
Q5. Do study area beaches need more sand?	11	14		31	30	14
Q6. Will spoil operation adversely affect attractiveness of beach?	17	6	2	36	28	11
Q7. Will spoil operation harm fish and fishing?	12	7	6	32	27	16

The data reveal that most respondents did not witness the actual spoiling process and only half of them knew of the project even though the majority were area residents. Mixed views exist about whether beach spoiling is a better means of disposal than dumping on the wetlands. As expected, there was a larger number of "don't know" responses from the people who had not observed the disposal operation. Generally, respondents felt that the New Jersey beaches require more sand. Respondents seemed to feel that the need for sand in the study area was somewhat less critical than for the state in general. Similar observations by residents prior to the operation were responsible for objections to the project. These people felt it would detract from the appearance of the beach (most voiced concern over the black color of the sand and the presence of clay balls on the beach). Responses regarding adverse effects on fishing were less negative and more uncertain. However, the water quality data do not point to major adverse effects. Such negative perceptions could interfere with the initiation of future operations, and it appears that aesthetics and perceived effects should be a focus of

future study. Interestingly, a prior beach fill project conducted after the disasterous storm of March 1962 utilized the same backbay materials. Selected persons interviewed following the disposal operation indicated that the fill had not produced any adverse visual effects. In fact, their casual attitude about the project was in marked contrast to their great concern before the operation was conducted.

CONCLUSIONS

Although the dredged material was less than completely suitable, there was some accumulation on the beach as a result of the relatively high sand content. The operation was perceived to temporarily reduce the attractiveness of the beach for visitors. However, as little as two months after completion of the operation there was no evidence to suggest that disposal had recently occurred on the beach. This, combined with the consideration that the tourist industry is minimal in the winter, indicates that aesthetics need not be a major problem if the operation is properly timed.

It would be desirable to implement measures to avoid dredge sites high in pollutant concentrations and organic material (such as those dredged on 2/2/78). This may not be possible, however, because of dredging realities and cost constraints. Fortunately, the situation may not be so critical because data suggest that the pipe concentrations disperse rapidly.

It is suggested that future operations should be conducted in the winter when fish populations and visitors to the shorefront are minimal. Although there is little evidence to indicate that the operation had an appreciable effect on the dimensions of the beach, it appears that beach disposal is a viable means of utilizing dredge spoil; at least spoil with the characteristics found in Barnegat Bay. However, the public must be informed that such operations result in minimum disruption of the beach in order to eliminate misconceptions.

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THE SPATIAL PLANNING IMPLICATIONS OF UNSATISFIED DEMAND FOR CAPITAL FUNDS IN A DEVELOPING ECONOMY

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A number of authors have concluded that the banking system in most developing economies is not satisfying the demand for capital funds outside of the enclave economy.(1) However, demand for capital funds is not confined to the urban enclave economy and capital needs in peripheral regions are met by nonbank sources of credit at high interest rates. The purpose of this study is to isolate several factors important to the spatial variation in excess demand for capital funds within the context of a developing economy and to suggest some policy implications.

THE STUDY AREA

The country chosen for this study is the East African nation of Ethiopia. The urban hierarchy in Ethiopia is dominated by the primary core city of Addis Ababa near the geographic center of the country and a secondary and competing core city of Asmara in the north. Although the commercial banking system has been relatively successful in opening branch bank offices in outlying towns, several studies indicate that the banking system has had less success in making loans available through the branch bank system.(2)

This study will utilize two main sources of data. The first group of data represents the total loans and deposits from all of the branch banks and was obtained from the Commercial Bank of Ethiopia.(3) The second data source was the government of Ethiopia.(4) Although a survey on indebtedness was taken by the former imperial government of Haile Selassie, it is significant that this 1970 survey, which showed excess demand for capital funds in the periphery, was not published until the military government came to power in 1974.(5)

To focus more clearly on the nature of unsatisfied demand for capital funds, two hypotheses have been identified. First it is hypothesized that the banking system will show a spatial concentration of investment in the largest population centers. These centers also have the largest clustering of industry, urban real estate transactions, and import-export trade - three sectors that the commercial banking system is known to have invested in heavily.(6)

The second hypothesis is that a pattern of unsatisfied demand for capital funds can be represented by high-interest loans from nonbank sources: landlords, village merchants, and the church. Although no direct measure of unsatisfied demand for capital funds exists, it is believed that high interest rates coupled with nonbank supply sources can serve as a proxy measure.

THE ANALYSIS

Canonical correlation was chosen as the multivariate technique to assess the simultaneous relationship between capital supply and demand patterns. By using this model, one is able to produce linear combinations of the original variables by maximizing the relationship between the bank loan supply variables for each urban center and the capital demand variables for that center.(7)

The canonical factor coefficients for the two sets of data are pre-

sented in Table 1. The size of the coefficients are indicative of the relative contribution of the original variables in composing the canonical factors. Factor one can be readily identified as being influenced by the banking sector, nonagricultural investments, and large urban centers. The "other sources" for loans and mean annual interest rates are both negatively related to this first factor. The level of indebtness is high; however, this is not unexpected in areas where industrial, commercial, and private consumption loans are being granted by banks. Finally, Factor 1 is found in those large population centers with high loan-deposit ratios that, according to the negative distance coefficients, are near the main core regions of Addis Ababa and Asmara.

The canonical factor coefficients associated with the second factor illustrate a different set of characteristics. Although found in urban centers with both moderately low loan-deposit ratios and high levels of indebtedness, Factor II is associated with high interest rates. The second factor is also marked by the relatively small importance of the banking sector but a strong dependence on landlords, the church, and merchants as sources of capital funds.

The distance variables indicate that in locational terms Factor II is located primarily in urban centers that are remotely located with respect to the Addis Ababa and Asmara core regions. Finally, the second canonical factor is negatively influenced by a high percentage of the urban population employed in nonagricultural employment.

CONCLUSIONS AND POLICY IMPLICATIONS

The analysis reveals a typical core-periphery development pattern. The first hypothesis that the commercial banking system will show a spatial concentration of investment in the largest population centers is confirmed by the first factor in the canonical correlation analysis. The second hypothesis that unsatisfied demand for capital funds is present in peripheral regions is also confirmed by the analysis.

The position taken by the commercial banking system in Ethiopia on agricultural financing, especially small-scale agricultural loans, appears to be a typical stance taken by established lending institutions in developing economies. However, the question that must be asked is, how valid is the perception of the traditional agricultural sector by the banking system? There is evidence that traditional agriculture has not been given the support that it deserves.

As this analysis indicates, farmers turn to landlords, merchants, and the church for bridging the capital gap between the growing season and the actual harvesting and marketing of the crop. These nonbank sources of loans receive annual interest rates of 100 to 200 per cent for providing loans of as little as $50-100.(8)

Although these moneylenders have proven the productivity and need for investment in the rural agricultural sector, the banking system was lending at interest rates of eight or nine percent to protected manufacturing activities, import-export companies, and real estate development in the large urban centers. Together with government, these urban borrowers absorbed nearly all of the bank's lending resources. The large interest rate differentials between organized banking and informal rural credit in Ethiopia are not unusually great relative to those in other developing ecnomies.(9) However, it is this typical western view that the traditional agricultural sector reflects the least attractive source of growth that has widened the gap between the urban core areas and the rural periphery. In

TABLE 1. CANONICAL CORRELATION OF THE CAPITAL MARKET STRUCTURE(1970)

Variables	Canonical Factor Canonical Correlation(R)* I .965	II .847
Loan-deposit Ratio	.745	-.338
Population	1.325	.449
Distance from Addis Ababa	-1.047	.389
Distance from Asmara	-1.359	.535
% of Nonagricultural Employment	.788	-.246
Average $ Indebtedness	1.551	.715
Average Annual Interest	-.079	.718
% from Landlord	-.201	.915
% from Merchants	-.219	.413
% from Banks	.963	-.190
% from the Church	-.069	.886
% from "Other Sources"	.021	.214

Roots Removed	Canonical R	R^2	Chi-Square	Deg. of Freedom	Lambda
1	.965	.932	248.7443	40	.0109
2	.847	.717	101.2212	30	.1587

*Rows represent canonical coefficients of each variable with the canonical factors (columns).

**Significant at the .01 level.

SOURCE: Computed by the author.

addition, the lack of emphasis on indigenous agriculture has contributed to the growing number of developing countries that are today net importers of food.

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MIGRATION VARIABLES IN THE OUTER NEW YORK SUBURBAN RING

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The decision to suburbanize may be regarded as a specialized case of migration. The United States is a particularly mobile society, both in terms of residence change and personal mobility. Decennial census data are only able to identify gross shifts in population. Lack of adequate and detailed information makes the testing of theory difficult. Theories based on volume and distance migrated have been amplified by the consideration of behavioral aspects. These involve the consideration not only of economic and employment aspects but also include such factors as place utility, life-cycle stage and threshold formation;(1) the resoltuion of family based (internal) and neighborhood generated (external) pressures in a mover-stayer framework;(2) and the discussion of differential attractiveness as it is influenced by information flows.(3)

In an attempt to consider the relative strengths of perceived variables in migration decisions on a small scale, a study was made in a township on the periphery of the New York metropolitan area. The township, Blooming Grove, is located in Orange County, about 50 miles north-west of New York City. It is identified as part of the outer suburban ring by the Tri-State Regional Planning Commission. Typical of many outlying suburban areas, Orange County has been increasingly influenced by New York City. In the mid-nineteenth century Orange County was connected to the city by railroad, and agricultural production shifted from grain to dairy farming. Small market centers formed the nuclei for expansion in the early 1900's, primarily as a result of population growth through natural increase. Before the construction of the George Washington Bridge, river crossings were by ferry and Southern Orange County represented the limit of day trips from the city. Beginning in the 1920's, several areas in the county, including Blooming Grove became popular as summer resorts. The resort trade started declining just prior to World War II. Transportation improvements and the post-war demand for housing initiated the development of the area into part of the peripheral metropolitan region. Later the construction of limited access, high speed highways, including the New York State Thruway, and improvement of Route 17, made daily commutation a possibility.

The township displays a settlement pattern related to its historical growth. Superimposed on the older centers are clusters of resort communities and newer, suburban-type developments. Depending on the lot size and the number of homes, these developments can be designated as scatter or cluster groupings. As land prices and taxes rose in the inner suburban ring, development in the greater New York area spread outward to impact Blooming Grove. This involved not only the construction of new homes but also the conversion of some of the vacation homes to year round housing. Examination of building permits issued reveals a steady expansion in construction through the 1960's with a marked surge in 1965. The peak was reached in 1972, and building has since declined due to economic pressures and the energy crisis. Since 1970, dwelling types have diversified with the building of apartments, townhouses and the opening of a trailer park.

RESEARCH DESIGN

The identification of recent migrants in the township of Blooming Grove proved a complex process. Two separate approaches were used. As much of the housing stock is in single-family homes, a search of the

County Deeds and Mortgages record was made for 1972, the peak permit issuing year. County records show the name and address of the buyer and seller of property. An accurate assessment of the house price can be made from the tax stamps affixed to the deed. Land sales which do not include homes and willed property can be omitted by a careful study of the legal document, which is in the public domain. In-migrants in 1972 who had remained in the area until 1977 were then identified by using a local telephone directory. This is a valid method since there are very few unlisted numbers. A 25 percent sample of these migrants were then interviewed by telephone.

As the first survey was restricted to home buyers, a second approach was employed to include rental units, necessary in view of the recent increase in this dwelling sector. The second sample telephone directories for two successive years, 1976 and 1977, and noting the new numbers. Again, a 25 percent sample was questioned by telephone as to their motivations for moving.

The design of the questionnaires aimed at determining behavior need to be as unbiased as possible. It was felt that the telphone interview was less of an imposition than a personal contact. The questioning was made as open-ended as possible by first inquiring the reason for moving, and only later suggesting possible answers. This was done to simplify analysis, although cases where a combination of factors existed were noted. Date of moving was asked to check on the information previously obtained. Data on employment and job location were also collected. Reasons for migration are affected by the migrant's perceptions, even if these later prove unrealistic. It has been noted by sociologists that people respond to their perceived environments, and that the accuracy of these impressions depends on available information. The in-migrants were thus questioned as to their links with the area, through both public and private channels, prior to their move.

RESULTS

The telphone interview yielded a good response: 94 percent successful in the first sample and 92 percent in the second. The survey was conducted in March which screened out summer residents. The total picture for 1972 and 1976 in-migrants reflected the areas of new construction for those years, and the shift in the later period from single family dwellings to a higher proportion of rental facilities.

The results of the telephone samples revealed the following patterns. In 1972, migration from New York City represented 27 percent, with 25 percent coming from the inner suburban ring (mostly Rockland county and inner New Jersey). Local migrants, from within Orange county, amounted to 33 percent. In 1976, New York City migrants again formed 27 percent of the total, but the inner suburban sector contributed 32 percent, while the local share dropped to 15 percent. The remainer in both samples had come from outside the greater New York region.

Migration data from both samples were aggregated to determine job related aspects of migration. Migrants appeared to be fairly 'footloose' in their distance from work. Only 22 percent lived in the immediate vicinity of their jobs. A further 11 percent worked in Orange County, but travel to work often involved a 20 to 30 minute ride. 17 percent worked in Rockland County and 27 percent commuted to New York City. The remainder included unemployed and retired respondents.

In general, the migrants fell into three groups. Those who had moved

REASONS FOR MIGRATION: 1972 MIGRANTS

	Reasons											
	Life Cycle			Push		Pull		Linkages		House Found		
Origin	Job Change	Family Change	Retirement	Deterioration of Area	Area too Costly	Rural Atmosphere	Own House	Friend	Family	Newspaper	Realtor	Private Contact
Brooklyn (7)	-	3	3	2	1	4	-	2	3	1	1	5
Bronx (4)	-	-	-	3	-	3	1	3	1	1	1	2
Queens (5)	-	3	-	1	-	5	1	2	2	-	1	4
Staten I. (1)	-	-	-	-	-	1	-	-	1	-	-	1
Rockland (10)	2	-	-	-	9	5	2	4	2	2	3	5
N. Jersey (5)	-	1	-	-	2	2	1	1	3	-	3	2
L. Island (3)	1	-	-	1	-	2	1	2	1	-	2	1
Conn. (3)	3	-	-	-	-	1	-	-	1	1	1	1
Upstate N.Y. (1)	1	-	-	1	-	-	-	-	-	1	-	-
Orange Co. (11)	-	6	-	1	-	1	6	7	3	2	1	8
TOTAL (50)	7	13	3	9	12	24	12	21	17	8	13	29
		16		21		36		38		50		

SOURCE: Telephone survey in March 1977.

REASONS FOR MIGRATION: 1976 MIGRANTS

		Reasons											
		Life Cycle			Push		Pull		Linkages		House Found		
Origin		Job Change	Family Change	Retirement	Deterioration of Area	Area too Costly	Rural Atmosphere	Own House	Friend	Family	Newspaper	Realtor	Private Contact
Brooklyn(4)		-	-	3	2	-	4	-	2	2	-	1	3
Bronx(2)		-	-	-	2	-	-	1	-	2	-	-	2
Queens(8)		-	2	3	2	-	7	-	2	4	2	4	2
Manhattan(3)		-	-	1	2	-	3	-	1	2	-	2	1
Westchester(4)		1	1	-	1	2	2	-	1	-	1	1	2
Rockland(14)		-	1	2	-	8	6	1	5	5	3	1	10
New Jersey(4)		1	1	1	-	2	1	2	-	2	-	2	2
L.Island(3)		1	-	1	-	-	3	-	1	1	-	1	2
Upstate N.Y.(5)		5	-	-	-	1	1	2	1	2	1	1	3
Orange Co.(10)		2	3	-	1	-	1	3	6	1	5	2	3
Out of N.Y. State (6+3 returns)		9	-	1	-	-	-	1	2	3	1	5	3
TOTAL	(66)	19	8	12	10	13	28	10	21	24	13	20	33
					23		38		45			66	

SOURCE: Telephone survey in March, 1977.

from New York City had moved to the larger developments, clustered groupings of single-family homes and were primarily responding to the attraction of 'rural' living with reasonable access to the city. As a result of crowding and rising costs in their previous location, migrants from the inner suburban ring tended to move to smaller, scatter developments; an extension of the typical suburban trade of space for accessibility. In contrast, local movers (those from within Orange county) cited life-cycle related reasons: marriage, divorce, retirement or change in family size. The different reasons cited were the pre-eminent ones for moving, although in most cases the decision was based on a combination of factors. Differentiating between 'push' and 'pull' factors was often hard for the interviewee.

Perhaps the most striking aspect of the two samples was the high percentage of migrants who had had friends or family in the area prior to their move. Job-related friendship linkages had been particularly important in the largest development, where there was a high proportion of New York city firemen and policemen. Family links were also important, and chain migrations had occurred, with a family being followed by related households. An increase in this trend had been made possible by the greater variety of housing stock.

The informational aspect of these links was revealed by answers as to how the present residence was found. Most migrants had found their homes through private contacts. Migrants from the New York City boroughs and inner suburban ring seem to illustrate an interesting factor in their specific choice of a residential area: the presence of family or friends, including links that had been forged during summer vacations. Such linkages provide information that lessens the risk and uncertainty for migrants, and enhances their perception of the area as a congenial location.

Although the study conducted was on a small scale, a scale imposed by the research design and the characteristic complexity of the migration process, it serves to illustrate the difficulty of devising theoretical approaches to suburbanization in the United States.

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THE DISTANCE AND DIRECTION FACTORS IN FREIGHT RATES

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Many factors affect the freight rates that individuals pay for the use of transport services. It is generally accepted that the cost of movement plays a significant role in the explanation of spatial distributions and spatial interaction. This cost has typically been measured by some function of the distance over which the movement occurs. Additionally, the orientation of the movement may also affect the rate that an individual may be charged. This paper attempts to look at these two factors and their relationship to the cost per ton-mile paid for moving a commodity by rail.

The cost paid by an individual for using a rail transport service is related to the cost of the service, the value of the service, the value of the commodity, the distance of the haul, direction of the haul, terminal charges, competition, regulation, and the volume of traffic as well as many other factors.(1) In determining the rates to be charged, three principles may be said to be in effect: cost-of-service, value-of-service, and 'what the traffic will bear' pricing.(2) The cost-of-service pricing is considered the lower bound of the rate that might be charged since this includes the terminal costs as well as the cost of the movement between an origin and a destination. A rational carrier could not be expected to charge less than this amount for a haul since, if he did, he would be losing revenue. The value-of-service forms the upper bound of the rates that may be charged. The value-of-service is defined as the market price difference per unit weight for a commodity between the origin of the shipment and its destination. Again this is a rational limit since a shipper would not be willing to pay more for the transportation of his good than he can expect in profit. The area between these limits is termed 'what the traffic will bear' pricing and is the area in which transport rates fall. The term was developed because of the common practice by carriers of charging the highest rate possible and yet falling below the value-of-service limit.

Each of the above mentioned principles has a relationship with distance. The cost-of-service limit increases with increasing distance of haul but at a decreasing rate. This is because of the terminal charges being spread over the length of the movement and certain economies enjoyed by the mode. The value-of-service limit is related to distance by definition since it is the price difference over space. 'What the traffic will bear' pricing is related to distance because the Interstate Commerce Commission (ICC) since the 1930's has required the use of distance in setting all class and commodity rates.

There are several reasons for the required use of distance in ratemaking. First, they are easy to understand. Second, rates based on distance tend to conform to the cost-of-service principle.(3) Finally, these rates tend to preserve for each locality the advantages of its location.

The work by Alexander, Brown and Dahlberg indicates that not only distance but also direction may be a factor in rates paid by shippers.(4) While the ICC requires that rates should be the same in both directions between two stations, there are exceptions. The rates may vary because of direction in an attempt by a carrier to upgrade or downgrade the amount of traffic. An example of this is the use of back-haul rates used to move cars from the industrial Northeast to the agricultural Midwest. The direction may also influence the rates because of the volume of traffic. If the volume of traffic is sufficiently large the cost of the service may decrease through the use of larger trains and therefore lower rates could be charged.

In looking at these two factors, distance and direction, and their relationship to the cost per ton-mile, two models will be considered. The basic forms of the transport cost model being considered are:

Model I: $Y = aX^{b_1} \; Z^{b_2}$

Model II: $Y = \exp(a + b_1X + b_2Z)$

where Y is the shipping costs, X is the distance of the haul, and Z is the direction of the movement. The parameters a, b_1, and b_2 represent values which are to be estimated. Assuming multiplicative error, the forms of the models are intrinsically linear by a logarithmic transformation. (5) The forms of the model were selected because of the relationship of the data as given in Figure 1.

The data for calibrating the model were drawn from individual waybills for freight movements during 1973 by the Penn Central Transportation Corporation. These data contain information on the commodity moved by seven-digit Standard Transportation Commodity Code (STCC) classification; originating and terminating freight station Standard Point Location Code (SPLC); amount moved by carload and tons; short-line miles; and the revenue received by the carrier. The data were collected by the author when he was Assistant Director of the Indiana State Rail Planning Staff from computer data tapes provided by the U.S. Railway Association for evaluation of branch lines in the state because of the formation of CONRAIL. The data for this research are restricted to those waybills termed local. These are freight shipments which were moved by the originating carrier for the entire length of the haul.

The transport costs which are used in this research as the dependent variable is the shipping cost paid per ton-mile based on revenue, distance and tonnage reported in the waybills. This measure is similar to those used in studies on the location of economic activities.

The commodity being considered is farm products, STCC 01. This classification includes field crops, fruits, vegetables, livestock, and poultry. The STCC provides a commodity classification system of very fine detail. This code then determines the rate to be charged. The research was restricted to the two-digit level to avoid problems of disclosure and provide a large enough sample data base to render the analysis testable.

The distance variable is measured as the short-haul mileage reported in the waybills. This mileage is defined as "... the shortest possible route over which carload traffic can be interchanged without transfer of lading."(6) The direction of the movement was determined by using the originating and terminating Standard Point Location Codes. This code provides information on state, county, and station. The data utilized was limited to only those movements occurring within the state of Indiana. Using that portion of the code which indicates the county, a direction was determined as a heading from north based on the county seat of the origin and terminal points.

This aggregation by STCC and SPLC resulted in a data file of 63 observations between 34 of the 92 counties in the state of Indiana. This data accounted for 115,326 tons and $479,022 in revenue for the carrier or 2.5 percent and 1.7 percent, respectively, of all local movements by the Penn Central of farm products.

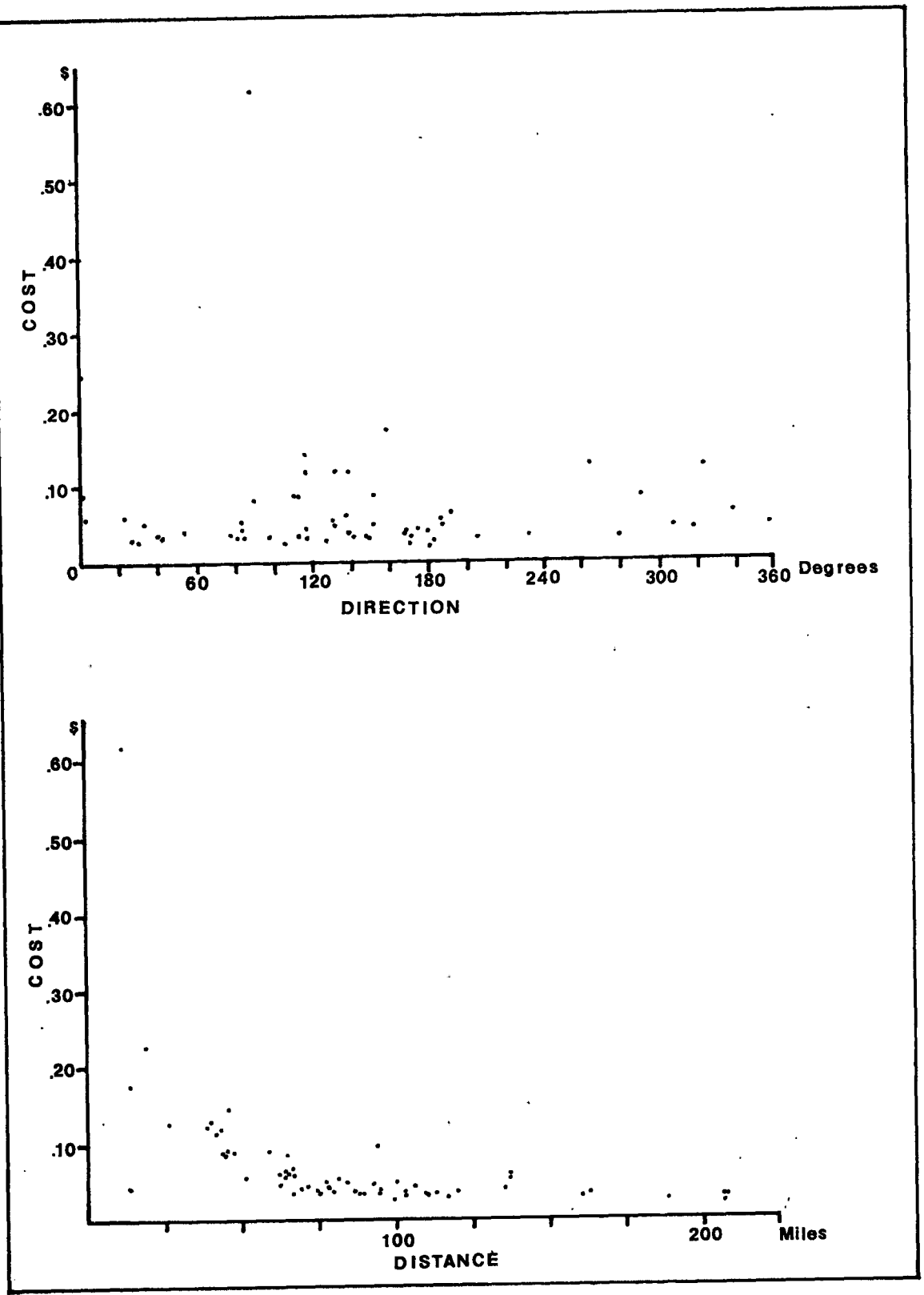

Figure 1. Relationships Between the Variables

The average distance of a haul was 83.2 miles while the mean orientation of the movements was 139.6 degrees. A Rayleigh test was conducted on the directional data to determine if there was a preferred orientation in the shipments.(7) The test indicated that there was a preferred orientation to the southeast. While this gives an initial indication that direction has some influence on movements in the study area, it does not indicate any relationship to the transport costs. This relationship may be tested with the information included in Table 1. The correlations between direction and the cost per ton-mile and the log of the cost per ton-mile are not significant at the .05 confidence level and may occur because of sampling variations. The remaining correlations are all significant.

TABLE 1

CORRELATIONS

Variable	Miles	Direction	In(Miles)	In(Direction)
Cost/Ton-Miles	-.440	-.219	-.679	-.454
In(Cost/Ton-Mile)	-.670	-.138	-.847	-.383

As metioned above, the parameters of the models were determined by regression analysis. The estimated models are given below.

Model I: $Y = .7151\ X^{-.8184}\ Z^{-.0406}\ \exp(\pm.3723)$
(1.24) (12.69) (1.08)
$R = .863, \quad R^2 = .745, \quad F = 175.52$

Model II: $Y = \exp(-1.9021 - .0108\ X - .0008\ Z)\ \exp(\pm.5344)$
(13.41) (7.23) (1.12)
$R = .689, \quad R^2 = .475, \quad F = 54.32$

where Y is the cost per ton-mile, X is the distance of the haul, and Z is the direction of the movement. The numbers in the parentheses below the models are the calculated t-values.

Both of the models are significant at the .05 confidence level. However, all the parameters are not significantly different from zero. Specifically, the parameters for direction in both cases fail the t-test. The inclusion of direction increases the explanatory power of the model by 3.7 percent for Model I and 2.5 percent for Model II. Most of the variation in the costs per ton-mile is explained by the distance of the haul, 74.5 percent in Model I and 44.9 percent in Model II.

While distance has a large explanatory power as would be anticipated, direction seems to have little power in explaining the costs per ton-mile paid by individual shippers. There are two possible reasons for this lack of explanatory power. As pointed out earlier, the ICC required rates to be uniform, in most cases, based on the direction of the haul. Second, the commodity classification used in this research may have been too limited. A combination of commodity types using the same type of railroad car may provide a better result. Further research into these two areas should be conducted.

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SHORELINE ORIENTATION, BREAKER HEIGHT, AND VOLUMETRIC BEACH CHANGES AT SANDY HOOK, NEW JERSEY

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This paper compares sediment budget data with differences in breaker heights and changes in shoreline orientation along seven oceanside segments at Sandy Hook, New Jersey (Figure 1).

RATIONALE

The purpose of this study is to relate wave height to the volume of sand deposited at breaks in shoreline orientation. It was therefore hypothesized that a relationship exists between changes in shoreline orientation, wave height, and quantity of sediment deposited. The apporach taken in this study was to provide a simplified model to determine the sediment budget. This would be applicable to long reaches of the shoreline where more complex empirical data are either difficult to obtain or unavailable. Such data would pertain to elements of wave energy, longshore current velocity, and sediment load.

Longshore sediment transport theories developed from experimental and numerical models are difficult to test in the turbulent flow conditions of the littoral zone. Another problem concerning these theories lies in the assumption that sediments are transported as a continuous river of sand. The river of sand can be described as unidirectional sediment transport which results from continuous flow conditions within the nearshore zone.

An alternative to this form of transport is periodic flows of sediment which occur in the form of pulses.(1) Sediment pulses are more evident at breaks in shoreline orientation and are dependent upon changes in wave conditions. The relationship between these conditions and the frequency of sediment pulses is poorly understood. This implies that simplified models of longshore sediment transport assuming the river of sand concept are inappropriate for this study area.

A useful conceptual framework to adopt is that of a sediment budget. (2,3,4,5,6,7) Pulsational sediment transfers can be integrated into this framework which is based on quantitites of sediment removed, transported and deposited, and the resulting excesses or deficiencies of material in the beach and nearshore zones. Volumetric changes are implemented in the sediment budget which can be expressed as an arithmetic relationship between the quantity of sediment added to a system from potential sources and the quantity of sediment moved to potential sinks. Standardized sediment budget notation is provided in the Shore Protection Manual.(8) Point sources (Q_i^+) and point sinks (Q_i^-) either add or subtract or subtract sediment across a portion of a control volume boundary such as an inlet or river delta. Line sources (q_i^+) and line sinks (q_i^-) are areas where material is either added or subtracted across a segment of a control volume boundary. Therefore, a sediment budget, which is balanced, should exhibit zero difference between the sources and sinks. This arithmetic relationship is expressed as follows:

$$\sum_{i=1}^{n} Q^+ + \sum_{i=1}^{n} q^+ = \sum_{i=1}^{n} Q^- + \sum_{i=1}^{n} q^-$$

The sediment budget is usually computed by subtracting the sum of

known sinks from the sum of known sources. This results in an estimate of erosion or deposition.

There are numerous advantages to using a sediment budget framework. These include the ability to: integrate onshore and offshore transport by wind and wave processes; identify and classify physiographic features as potential sources or sinks in response to given wave climate conditions; facilitate location of recreational facilities; and aid in design of protective structures.

There are certain difficulties with using the sediment budget technique. They primarily occur because of infrequent photographic coverage or lack of synchronous recording of empirical wave data with beach profile characteristics.

METHODS

The methodology involved a short term history of shoreline orientation and volumetric change. These were compiled for the seven segments from existing aerial photographs taken twice annually from 1953 to 1971. Seven transects, established normal to the shoreline, were measured from easily identifiable targets such as buildings and storage tanks (Figure 1). Changes in the patterns of erosion and deposition were recorded relative to the initial 1953 aerial photographs.

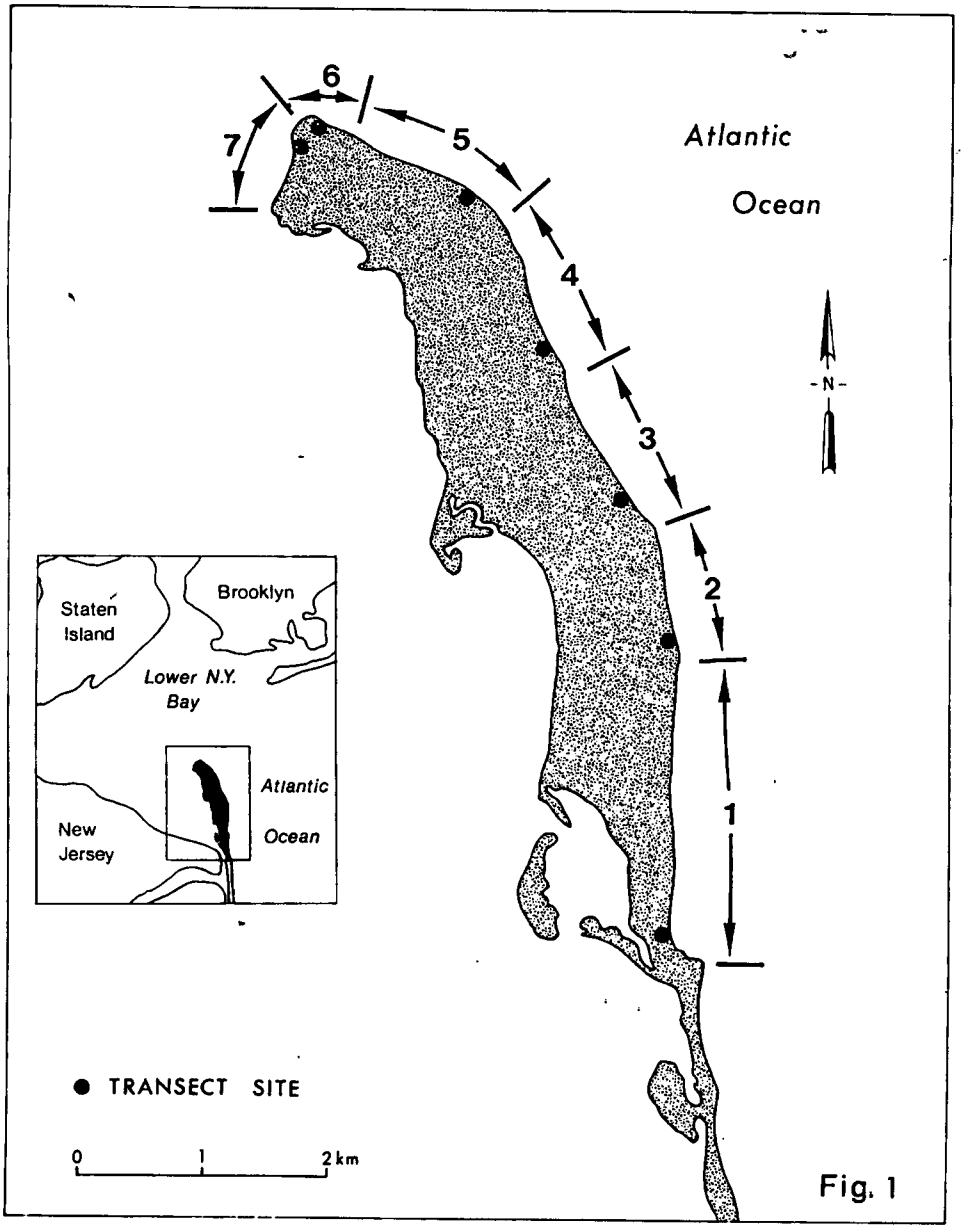
Volumetric changes were ascertained by combining the photographic shoreline change data with changes in the area of the beach profile cross-section. Profile changes were determined from actual beach surveys. Comparisons were then made between volumetric changes and changes in shoreline orientation. Significant breaker height is used as a first approximation of wave energy in this study, and at least 40 observations were recorded at each site.

RESULTS

The proximal end of Sandy Hook, denoted as Segment 1, is oriented on a north-south axis and comprises two distinct zones. The first is characterized by a shoreline that is artifically stabilized by a seawall and groin field. The second immediately to the north is the principal line source of sediment for the downdrift segments (Figure 1). The seawall and groin field to the south effectively impede longshore transport of sand that would be available to the unprotected zone downdrift. This combined with high wave energies produces an erosional area within the unprotected beach.

The remaining oceanside segments are characterized by deposition. This sediment sinks are responsive to changes in shoreline orientation and significantly influence breaker height. The relationships between shoreline orientation, significant breaker height, and the sediment budget at the oceanside segments are shown in Figure 2. Segments 1 and 2 display little change in beach azimuth and exhibit greatest breaker heights. A combination of high wave energy and updrift sediment deficit result in erosion. Correspondingly, changes in beach azimuth and the decrease in wave height at segments 3 through 7 result in net deposition. An examination of data for Segments 3 and 4 indicates that net deposition occurs with sequential changes in shoreline orientation and reductions in breaker height.

This relationship, however, becomes complex at segments 5, 6, and 7. Although azimuth changes are evident and significant breaker heights de-


6
7
5
4
3
2
1
Atlantic
Ocean
N
Staten
Island
Brooklyn
Lower N.Y.
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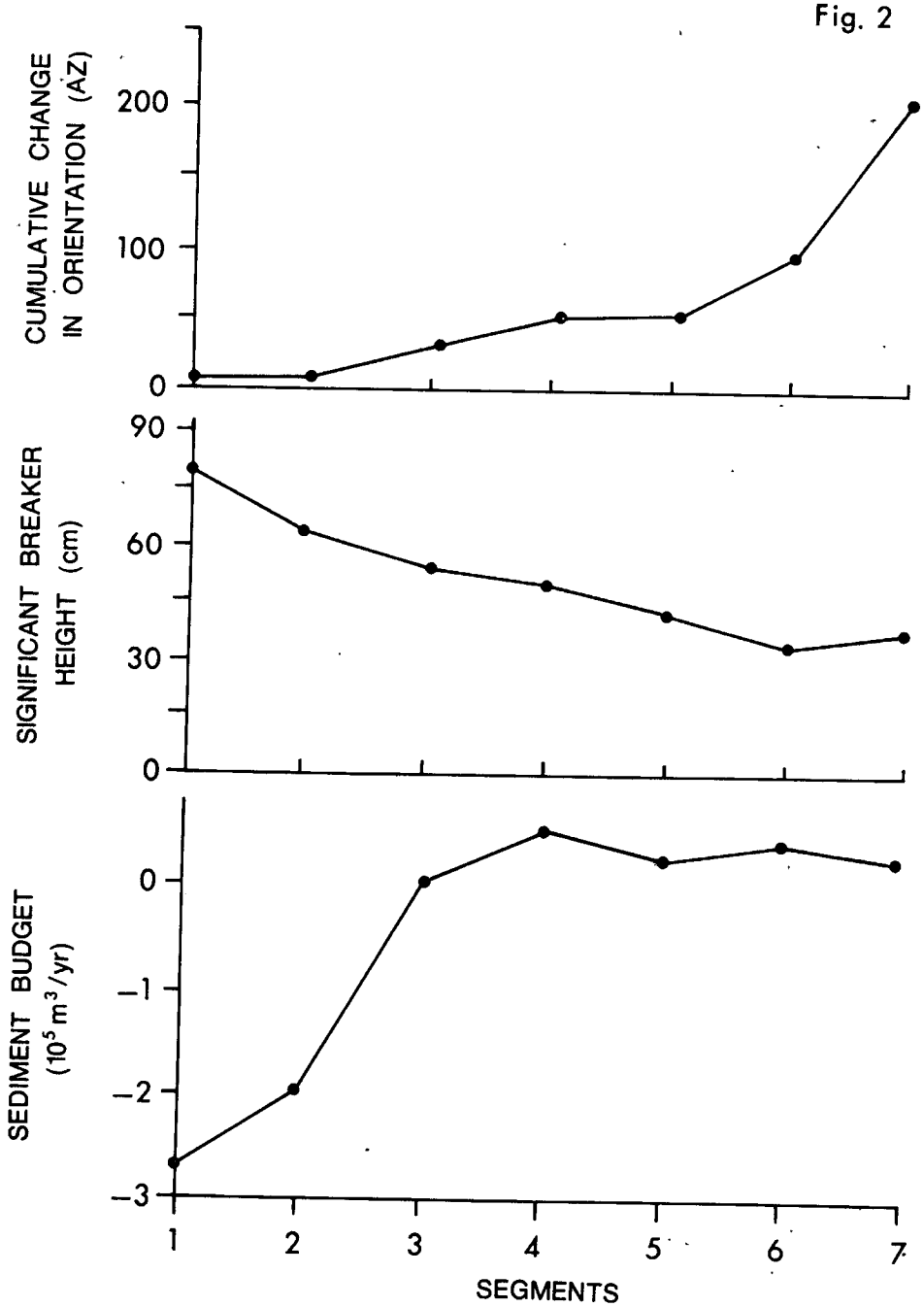
New
Jersey
TRANSECT SITE
0
1
2 km

Fig. 1

Fig. 2


CUMULATIVE CHANGE IN ORIENTATION (ΔZ)
200
100
0
SIGNIFICANT BREAKER HEIGHT (cm)
90
60
30
0
SEDIMENT BUDGET (10^5 m^3/yr)
0
−1
−2
−3
1
2
3
4
5
6
7
SEGMENTS

crease, sediment budget values at these segments do not increase relative to Segment 4. This suggests the possibility of an energy threshold existing between Segments 4 and 5 where downdrift wave energy becomes insufficient to enable transport of large volumes of sediment.

The slight increase in sediment budget at Segment 6 relative to Segment 5 may be explained through changes in azimuth and breaker height. A change in shoreline orientation and the resulting decrease in breaker height promotes deposition. Segment 7 exhibits the greatest change in azimuth as well as a slight increase in breaker height. The sediment budget for this segment however does not increase. There are two principal causes that can account for this. First, tidal currents are effective in reducing a large volume of sediment deposition. Secondly, nearshore profiles do not extend deep enough to include sediment deposition associated with offshore storage.

A sediment budget framework has been adopted to compute volumetric changes in the Sandy Hook shoreline. A comparison of these changes with factors such as shoreline orientation and significant breaker heights have permitted some tentative conclusions to be made:

1. The hypothesis that an identifiable relationship exists between changes in shoreline orientation, wave height and sediment budget is supported.

2. Areas of sediment deposition can be identified as a result of sequential reductions in wave energy and changes in shoreline orientation. These represent only two variables of wave and shoreline characteristics. Other factors such as waves and tides, beach protection structures, and land use must be considered for their effects on sediment budget.

This paper has investigated the importance of breaker height and shoreline orientation in the determination of a sediment budget. The model should be expanded to include budget contributions to dune, beach, and offshore storage. Knowledge of contributions or losses to these storage areas would benefit short-term and long-term strategies of planning, design, and management agencies.

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RIDGED FIELDS IN MONTSERRAT, WEST INDIES

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For several years I have been studying the British island colony of Montserrat in the Eastern Caribbean in an effort to understand the nature of human use of that island from early colonial times to the present. One of my interests has been in the details of cultivation on small plots of from one to ten acres. This paper discusses an agricultural landform common to such plots--the ridged field. Particular attention is given to the possible functions the ridges serve as suggested by the cultivators themselves and by my observations. The ridged fields are placed in the context of related man-made landforms in the New World; some drawbacks of the ridges are noted; and some thoughts on how such traditional customs can figure in development strategies are presented.

Montserrat is a mountainous volcanic island of 32 square miles. Of the 6,000 acres in agriculture in 1972, 1,567 acres were in holdings of one to ten acres and comprised 1,201 individual farms. Eighty percent of all farms are still worked without any mechanical or animal help. Less than nine percent of the farmers use fertilizer. Sixty-seven percent of farmers working one to ten acres own their own land. Because of the mountainous terrain nearly all cultivation plots are on an incline and 20 to 40 degree slopes are common.

The ridged fields consist of earth banks following the horizontal contour of the land, usually for the entire width of the plot. The ridges are spaced about three feet apart proceeding down the slope and are 10 to 14 inches high from furrow to ridge summit. Ridged fields are ubiquitous in the small plots being found in lowland and highland cash crop plots, in mountain swidden plots and in houseyard gardens. In complex multi-crop gardens such as some mountain grounds and nearly all houseyard gardens, ridges are frequently the only regular pattern in the plot. The ridges are constructed and maintained with a hoe, a cutlass or a dibblestick are not buttressed with stones, tree limbs or other debris because, as discussed below, it is essential to the cultivation system that the ridges remain mobile.

Of particular interest and significance are the ways in which vegetation is planted and tended in ridged fields. At the beginning of the growing season slips, seedlings, or seeds are planted along the uphill side of the ridge. As the season progresses the field is cultivated by hoeing the soil down the slope from ridge to ridge so that the soil from the downslope side of one ridge is brought down around the plants of the next lower ridge. The process is continued down slope for the length of the plot. This hoeing sequence is repeated several times in the growing season. The effect is that while the plant itself remains more or less stationary in the field, part of the ridge on which it is planted moves downslope and part of the ridge above is drawn down around the plant. By the time the plant is well established, it is no longer on the upslope side of the ridge, but rather is centered at the summit of a ridge. Because the soil has been moved downslope in such a manner, plots which have been cultivated for many years have a noticeable trough or ditch at the top of the field and a definite bank of soil at the bottom of the field.

While these agricultural landforms have some of the appearance of terraces, the morphology of the ridges and their mobility sets them apart

from all of the types of terraces delineated by Spencer and Hale.(1) The ridged fields, however, do serve some of the functions of terraces and their particular characteristics make them useful for additional reasons. The cultivators reported that they constructed ridges to create a more level planting surface; to reduce the distance the cultivator has to stoop for hoeing or harvesting; to inhibit erosion; to trap and store precipitation; to improve drainage around plant roots in times of heavy rains, especially on flat land; to provide loose soil for root and tuber development; and to facilitate the digging of roots and tubers.

My observations confirm these advantages and suggest several others. Because the plants are started on the upslope side of the ridge when the plant is young and vulnerable, the sun's rays strike it obliquely, thus reducing the potential rate of transpiration. By the time the plant matures and needs more light for photosynthesis, the hoeing system has moved it to the top of the ridge where it gets more direct sunlight.

Wind stress and dessication, especially of young plants, are problems in Montserrat. The increased surface roughness in a ridged field possibly reduces wind speed at ground level, thereby lowering turbulent transfers of moisture from young plants. The ridges may also afford better ventilation, especially for mature plants, by raising them above the natural field surface thus modifying high temperatures in the micro-environment and thereby improving conditions for photosynthesis.

The physical properties of the soil are also modified by ridging. Top soil and organic matter are concentrated around the plants, and the movement of the soil from ridge to ridge breaks capillary connections and prevents moisture stored deep in the soil from being drawn to the surface.

Most importantly, ridges are a shortcut to many of the advantages of terracing. Because the labor involved in their construction is not excessive, ridges can be used even in swidden plots which will be cultivated for only a few years.

There are also several less important advantages to ridges which the cultivators did not report: they provide level walkways across the slope and a crude stairway up or down slope; and the trench created at the top of ridged field by years of downslope hoeing often serves as a reservoir for excess precipitation, releasing it gradually into the soil downslope.

In spite of their many possible advantages and popularity among small plot cultivators, ridges are not favored by British agricultural agents who complain that ridging is a tenacious folk custom which inhibits the adoption of modern agricultural techniques. One complaint is that ridges spaced at three-foot intervals are a waste of space. For example, carrots, a recently introduced cash crop, are generally planted in rows 12 inches apart. But in Montserrat the rows are about 36 inches apart because the cultivators plant one row per ridge. Another complaint is that ridges prohibit mechanical cultivation. A third and major complaint is that while cultivators see ridges as an erosion control, the ridges--moving inexorably downslope as they do--are actually themselves an erosion agent. Some of the most common, but little noted, man-made landforms in Montserrat are the large banks of soil at the downslope margins of ridged fields.

No description of ridging has been found in studies of small-plot cultivation in the British Caribbean. This may be because only a few writers such as Kimber(2) have taken note of specific cultivation customs

or efforts at microenvironment management. Merrill(3) has included a picture of a ridged field in Nevis but gives no comment on the custom. Niddrie(4) reports that on the coral lowlands of Tobago soil is scraped into piles, planted with root crops, and returned to its original position after harvest. Taylor(5) does not report any cultivation practice resembling ridging among the Black Caribs on Dominica. Only one writer comments on the ridged fields of Montserrat. C.Y. Shepard,(6) an agriculture development agent writing in 1947, noted that cotton was grown on contour banks which effectively intercepted runoff. No further comment on the microenvironment significance of the ridges, their historical antecedents, or their use for other crops was included, and though Shepard reports on several other islands, he mentions ridging only in Montserrat.

It remains then for further research to uncover something more on the origin of the ridging custom. It may very well be a creole technique developed to suit the special cultivation problems of a mountainous terrain. It is also possible that ridging, which the cultivators regard as a property improvement, may be more popular in places like Montserrat where such a large percent (67) of the small plot cultivators own their own land and can expect to reap the benefits of the ridges they construct for years to come.

In conclusion, the ridged fields of Montserrat are a useful indigenous cultivating technique for sloped lands. Advantages are perceived by the cultivators and this research confirms these and adds several more. On the other hand, agriculture agents see many disadvantages. As development officials work with cultivators to improve agricultural production, it would be wise to recognize the strengths of traditional methods such as ridging, concentrating reform efforts on aspects of the practice which are the most damaging. Perhaps a consensus could be reached on some method of stabilizing the ridges which would then remove the charge that they are, themselves, erosion agents. Certainly, suggested improvements will be more easily accepted if they can be incorporated into present cultivation practices without excess disruption.

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THE CITY: ECLIPSE OF A GEOGRAPHICAL CONCEPT

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Satisfactory definitions of "city" are notoriously difficult to write because the city is so many things to so many people. The city is an assemblage, and the most successful definitions have been those which reflect this diverse character.(1) These remarks are directed toward this definitional matter, and toward the urban meanings which arise from events in post-industrial America. Specifically, I wish to address and to challenge some longstanding beliefs concerning urban places which, taken together, comprise an argument for diluting the use of the urban concept in geographical inquiry.

Urban definitions have a highly geographical character. The property of areal boundedness for urban places allows geographers to create land-based categories useful in general analysis. The rural-urban dichotomy, for example, has proved useful in distinguishing between peoples on an economic, social, and demographic basis. With metropolitan growth, however, the political or behavioral boundary distinguishing these areas has been increasingly difficult to demarcate; principal attention by those concerned seems more occupied with properly locating those boundaries than with questioning their value at any location.(2) This act of urban boundary-placing manifests belief in the rural-urban dichotomy, a strictly Wirthian view of the city which may bear little relationship to the United States of the 1970s.(3)

A wide variety of familiar urban concepts depend heavily upon the areal boundedness of the urban place as geographers have conceived it. Five of these concepts are reviewed below, providing in brief fashion an interpretation of the assumptions which lie behind each, and some consequences of those beliefs in the light of modern events. These are: (1) economic base, (2) residential ecology, (3) social activity, (4) political control, and (5) the inter-urban system of cities.

ECONOMIC BASE

Economic base theory is the cornerstone of urban economic understanding. Analyses of the city's internal linkages and export sectors are most explicitly stated in input-output matrices which provide a descriptive and predictive characterization for a somewhat insular urban economy. Economic base studies can be made at any reasonable scale and for any place, but these studies reach their fullest meaning when the economy itself is heavily interlinked, and when the production of materials, services, wealth, and control are localized. That is, the value of knowing economic facts of localities lies in discovering economic tenability, prospects for investment, employment potentials, local revenue opportunities, and the like. As local wealth and control stemming from these productive factors erodes, prognostications of local economic trends weaken, dependence on local services and supplies by the corporate enterprise lessens, and local concern and responsibility by the corporate citizen falls away. Economic base theory, then, sits uneasily when the distributions of wealth and control are askew to the distributions of physical production.(4) The localization necessary to sustain urban economic base analysis has diminished significantly in the recent years of corporate consolidation, public sector employment contracting, decentralization of metropolitan population, and both public and private sector responses to recognizable regional disparities on a national scale.

RESIDENTIAL ECOLOGY

The geographical effort to characterize the residential pattern as a matchup between social attributes and the social and physical environment has met with modest success, but has failed to incorporate an occupational dynamic within its theoretical framework. The theory of labor force segmentation which underpins the ecological distribution of urbanites takes no cognizance whatever of the changed nature of occupations within the post-industrial economy. Gottmann long ago identified the quaternary sector, and some authors now argue for a quinary sector.(5) The critical point lies in the classification of occupations themselves, the new need for understanding the nature of productive work, the rewards each brings, and the social status derived therefrom. Likewise, the increasing number of two-worker households, the decreased stability of the nuclear family as a social unit, and the rapid departure of population from metropolitan central cities and inner suburbs all lead to a widening ecological pattern, a pattern differentiated from the past in both its scale of homogeneous residential units and in its demographic and social makeup.

The notion of a widening residential ecology crucially abuts the urban concept. Recent evidence shows in-migration to non-commuting, formerly rural, counties to be on the upswing,(6) and one study identifies a broad ring of mobile home development well beyond the reaches of the metropolitan built-up area.(7) The suggestion that we identify and analyze zones of metropolitan influence, or urban fields, or daily urban systems, raises the more basic point as to whether it is helpful to call these "urban" at all. Put another way, the connotation of the category "urban" is that there are important non-urban categories from which urban is to be distinguished. There seem few important senses in which this is true.

SOCIAL ACTIVITY

The notion that the urban environment triggers a distinctive urban behavior set by engendering stimuli both quantitatively and quantitatively different from that in non-urban areas has been open to debate for some time. Whatever one's viewpoint on this question, it must be informed by the impact of technological advances in communications and knowledge of the breadth of television viewing markets. The Designated Market Areas of the Nielsen Service reflect data on the extent of focality of television broadcasting, indicating that the information received by viewers across the land is distinctively metropolitan in orientation and character.(8) In this important sense, we are all urbanites, our dwelling preferences notwithstanding. As to behaviors arising from environmental stimuli, one might more reasonably expect the important behavior variations to be intra-metropolitan in occurrence, arising from various senses of participation in the mainstream labor forces, in various social movements and in the ownership of property and other trappings of material well-being.

POLITICAL CONTROL

For the past decade urban geographers have lamented the political fragmentation of urban areas, and have pointed to Toronto or Minneapolis as examples of unified metropolitan government. Such jurisdictional inquiry has a highly formal tone, and leads toward what amounts to stop-gap conclusions for peripherally bounding a continuously expanding frontier of development. In spite of strong sentiments in favor of decentralization or local control, reductions of tax burdens on property, and revenue sharing, one might argue that a partially consolidated form of metropolitan govern-

ance has been operating for some time in the form of state government. Although boundary incongruence remains a problem, state government is pitched at the appropriate scale for metropolitan control. Both state and federal agencies have been regulating urban areas for some time in the form of taxation, regulation of industry and trade, the setting of interest rates, the letting of contracts, and so on. What we are beginning to learn is not how we might govern the metropolitan area, but how in fact it has been governed for some time. At issue ultimately is not the form or locus of government institutions, but the consolidation of power and control. This issue, of power and control, is not urban at all, but one of population and economy, however urban or non-urban those distributions may be.

INTER-URBAN SYSTEM OF CITIES

Recent geographical attention to urban linkages in the form of a morphologically specified urban system has grown with the due elaboration and sophistication of materials originally outlined by Jefferson and Zipf decades earlier, with the recent expansion of innovation diffusion theory into this macro-urban topic, and with the renewed appreciation of the city's inability to control its own destiny.(9) These formal characterizations of the urban system fundamentally depend upon urban definitions: nowhere is this more clear than in the unpersuasive cross-national comparisons attempted by thinkers in this school of thought.(10) But even within the United States, the complexity of urban-wise diffusion of innovations vis-a-vis the urban hierarchy suggest a relationship so complex as to mask genuine systemic effects. One recent study, for example, poses the difficulty of determining whether Northeastern manufacturing losses to the South are due to urban or to regional causes.(11)

Understanding the geographical patterns of growth and change may profit from an approach conceptually more open. The hypothesis that national patterns of change in contemporary times stems from impulses and receivers within metropolitan focal points on the landscape seems unjustified from early evidence. An alternative viewpoint would discard the a priori assumption of urban significance, employing regional categories as building blocks for the national system of exchange.

CONCLUSION

I believe we can say that future urban historians will look back upon the third quarter of the Twentieth Century as that period when the polarization of urban effects on the landscape ended, not because the city itself died away, but because that concentration of events and effects which were uniquely urban at an earlier time became ubiquitous on the Anglo-North American continent. At the heart of counter-urban trends lies a shifting and reintegrating pattern of wealth, power, and control. Discovering the relationships between evolving settlement patterns and the system of social, economic, and political control is a great challenge for the 1980's. It seems likely, however, that the urban concept will diminish significantly in these future characterizations. Areal categories both within and between, that is, both above and below, the urban scale seem likely to gain conceptual significance.

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AGRICULTURAL CHANGE IN THE NORTHEAST, 1954-1974

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Between 1954 and 1974 the number of farms in the northeastern states declined from over 338,000 to under 127,000. During this period the number of acres in farms decreased from more than 41 million to less than 24 million, while the size of the average farm in the region increased from 121 acres to 184 acres. This study examines the geographic patterns of these changes at the county-unit level. Cartographic analysis is employed to summarize change over the 20-year period and statistical analysis is used to study these trends in greater detail for each of the five-year periods.

The data are from the U.S. Census of Agriculture.(1) Because of disclosure regulations, comparable data were not available over the full 20-year period for eight of the Northeast's 217 counties. These counties, all eight of which were relatively insignificant agriculturally, are Nantucket and Suffolk in Massachusetts; Hudson in New Jersey; and Bronx, Hamilton, Kings, New York, and Richmond in New York State. For the remaining 209 counties, percentage rates of change were computed using the values for the earlier year in each period as the base.

CARTOGRAPHIC ANALYSIS

Average farm size was mapped for 1954 and 1974 using the same breaks between categories in order to facilitate comparison (Figure 1). Although these two choropleth maps differ in degree of darkness, reflecting the increase in average farm size, the spatial patterns are noticeably similar. The simpliest manner by which to describe the apparent visual likeness of the maps is mentally to draw an axis extending from southwest to northeast through the entire region: farms to the north of this imaginary line are generally larger than those to the south. The most notable exceptions occur in western Pennsylvania, although several counties with relatively rugged terrain in the eastern part of the Appalachian Plateau exhibit a trend similar to that found in other dissected uplands of the Northeast. Despite the inherent uncertainty of visual estimates of spatial similarity based upon choropleth maps, this pronounced temporal relationship is validated further by a .90 product-moment correlation.

Might this trend in average farm size be the result of closely related changes in the numerator and denominator of the average farm size--number of farms and number of acres in farms? This would appear to be the case insofar as the county-level correlation between 1954 and 1974 are .94 and .95 for absolute numbers of farms and acres of farmland, respectively. These correlations must be interpreted cautiously because spurious relationships can arise from differences in scale: these counties vary greatly in area and a small county logically could not lose as many farms and as much farmland as a large county. Thus, it is necessary to examine the temporal trends in farm units and farm acreage relative to their potentials for decline. Figure 2 portrays the percentage rates of decline, 1954-1974, for both of these agricultural measures. The class breaks used are based on the means and standard deviations of the individual distributions and promote the recognition of a high level of geographic cross-correlation. A product-moment correlation of .81 confirms the similarity in the patterns of decline for farms and farmland. This high temporal correlation notwithstanding, there appear to be no prominent geographic trends. Neither directional trends nor definitive metropolitan-nonmetro-

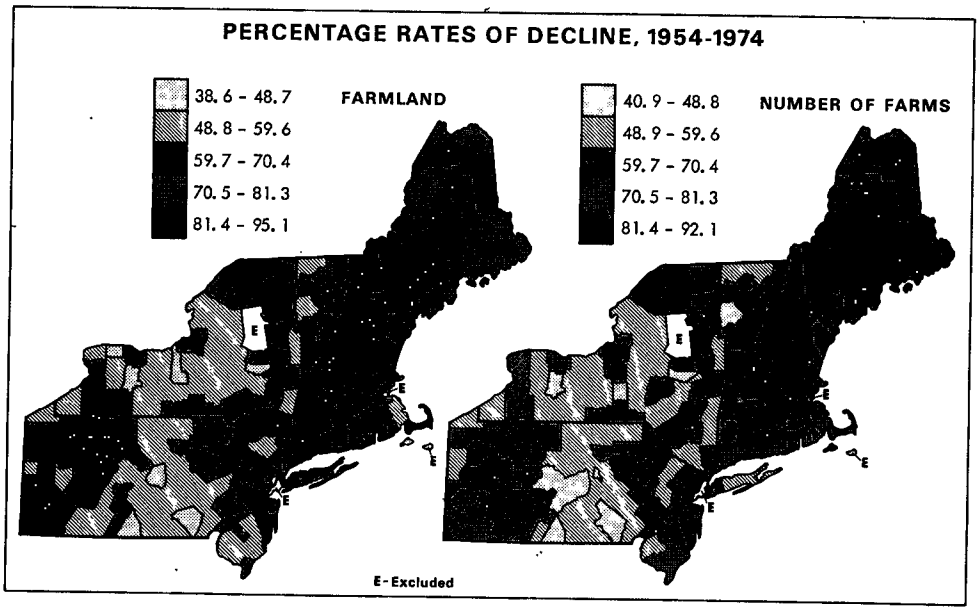

Figure 1

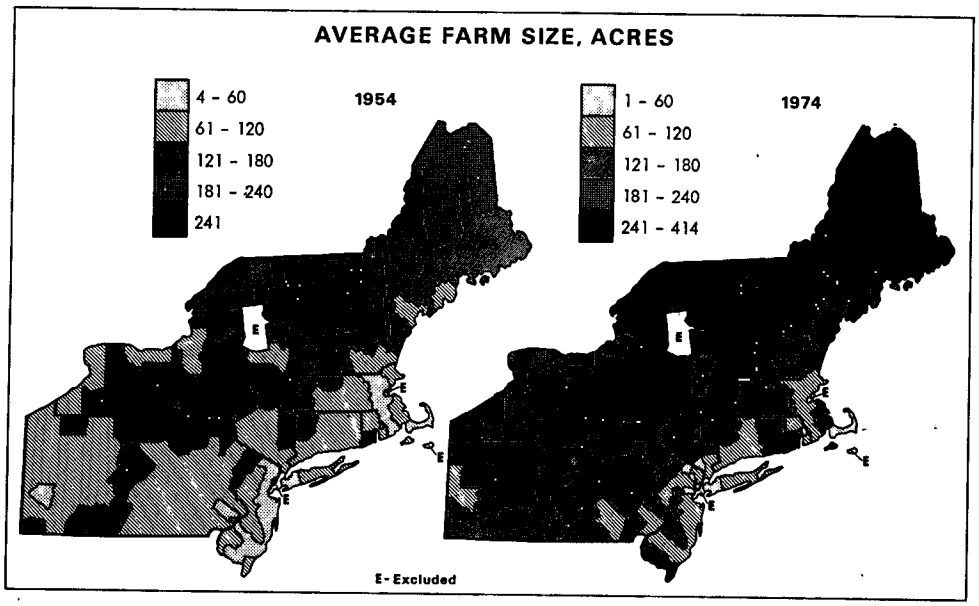

Figure 2

politan differences are apparent. A finer scale of analysis, however, might well reveal urban-suburban-rural effects within counties.

It is unreasonable to assume that these rates of decline were uniform throughout the 20-year period. Insofar as suburbanization into existing agricultural areas was well underway in the 1950s, major metropolitan areas could have been expected to have suffered more marked declines earlier in the 1954 to 1974 period. Figure 3, which shows for each county the five-year period by which at least half of the decline in farmland had occurred, indicates the effect of urban sprawl. For example, during this 20-year period, if a county that lost 100,000 acres of farmland had lost 50,000 or more by no later than the 1964 census enumeration, this county would be represented by the middle-gray tone for the 1959-1963 period. This hypothetical county typifies most of the more urbanized parts of the Northeast, particularly those in the megalopolitan corridor. Philadelphia, with few very small, hardly representative farms, is a noteworthy but insignificant exception. A number of now highly suburbanized counties in New Jersey and southwestern Connecticut, as well as Allegheny County in southwestern Pennsylvania experienced the majority of their losses in the first of these four five-year periods. It should be noted, as well, that no county had its greatest loss in the latest 5-year period. In comparison, places where the majority of losses occurred in the latter half of the 20-year period are largely nonmetropolitan.

STATISTICAL ANALYSIS

Because the processes of decline in farms and farmland are not uniform spatially, an analysis of the relationships between losses and corollary factors demands that the 1954 to 1974 period be disaggregated into shorter periods. The need for a finer degree of temporal resolution is particularly evident in the first two columns of Table 1, wherein the percentage change in acres of farmland is correlated with rates of change for numbers of farms and average farm size. Although for the entire 20 years the losses of farmland and decline in numbers of farms yield a correlation of .81, in none of the five-year periods is the correlation this high. Moreover, the geographic association of the rates of decline shows a progressive decrease from .78 for 1954-1959 to .26 for 1969-1974. In contrast, the relationship between the rates of change for farmland and average farm size rose progressively through the periods from .25 to .75, the latter rate exceeding the 20-year correlation of .52.

These two trends suggest that, for the Northeast in general, the loss of farmland in the 1950s was the product of a conversion of land to nonagricultural uses accompanied by a reduction in the number of farm units, especially smaller operations. In the 1950s, abandonment and conversion were associated with declines in farmland. In some of these counties, however, farm size was also increasing, indicating selective farm consolidation. By the 1970s, substantial percentage losses of farmland almost invariable occurred in counties with relatively small farms, whereas counties with growing agricultural units experienced few losses. As indicated in the last column of Table 1, for each of the five-year periods the pattern of farm abandonment is only moderately related to an increase in farm size. For the 20-year period, in fact, the decline in number of farms is almost statistically independent of the pattern of growth in farm size. Consolidation of farms and conversion of land to nonagricultural uses (including abandonment) have led to agriculturally stable areas with large and growing farms and threatened areas with small or stable holdings.

Of the myriad factors which have contributed to the Northeast's changing agricultural situation, only two have been selected for analysis here--

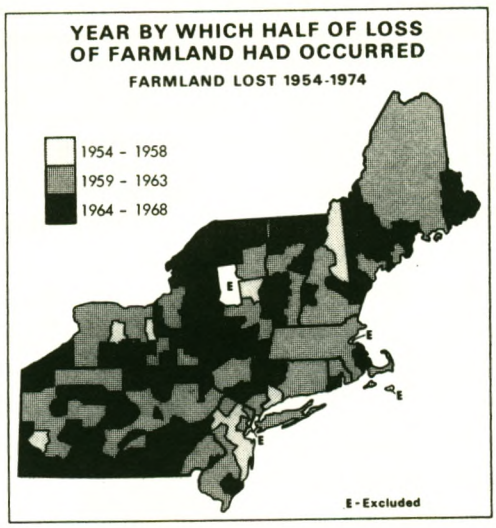

Figure 3

TABLE 1. INTERCORRELATIONS OF PERCENTAGE RATES OF CHANGE.

Period	Farmland and Number of Farms	Farmland and Average Farm Size	Number of Farms and Average Farm Size
1954-74	0.81	0.52	-0.05
1954-59	0.78	0.25	-0.40
1959-64	0.68	0.41	-0.38
1964-69	0.65	0.46	-0.35
1969-74	0.26	0.75	-0.41

Source: Computed by authors.

TABLE 2. CORRELATIONS OF AVERAGE VALUE OF LAND AND BUILDINGS AND AVERAGE AGE OF OPERATOR WITH PERCENTAGE RATES OF CHANGE OF FARMS AND FARMLAND.

Period	Average Value at Beginning of Period and Percentage Rate of Change of. . .		Average Age of Operator[a] and Percentage Rate of Change of. . .	
	Number of Farms	Farmland	Number of Farms	Farmland
1954-74	-0.14	-0.28	-0.77	-0.59
1954-59	-0.16	-0.32	-0.58	-0.51
1959-64	-0.08	-0.25	-0.41	-0.45
1964-69	-0.12	0.02	-0.48	-0.29
1969-74	0.19	-0.31	-0.03	-0.28

Source: Computed by authors.

[a] Correlations for 1954-59 and 1954-74 are based upon average age of operator in 1959; for the other three periods the average age for the earlier year is used.

the average value of agricultural land and buildings and the average age of farm operators. (The Census of Agriculture asked farmers to estimate and report current market value of land and buildings owned, rented or leased from others, and rented or leased to others. If value of land and buildings was not reported, the Census Bureau estimated it by using the average value of local farms with similar characteristics.)(2) The average real estate values show weak correlations with the rates of change of both farms and farmland. These generally negative correlations suggest that counties with higher average values have experienced somewhat greater losses. Yet, because these average values reflect not only agricultural potential but also nonagricultural development, the low association between value and decline in farms and farmland is not surprising. More revealing are the correlations between the rates of change and the average age of farm operators (Table 2). Counties with older farmers have undergone the more marked losses of farms and acreage, particularly in the earlier segment of the 20-year period. The apparent waning of this effect on the decline in farm units is especially noteworthy.

Variations in age structure can be more complex than the average age of the farm operator reveals. In the Northeast, although the mean age of the operator for the average county has changed little from 1959 to 1974, from 51.7 to 52.1 years, the standard deviation has increased steadily, from 1.8 to 2.5 years. The age of operator and the various factors contributing to age differences, trends, and their possible impact on agricultural decline bear further investigation.

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UNCERTAINTY IN GEOGRAPHY

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Part of the problem with maturing into a professional geography has been the polemic nature of the discipline's development. Radical shifts in approach and concept seem to spawn apathy or fanaticism, rather than coherence. As Bunge pointed out, where other disciplines integrate, Geography has tended to purge. As we move from one predilection to the next, earlier movements are discredited.(1)

Fostering these dichotomies in Geography has been a relatively small number of workers in the field. The paucity of professional geographers has allowed the discipline's research directions to be easily realigned. As of December 31, 1977, for example, the membership of the Association of American Geographers stood at only 6,541.(2) A general methodological cycle can be identified, however, and used to place these shifts in perspective.

The earliest Grecian efforts in Geography were part of what was then known as Cosmography. This work was largely concerned with mathematical aspects of earth measurement. Subsequently, there was a long period of exploration and classification: the age of discovery.

The revelations of this second era provided the foundational information that scholars needed to begin examining the effects of mankind upon the earth. This was the time of the early conservation movements, the agricultural revolution, in the 19th century. The "new" idea that man was able to cause changes in the environment promoted an awareness of bilateral man-environment relations. An example of this was Marsh's 1864 treaties, Man and Nature.(3) This view was later expanded upon by Davis at the University of Chicago, but was supplanted by the concepts of environmental determinism.

The tenets of determinism are perhaps best expounded in the works of Semple and Huntington in the United States, and Taylor in Australia. However, just as a meandering river cuts off those loops which become too extreme, so did Geography sever environmental determinism.

At about this time (circa 1920), the cycle may be seen as coming full circle and beginning again. There was a second period of classification characterized by a huge volume of research dealing with particular regions. Almost concurrent with the classification movement came the second wave of man upon the land study. This school was largely led by Carl Sauer and it made an attempt to form some interdisciplinary ties with other social sciences.

In the early 1960s, the practice of the science of Geography was dying. This was largely because geographers were not seeking out important problems. According to Ackermann, what little research frontier did exist was atrophying.(4) This was shortly changed however, by a renewal of interest in the environment.

The ecology movement of the late 1960s was originally a non-academic realization of the geography of man-affecting-nature and nature-affecting-man. This interest moved into the universities and re-established itself as a research trend which still stands today. Ecology and an ecosystem's approach have provided both a philosophy and a methodology for Geography. This is at a time when the need for a geographical approach is perhaps as critical as ever.

Bunge recognized this need when he stated that Geography is ultimately dealing with the survival of the human race, and it is time we stop arguing amongst ourselves and get down to those issues that can ameliorate the human condition.(5) A first step in this survival geography is the learning and understanding of the systems necessary or desirable for our continued support.

It is very likely that the earth's human population has already surpassed the number that can be supported by natural systems of chemical and energy movement (this, of course, presumes that man-influenced systems are not natural). Even now, man's continued existence is dependent upon ever-increasing quantities of technological input, an idea bemoaned by Sauer.(6) Assuming the continuation of technological growth and as standards of material well-being grow, it will become more difficult, if not impossible, to sustain (or even obtain) a harmonic, vital balance of production.

It is thus imperative that the natural functionings of the environment are understood. Systems analysis affords one approach to this end.

Watts uses the systems concept to describe:

> "physico-chemical restraints upon all members of the organic world..."

By viewing cycles and energy flows as open systems, he then theorizes about a steady state of each environmental system. He further hypothesizes that it is interference with steady state that leads to the movement of energy or matter from one system to another.(7)

The results of this cross-boundary flow may cause deficiencies of material in one system and surpluses in the next (examples being soil erosion, increased phosphate concentrations in streams, etc.). Watts considers the advantage of systems analysis to be the delimiting of empirical function regions. This in turn allows one to recognize and deal with intersystem movement.

The question faced here is not "is this an appropriate methodology and theory for geography?" It is rather what is to be gained through its employ.

There has been considerable debate on the value of systems theory. According to Langton, the limitations of a systems concept are: functionalism - systems are concerned with relationships between phenomena, and not the phenomena themselves; empiricism - systems are based upon reality and do not lend themselves to abstraction; duality - systems have difficulty dealing with non-empirical phenomena, (for instance, thoughts or motivations); closure - Langton points out that it is extremely difficult to define the boundaries necessarily inherent in systems theory.

The positive aspects of systems theory analysis are considered to be: the rigorous approach of systems theory allows an easier perception of important questions; individual systems lend themselves to a "fit" with other systems; it allows and aids in the building of a certain variety of process models; systems analysis forces the researcher to base his work on functional units.

After his lengthy weighing of the arguments, Langton wonders if indeed systems are worthwhile methodological units for geographers. Admirably, he manages to avoid the pitall of pronouncing upon what is good for the

discipline; concluding rather that if something helps Geography, then it is of value.(8)

Most discussions of systems theory are not so impartial. Chorley, for example, stated that systems should occupy that place in Geography presently being won by human ecology. He states than as an organism, man exerts too much control over his environment to be considered in terms of niches and interactions. Instead, his activities must be seen in a systems framework that would allow a definition of all activities.(9) Others, like Warntz, have argued for systems on their own merits.(10) There are also those who do not see systems analysis as being incompatible with human ecology, but instead see them as being closely intertwined and necessary for a complete understanding of any particular environment.(11) Hewitt saw one of the values of systems theory analysis to be its view of the entire realm of functions operating in a space. He further stated, however, that the systems theory is not really saying anything that is not already known. It is instead a restructuring of data into a more visible matrix.(12)

Of course, it is easy to get lost in the maze of pronouncements and treatises on methodology and philosophy in Geography. A caveat, however, one must always bear in mind is that in reality all of the philosophic discussion that bears upon a belief has no effect upon absolute truth. This premise helps one when faced with directly contradictory approaches to the philosophy of Geography. On one hand, Walmsley says that neopositivism is the correct view; (13) on the other, Tuan treats with phenomenology.(14) There are others who argue for determinism, possibilism, nihilism, or any one of other numerous "isms".

All of these perspectives on Geographical philosophy are important as long as they meet the requirements of being logically structured and are presented in a scholarly manner. Any particular one is "good" to the extent that it aids the progress of the state of the discipline.

Geography, more than any other discipline, offers the chance to really explore the workings of the world, to reach for the edges of understanding. As we stand there, pushing at the limits of imagination, we would do well to remember than an element of uncertainty is to be expected, and perhaps desirable. As D.B. Mather so eloquently stated,

> "There comes a point at which the thoroughly experienced Geographer should set aside his measuring sticks and take up his divining rods."(15)

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THE GARDEN AND DESERT IN THE IMAGINATIVE LITERATURE OF THE GREAT PLAINS

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Historians and geographers, in looking at changing perceptions of the Great Plains, have identified a "garden-desert" dichotomy, a polarity between a land seen as sterile and arid and one seen as fertile and life-giving.(1) This paper examines the "garden-desert" dichotomy in works of imaginative literature. Twenty-two novels set in the eastern third of the Great Plains in the years between the Civil War and the First World War were analyzed to see how garden and desert images are revealed.(2)

Twelve of the novels deal with the initial pioneering process, the move west, the breaking of land.(3) The "garden-desert" stereotype lends itself to these novels. The plots develop and are enhanced by the uncertainty of the image, by the struggle such an image implies. In works of Bojer, Kramer, Garland, Lane, Rolvaag, Aldrich, Winther, and Davis, an archetypal theme emerges that employs this "garden-desert" dichotomy. Initially, there is an air of enthusiasm and hope. As the plots develop, houses are built and crops are planted. After a period of success, catastrophes strike, usually in the form of prairie fires, droughts, blizzards, or grasshoppers. Sometimes several disasters follow one another in close succession. The other side of the Plains, that of the unrelenting desert is revealed. A critical period is reached and the characters are faced with a decision to stay or leave.

It is significant that in not a single novel does a prairie fire or a rain of grasshoppers arrive in the first few months of settlement. The authors delay these events until their dramatic impact can be better contrasted with the optimistic garden image of early settlement. Clearly, in this instance, the author is less concerned with the accurate picturing of a landscape or of a settlement process than he or she is with establishing a dramatic theme within the work. The "garden-desert" dichotomy is used to help establish that drama.

More specifically, in looking at the content of particular works, one can identify passages that include the word "garden" or that imply Eden-like images.(4) Similarly, other characters or descriptions express desert imagery.(5) Frequently, the duality is established trhough two characters, a husband and a wife. The husband expresses the garden image while the wife is identified with the desert image. Seven of the fifteen authors use this convention within at least one of their novels.(6)

The clearest example is found in O.E. Rolvaag's Giants in the Earth. Per Hansa, the optimistic Norwegian pioneering in South Dakota, sees nothing but success in the future. On his new farm, Per Hansa is "carried farther and farther away on the wings of a wondrous fairy tale" (p. 107). He is sure that he is "the owner of 160 acres of the best land in the world" (p. 107). Per's wife, Beret, finds no peace, no bright dreams on the Dakota plain. For her, the soil is profane and evil, possessed by demons and incapable of giving life. The place is "the end of the world... beyond the end of the world!" (p. 8). Her first impression is one of disbelief. Her fears are multiplied by the fact that "there isn't even a thing that one can hide behind" on the open Dakota landscape (pp. 28-9). She descends into numbing periods of psychological withdrawal.

Bess Streeter Aldrich, another Plains novelist, describes the different reactions to Nebraska in her two principal characters in A

Lantern in Her Hand. The young husband, Will, suggests moving to Nebraska from Iowa:

> "It's a wonderful opportunity. It's the poor man's country. We can get railroad land dirt cheap... or lease school lands near the river or even push farther west and homestead" (p.61).

His wife, Abbie, thinks less of the idea, however, claiming the word "Nebraska" "had the sound of South Africa" (p. 60).

In Clyde Davis' Nebraska Coast, a novel of settlement in the 1860s, Mr. MacDougall arrives with his wife and children. The narrator remembers the scene:

Father was entranced. "Look at that county!" he exclaimed over and over, waving his whip. "Just look at it. You'll never see a farming country equal to that if you travel the whole world!" (p. 144). Mrs. MacDougall responds by saying, "It looks pretty dreary to me. You can't see a tree for miles" (p. 148).

In Rose Lane's novel, Free Land, and in Sophus Keith Winther's Take All to Nebraska, pioneer wives again pass through periods of hatred for the plains which clash with their husband's ambitions.(7) In Horace Kramer's Marginal Land, Steve Randall's wife finally leaves him, tiring of his unbounded optimism. Josephine tells her husband:

> "Even if it were the Garden of Eden, I'd be haunted by the horror of knowing that every other day brought me just that much nearer to another dreadful winter!" (p. 178).

The dual garden-desert image also emerges in landscape descriptions, particularly in weather and in seasonal changes. Beauty is closely juxtaposed with desolation. In A Lantern in Her Hand, Aldrich describes the snow, heat, and droughts of Nebraska and then counters the desert image by writing:

> "But between these onslaughts there are days so perfect, so filled with clover odors and the rich, pungent smell of newly-turned loam, so sumac-laden and apple-burdened that to the prairie-born there are no others as lovely by mountain or lake or sea." (p. 1).

Even a single summer season can assume a dual image. The heat of July is associated both with fecundity and with drought. In Cather's My Antonia, summer is described:

> "July came on with that breathless, brilliant heat which makes the plains of Kansas and Nebraska the best corn country in the world. It seemed as if we could hear the corn growing in the night; under the stars one caught a faint crackling in the dewy, heavy odoured cornfields where the feathered stalks stood so juicy and green" (p. 137).

The prairie is seen as an agricultural garden.

Summer can also be portrayed as desert-like in the novels. Several authors describe a summer drought with words similar to Rose Lane's:

"Day after day was clear, hot, monotonous with wind. The wind blew steadily, a flow of increasing heat over the suffering earth. The sun rose in a pale sky which at noon was brassy. It sank in a sky too pale to blush, and through the night the hot wind went on blowing." (p. 259).

Not all of the 22 novels examined make use of the images of the garden and desert that, historically, have been associated with the perception of the Plains. A majority of the works do, however, especially those with rural, as opposed to town settings.(8) The study suggests that these novels support the "garden-desert" dichotomy in the modern popular historical image of the region. The study helps show how these images in history are expressed and reinterpreted in works of imaginative literature and how individual characters have lived out, both in fiction and in reality, the real human drama of the garden and the desert on the Great Plains of North America.

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POPULATION CHANGE IN OSWEGO COUNTY, NEW YORK, 1940-1970

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This paper examines the effects of economic activity on population change during the 1940-1970 period for the cities of Fulton and Oswego and the 22 towns of Oswego County in New York (Figure 1). Data are from the U.S. Census of Population and Housing, and rates are computed for 10-year periods.

THE SETTING

Oswego County is generally viewed as a rural county in Central New York. Its two largest incorporated urban places are the cities of Oswego and Fulton. For 1970 these cities had 23,844 and 14,003 residents, respectively, and accounted for 37.5 percent of the county population.(1)

Historically, the city of Oswego was important economically to Central New York because of its location on Lake Ontario. Even today, Oswego is still known as the port city of Central New York. Oswego remains the county seat, but has lost the importance it once held as a regional transportation distribution center. The county is strongly dependent on manufacturing activities, which employed 33.4 percent of the labor force in 1970.

The climate is greatly affected by Lake Ontario. During the winter months winds off the lake from the west bring in moisture that is released in snow squalls, making the county one of the more snowy and chilly parts of the United States. Average annual snowfall is 120 inches in the city of Oswego, but 10 miles south of the lake in Fulton the average is about 140 inches. In the eastern part of the county, on the western edge of the Tug Hill Plateau, higher elevations yield an even greater, orographic snowfall. The road network is least extensive in this sparsely developed area.

POPULATION CHANGE

Between 1940 and 1970 the resident population of Oswego county increased by 41.5 percent from 71,275 to 100,897.. During the 1940s and 1950s, population growth in Oswego County lagged behind that in both New York State and the United States. By contrast, for the 1960-1970 period Oswego county experienced an absolute upward shift in population change relative to the rates for New York State and the United States, whereas for the periods 1940-1950 and 1950-1960 the shifts were downward.(2)

Maps in Figure 2 depict the geographic patterns of population change at the town level for each of the three decades. The same set of three class intervals is used for all three maps to promote comparability. Zero percent, distinguishing gains from losses, provides an inherently meaningful class break. The other class breaks recognize the areas above and below the county growth rates.

Although Oswego and Fulton have remained the most populous areas of the county, their dominance consistently declined since 1940, when together these cities accounted for almost fifty percent of the total county population. This percentage declined slightly to 47.4 percent by 1950 and to 42.3 percent by 1960. By 1970 the two cities accounted for only 37.5 percent of the total population of the county.

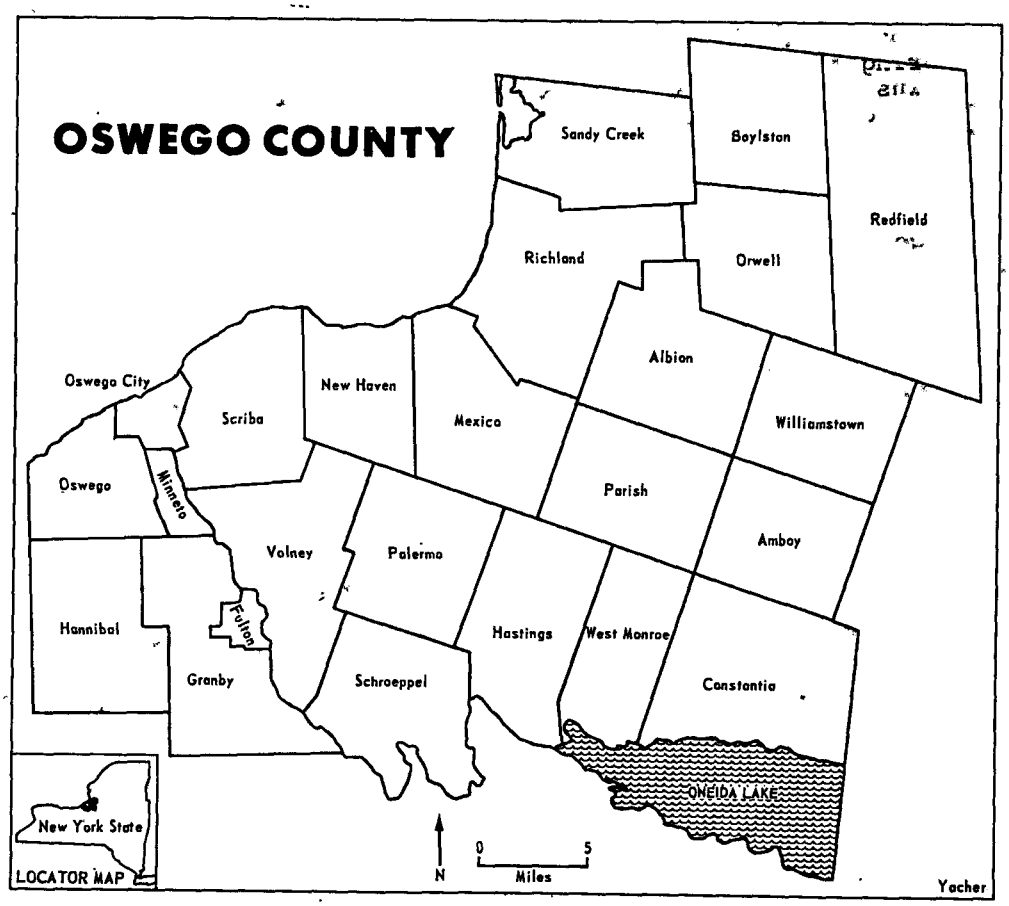
OSWEGO COUNTY
Sandy Creek
Boylston
Redfield
Richland
Orwell
Albion
Oswego City
Scriba
New Haven
Mexico
Williamstown
Oswego
Minetto
Parish
Volney
Palermo
Amboy
Hannibal
Fulton
Hastings
West Monroe
Granby
Schroeppel
Constantia
ONEIDA LAKE
New York State
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Figure 1

The southern part of the county experienced substantial population gains, whereas the northeastern part consistently lost population. Between 1940 and 1950, ten of the 24 townships exhibited higher percentage increases than the county. During this period the New York State Thruway was built directly south of the county.(3) The General Electric Company developed its electronic systems division at Electronics Park, just south of the Oswego county line. Other industries followed suit, creating numerous jobs and directly benefiting the southern part of Oswego county.(4)

Growth continued through the 1950s and 1960s. Fourteen townships experienced absolute upward shifts for 1950-60 and seventeen townships gained at rates above the county rate in 1960-1970. Again, the southernmost townships received most of the increases at rates disproportionately higher than in other parts of the county (Figure 2, b and c). Most residents of southern Oswego county were employed in manufacturing and construction. Yet, the high rate of growth led to serious housing shortages that forced the development of several trailer parks.(5) The influence of the city of Syracuse was quite evident between 1940 and 1970. Commuting to Syracuse from southern Oswego county is facilitated by Interstate 81, which parallels the Hastings-West Monroe township boundary. Both towns exhibited exceptional growth, especially between 1960 and 1970 when the highway was opened. By 1970, 72.3 percent of West Monroe's and 65.8 percent of Hasting's working populations commuted to Onondaga county.(6) The correlation coefficient between the rate of population growth and the percentage of the working population commuting to Onondaga county is .506. In the northern part of the county the towns of Scriba, Minnetto and Oswego, which grew at relatively high rates, tended to lower the correlation. The extraordinary growth of the State University College in the city of Oswego contributed greatly to the growth of this city's surrounding towns.(7) More recently, in the late 1970s the development of Nine Mile Point Nuclear Plant to the east of Oswego has led to an influx of construction workers and their families.

The northeastern part of the county consistently has shown losses or a virtual stagnation of population growth (Figure 3). Sufrin and Thompson have described the general economic health of this area as poor. In contrast, the economic health of the county as a whole was characterized as either moderately low or in insolated areas, intermediate.(8) The influence of the area's severe winters most likely is indirect: few employment opportunities and minimal economic development are the direct causes of this demographic anemia.

CONCLUDING REMARKS

Noteworthy differences exist within the county at the township level. The principal factors underlying these differences are proximity to the central city of the Syracuse SMSA, the expansion of the SUNY four-year College at Oswego, and, particularly in the northeast, the low level of economic health. The continuing expansion of the Syracuse urban ring and the development of new industry in the southern part of the county and particularly in the northern part of adjacent Onondaga County accounted for much of the population growth of Oswego County. The trend of growth in Oswego County should continue into the 1980s as Syracuse develops and attracts new industry into the area. Continued development of nuclear power plants along the southern shore of Lake Ontario will affect the population of the northern part of Oswego County.

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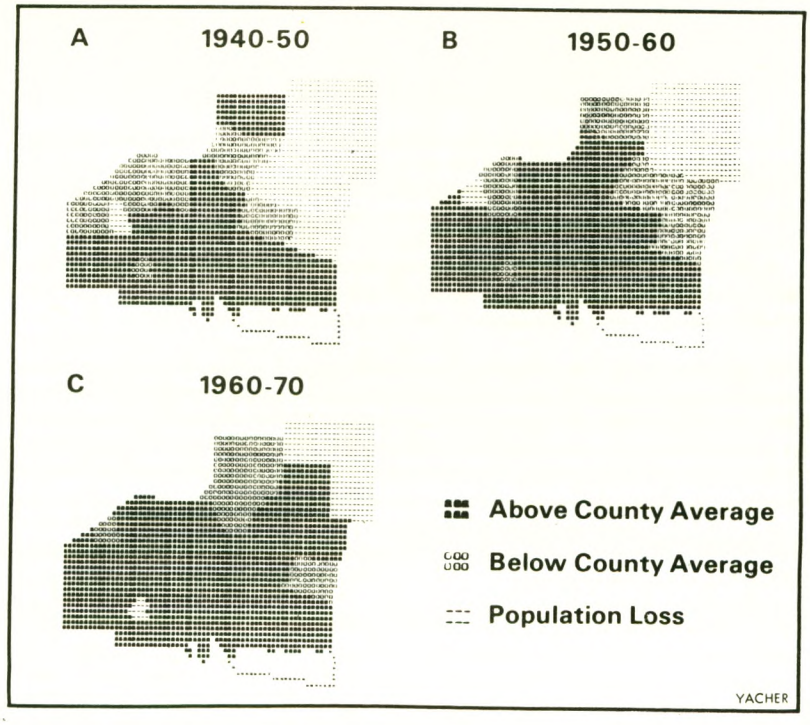

Figure 2. Population Change by Decade; Oswego County, 1940-70.

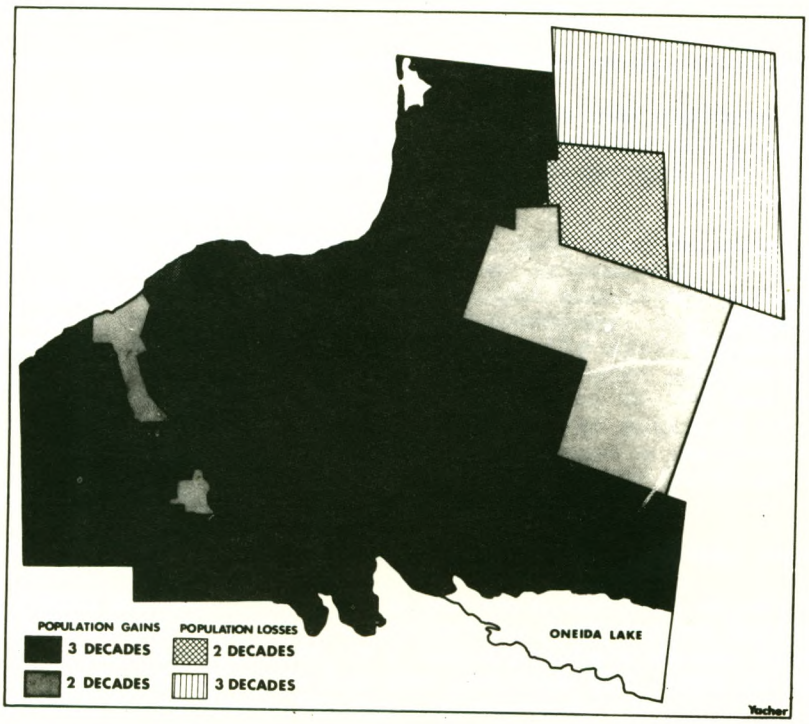

Figure 3. Trends in Population Change; Oswego County, 1940-70.

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THE NATURAL RESOURCE INVENTORY AS A LAND USE PLANNING TOOL

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The quest for comprehensive environmental quality will ultimately be determined by the success in guiding growth and development. Historically, the apportioning of land among competing uses (agricultural, commercial, industrial, and residential) often occurred as a result of political leverage and zoning ordinances, both of which have had a widely varying range of effectiveness. In the 1970s, however, fixed boundaries combined with mushrooming expansion and an increasing concern for the environment have created a heightened awareness of the need to integrate ecological considerations into a land use decision-making process previously dominated almost exclusively by socio-economic factors. A major component of this new approach in a few states, notably New Jersey and New York, has been the natural resource inventory (NRI).

WHAT IS AN NRI?

An NRI is an attempt to gather together in one document the information about the range of natural conditions of the particular area in question. The common list of identifiable factors includes soils, geology, topography, air, water, flora and fauna. Not everything can be cataloged, therefore, attention should be directed toward an examination of the physical systems that will most likely pose potential limitations upon the use of land in a particular community. For example, restrictions imposed by soil will usually be more important than those created by animals. The NRI, then, should focus on describing and analyzing a municipality's assets and liabilities as determined by the natural resource base with the level of concern for each variable based on its relative significance in contributing to an understanding of the environment.

According to Galantowicz, the basic purpose of an NRI is:(1)

> "To provide sound data on natural resources and resource systems existing in the municipality as a basis for planing and legislation such as zoning ordinances and subdivision regulations."

Only by knowing what exists can a governing body hope to encourage what should exist. An NRI can provide the needed information if the content and organization reflect this desire. The content should be factual, current, and based on an objective, well-defined methodology. The organization should be amenable to the derivation of spatially distinct areas within a municipality that have tolerances for different types and levels of development. To fail either of these tests may mean than an NRI has been an exercise in futility in terms of its usefulness in the planning of orderly development. Unfortunately, the NRI that possesses a pertinent content and appropriate organization may have little value if not utilized by local agencies and individuals who make land use decisions.

WHAT IS THE POTENTIAL IMPACT OF AN NRI ON THE PLANNING PROCESS?

In the State of New Jersey, it seems reasonable to expect that an NRI will have the greatest potential contributing information during the creation of the land use element of a municipality's Master Plan as stipulated in the new Municipal Land Use Law (Chapter 291, Laws of New Jersey, 1975). There are three bases for this contention:

1) the law states, "The Master Plan shall generally comprise a report or statement and land use and development proposals, with maps, diagrams and text,..."(2) and an appropriate NRI will usually contain these items;

2) the physical factors and other suggested contents of the land use element generally exist in an NRI;(3)

3) the law states, "Appendices or separate reports containing the technical foundation for the master plan and its constituent elements"(4) may be attached to the Master Plan, and this provides an excellent opportunity for an environmental commission to have the NRI included in the Master Plan in order to signal the importance of the interrelationship of the two.

In short, the Municipal Land Use Law seems to embody a recognition that the NRI has utility in the planning process, but one wonders if this link has been forged in actual practice.

Mrs. Candace Ashmun, Executive Director of the Association of New Jersey Environmental Commissions, believes NRI's should lead to another impact: the development of ordinances. According to her, "if they are not adequate for that, they are not adequate for anything."(5) The variety of ordinances that have evolved from NRI's in New Jersey is unknown at the present time, although pieces of available information suggest a predominance of the site plan review type. Regardless, there may be another factor at work that may muddle the picture in regard to the NRI contributing solely and directly to ordinances. That is, an NRI may have only served to heighten the awareness about a particular problem known previously. Even in this situation, however, the NRI produced an impact. Any investigation in this regard would have to proceed with extreme caution because it is quite apparent that the NRI-ordinance nexus is a complex of interactions.

WHAT IS THE POTENTIAL VALUE OF AN NRI TO A MUNICIPALITY?

The community that spends the time and money to prepare an excellent NRI and then integrates the inventory into a planning framework will most likely benefit from these efforts in two principal ways. One, it may seem axiomatic to suggest that a municipality focus upon the most important variables within its borders. Nevertheless, evidence abounds to confirm the existence of both insufficient detail and non-essential content in some of the NRI's completed in New Jersey within the last five years. This translates into less than adequate baseline planning data for local environmental management. In states where home rule is strong, such as New Jersey, minor civil division level officials are under extreme pressure to allow the maximum amount of land to be developed with a minimum number of restrictions. These circumstances require the careful delineation of at least a three-fold land division scheme: areas where development will produce little or no environmental harm; areas where development will produce unacceptable environmental damage; and areas where development can produce within certain specified restrictions. A well-prepared NRI should yield the information necessary for this type of assessment.

The other possible benefit that a community could reap is financial in nature. Two types of costs can be involved in the NRI process: direct and indirect. Direct costs are those associated with compiling and publishing the NRI; these are amounts each community will have to bear. But

which municipalities will experience indirect costs?

Indirect costs that may be associated, and perhaps ameliorated, with a resource inventory stem from two sources: 1) in New Jersey, legal challenges to the land use element of the Master Plan and any ordinances developed from the contents; and 2) development-induced problems eventually requiring a community-wide solution using public funds. In the case of the former, the promulgation of a land use element or ordinance on the basis of information with inherent defects will likely lead to litigation, an expensive procedure and one that does not resolve the original reason for complaint. A community with an inappropriate inventory has already paid for the development of the document, may pay additional monies in legal fees, and will probably have to pay still more money to acquire the necessary information to adopt legally acceptable regulations. Conversely, an NRI with impeccable features should provide fewer opportunities for lawsuits by builders trying to expand the amount of developable land or by citizens trying to protect the character of the community.

An example of a development-induced problem might be a case where residential construction utilizing on-lot septic disposal is initially allowed and then the density reaches a point at which the threat of groundwater contamination (perhaps of the water supply) forces the installation of a public sewer system. A resource inventory, if competently performed, could be used to identify potential problems of this type. It may also be worthwhile mentioning another savings of significant monetary value to a governing body with a well-written inventory: a factual base upon which to determine the best location for open space and recreation. With limited funds, a municipality can use its study to assess the various areas subject to one or more limitations and select the parcel in greatest danger of development or destruction.

CONCLUSION

Planning is a process of the recognition of constraints. During the last several years, there has been a greater realization about the importance of environmental constraints in particular. The human ability to transform the landscape is not boundless, and a resource inventory can serve as a key element in the exercise of intelligent judgment about the natural limitations of the environment. A significant additional advantage of such an activity may very well be a cost savings.

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ABSTRACTS

AN ASSESSMENT OF PUBLIC SUPPORT OF FOUR YEAR COLLEGES IN THE UNITED STATES

Jery Gerlach
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Public four year colleges expanded tremendously in number and size during the 1960s. During the 1970s these same colleges have been contracting in number and size. The most common measures of state and regional support of colleges are dollars, dollars per student, percentage of state taxes spent for higher education and other monetary figures. This writer felt that this was an inadequate measure as it does not take into account the ability of states and regions to support colleges. This paper measures public support of higher education by controlling for population size and income differences. Faculty/population and student/population ratios were mapped for each state. Income/faculty and income/student ratios were also mapped. A composite map was then constructed to illustrate the states that give the most and least support to higher education in the United States. Higher education is most supported in the West and in West Virginia, the Central Deep South, and Vermont. Higher education is least supported in the extreme Southeast, the Northeast, the Midwest, and California. Public support of four year colleges is greatest in newer states and in states with a relatively small population. Higher education is least supported in the populous states, the older states of the Northeast, and the states that have not had a long commitment to public education.

NEXUS: NEW MODEL OF BARRIER ISLAND DEVELOPMENT

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The origin and migration of barrier island systems has intrigued scientists for many years. In more recent years in response to increased building and habitation, this concern has been heightening amongst the general public due to a series of severe storms. While most workers championed one method of barrier origin, more recent investigations have suggested that barrier island systems developed on a compartment-wide basis, reflecting the influence of the latest pre-Holocene topography.

Stratigraphic data from Delmarva Peninsula's oceanic coast show that the configuration of the pre-Holocene erosion surface has had a strong influence on the type of transgressive barriers that developed, and are developing along the coast. This linking, hence nexus, of the new topography with the old, combined with a differing sediment supply along the compartment, helps to explain the similarity of landforms in the East's compartments as suggested by Fisher. He noted that Cape Cod, Long Island, New Jersey, the Delmarva Peninsula, and the southern coastal states have all or most of the same elements: a northern or cuspate spit, an eroding headland, a southern barrier, and a barrier island chain.

Coring along the Delmarva Peninsula reveals a relict topography of mid-Wisconsinan (?) age, whose transgressive phase left similar environments and lithosomes as in the Holocene. The regressive phase (late Wisconsinan) left a variable density paleochannel network with higher interfluve divide areas. As the Flandrian-Holocene relative transgression began, beaches formed against highlands of the divides, and estuaries developed in the paleochannel valleys. Major inlets remained in the relict thalwegs until sediment supply and coastal dynamics were sufficient to produce closure. Thus, in the

northern section of the Peninsula the relict topography is characterized by deeply incised headland areas with a relatively dense dendritic drainage pattern. Hence, the Holocene pattern of landforms has beaches against highlands, a northern spit, small lagoons, and baymouth barriers linking headlands. The central section, along Assateague Island, had a coarser relict drainage pattern; thus, the earlier-late Holocene barriers were segmented with a large lagoon behind. Relative sea level rise and continued sediment supply allowed these segments to link. The relict topography of the southern barrier island chain was a wave cut cliff-shoreline which caused the paleochannel incisement to be perpendicular to the coast. Thus, because of a decrease in sediment supply and lack of significant headlands, the segments of the barrier island chain below Assateague Island have remained unlinked throughout the relative Holocene transgression and the high number of inlets has allowed vast marsh and tidal flat development to occur landward.

While this model was developed along the Delmarva Peninsula, preliminary work along the New Jersey, Long Island, and North Carolina coastlines suggests that the Nexus model may be applicable there and in other coastal compartments of the world, particularly along other trailing edge coasts.

Implications of the Nexus model for present and future planning in coastal areas, assuming the present rate of submergence, include continued erosion of headland areas, increased deposition in the northern spit complex, and ongoing landward migration of the southern barrier and barrier island chain. As the barriers migrate landward, the estuaries and bays will continue to shallow especially in inlet areas, and marsh will become more prevalent behind the barrier.

MASS TRANSIT AND BEACH USE IN NEW YORK CITY

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Access to the shore has been cited as the single most important factor affecting beach activities. This paper analyzes factors related to access. Variables include transportation, travel time and distance to three heavily utilized New York beaches. When dividing the mode of transportation into three types (subway, bus and private car), the latter exhibits a larger and more diffuse service area, followed by subway and busses. The travel time constraints are greatest among car users, whose average travel time to the three beaches range from 21 to 30 minutes. The beach users arriving by subway exhibited the least resistance to travel, with average times ranging from 22 to 33 minutes. The beach users arriving by busses generally fall between visitors arriving by car and those arriving by subway, and vary between 26 and 43 minutes. Considerable variation exists in the user intensity of all the city beaches. Since travel time is not directly correlated with distance and since service area varies between beaches and mode of transportation, it is suggested that greater efficiencies may be obtained by increasing bus service to the under-utilized beaches. This should be accomplished without exceeding what appears to be the critical limit beyond which the attractiveness of the beach is lost through time spent travelling. Future research should identify special express bus lines from predetermined locations within the city to those beaches which are relatively under-utilized at the present time.

SOME OBSERVATIONS ON MEXICAN-AMERICANS AND URBAN CONFLICT IN THE U.S. SOUTHWEST

Larry Herzog
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The study of urban conflict offers a critical perspective on the nature of urban social problems. The extent and character of Mexican-American participation in Southwestern urban conflicts is considered by isolating some of the more important forces that have shaped the settlement experience of the Hispanic minority, and may well provide an excellent preview to more detailed research on their role in the urbanization conflictual process.

NEW JERSEY AND OCS DEVELOPMENT

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New Jersey Dept. of Energy
Office of Planning and Policy Analysis

The leasing of offshore areas on the Outer Continental Shelf (OCS) in August of 1976 by the U.S. Department of the Interior in Lease Sale No. 40 has precipitated a number of responses at various levels of government throughout the State of New Jersey. Some areas have seen the leasing as a threat to their economy while others have seen it as a means of economic revitalization.

This paper will discuss the myriad of responses by state, county, and local governments to offshore oil and gas exploration and development and its relation to physical and ecological systems present along New Jersey's coastline.

New Jersey's second largest industry is tourism, based upon the availability of high quality environmental resources along the Atlantic coastline. This fact in combination with political events, such as the passage of casino gambling in Atlantic City and the creation of the New Jersey Department of Energy, added additional factors that have played a role in the State's response to OCS development.

These factors are discussed in the ever-evolving response to an unprecedented event on the nation's Atlantic coast that will set precedents for future lease sale areas.

DESERTIFICATION PROCESSES ON THE EASTERN COLORADO PLAINS

Ervin Y. Kedar
William Patterson College of New Jersey

Airborne observation of the dust storm on the Eastern Colorado Plains, as seen and photographed from an aircraft on February 23, 1977, showed that dust was lifted only from certain fields. The steady flow of dust was from the Nunn-Bresser-Ascalon-Truckton soil associations, in spotty, selective, and sporadic form, when wind speed reached its peak of gusts.

APPLICATIONS OF LANDSAT THERMAL IMAGERY

Ray Lougeay
State University College at Geneseo

The new thermal imaging channel (10,400-12,600 nm) of the multisprectral scanner aboard LANDSAT III provides imagery of earth scenes covering approximately 34,000 km^2, with a spatial resolution of 240 m and a thermal resolution of 1.5°C. Unlike the familiar four LANDSAT spectral bands between 500 and 1100 nm which images scenes by sensing reflected sunlight, the thermal system provides imagery which portrays radiant energy emitted from the earth's surface as a function of surface temperature. The ability to detect a given subject on thermal imagery is a function of differing emittance values between the subject and its surroundings. The mosaic of tones on a thermal image is a function of microclimatic heat balances for materials and surfaces within the imaged scene. When coupled with the visible and near-visible LANDSAT imagery, the thermal imagery from LANDSAT III will provide new information which will enhance image interpretation and surface mapping. Interpretation problems associated with thermal imagery from alpine regions exhibiting extreme relief characteristics are discussed, along with examples of information available solely from the thermal imagery. Problems associated with varying microclimatic energy balances and resultant surface termperatures produced by slope exposures, sub-surface heat sinks, emissivity, and varying thermal properties of surface materials are also presented. Thermal remote sensing is now readily available and will prove to be a valuable tool for geographers who will become accustomed to viewing the earth from this spectral format.

ALTERNATIVE ENERGY SYSTEMS--INFORMING THE PUBLIC OF POSSIBLE PROBLEMS

Michael Miernik
Rutgers University

At present, most of the public's contact with alternative energy systems (AES) comes through articles or media events like Sun Day which wax euphoric about their potential. Unfortunately, most all AES have associated problems of either an environmental or socioeconomic nature. While all of them could be easily dealt with during the conceptual and design phases of development, it is possible that they may be relegated to a position of minimal importance due to public indifference. Similiar indifference 30 years ago has given us a nuclear energy program now bottled up due to concerns over numerous environmental hazards.

As present rhetoric is often identical to that used 30 years ago, with "solar" replacing "nuclear" in the text, a replay is a definite possibility. We must insure that AES programs are carried out giving proper recognition to the adverse as well as the positive aspects of these many alternatives. The purpose of this paper is to present a possible framework within which the significance of hazards can be evaluated, information about them disseminated, and responses elicited. Rather than attempting to break new ground, the author takes tools and concepts developed in hazard and environmental perception research and uses them as the basis for his framework.

An informal survey carried out to test some of the author's hypotheses yielded conflicting responses, indicating that a more formal survey would be useful in shaping and presenting energy policy in certain areas.

THE KINKAID SETTLEMENT EXPERIENCE

Frederick B. Piellusch
Mansfield State College

Nebraska settlement, which began in 1854, can be characterized by a numerical variation through time that was accompanied by spatial variation with the Nebraska Sandhills region being noticably unpopular with settlers. The Kinkaid Act (1904) increased homestead size from 160 to 640 acres to spur settlment of nearly nine million acres of Northcentral and Northwest Nebraska.

The Sandhills is a region of literally sandhills covered with grass with dozens of varieties represented. Areas of drifting sand and blowouts, poor drainage, and lakes and swamps also exist. Summers are hot, the winters are cold and precipitation ranges from 13 to 35 inches including 30 to 50 inches of snow. Isolation is a common winter problem.

Sandhills occupance before the passage of the Kinkaid Act ranged from the hunting grounds of Indians to the development of cattle grazing businesses on the public domain. Indians hunted American buffalo until their exile to South Dakota. Range cattle brought from Texas and Oregon grazed the public domain for two years. American and British investors were able to earn handsome profits by controlling water supplies within the region and thus the surrounding grass lands.

The Kinkaid Act was designed to fill in this previously bypassed region, develop the land agriculturally, and put this vast area on the tax rolls. Land developers, speculators, and the general public moved into the region with positive and negative results. In general, it can be said that soils were overrated and the stated carrying capacities of the grass was excessive so that the 640 acres of the Kinkaid Act was really too small.

Settlement under the Kinkaid Act was a failure. Pre-Kinkaid settlement of extensive land use was superior to the 640 acre Kinkaid tracts. Post World War I deflation and declining cattle prices doomed most Kinkaiders to failure and a region of large cattle ranches interspersed with irrigated cropland developed.

THE GREEK MOUNTAIN VILLAGES TODAY

Paul P. Vouras
William Patterson College of New Jersey

Greece still consists of many mountain villages, a type of social organization, whose early beginnings are obscure. Rapid outmigration from the villages started after the Second World War. As a result, their economic and demographic structure changed. Several plans have been introduced to stem the depopulation of the villages.

URBANIZATION AND WAGE LEVELS: A TEST OF TWO HYPOTHESES USING AFRICAN DATA

Raymond W. Waxmonsky and George H. Blackford
State University College at Buffalo

Using data on the level of wages paid African workers employed in manufacturing, a test has been conducted of two hypotheses relating the degree of urbanization to wage levels. The first hypothesis, that of cultural change wherein the more urbanized workers are hypothesized to be more effective in

competing for wage employment and more successful in attaining employment at relatively high wage levels, is not supported. The second hypothesis, that of migration, wherein migrants are said to be more productive than nonmigrants and where nonmigrants would be expected to attain relatively high wages, is supported.

NETWORK ANALYSIS OF DERANGED STREAMS: A FIRST APPROXIMATION

Edmund B. Woods, Jose F. Betancourt and Roger H. Clark
State University College at Brockport

A set of network terms are suggested for deranged stream patterns. A completely deranged drainage system consists only of kettle lakes and hills. These kettle lakes are known as barrier nodes; they prevent efficient removal of the water to lower base levels. Streams develop to supply the barrier nodes; they are called feeder links. When a feeder link erodes headward and taps another higher node the eroding link is called a connective link. The tapped node then converts to an intervening node. The intervening node no longer acts as a barrier to movement of water; it is only a barrier to the movement of sediment. The entire system is then known as a second order collecting unit. Any collecting unit that is connected to a master link is then called a collecting system. The master link drains the collecting systems, moving the water to the ultimate base level, sea level.

A newly exposed glacially modified surface has a derangement index of 100. The following relationships are expected to exist:

$$D = L/J_s \qquad \text{Equation 1}$$
$$D = L/C_s \qquad \text{Equation 2}$$

Where, D is the derangement index, L is the frequency of lakes, J_s is the frequency of stream junctions and C_s is the number of mapped first order channels.

A quadrat analysis of a 625 square mile sample of the Upper Hudson River Basin suggests that the hypotheses suggested by Equation 1 and 2 must be rejected. The derangement index is apparently directed related to all three variables. All three variables decreased with observed increased integration in the Upper Hudson River Basin.

INSTRUCTIONS FOR PAPERS PRESENTED AT ANNUAL MEETING OF MIDDLE STATES DIVISION, AAG

The program committee for the annual meeting of the Middle States Division, AAG, invites members of the Division to prepare and submit papers which present results of geographical research and are likely to command the attention of a substantial number of fellow geographers. Papers by graduate and undergraduate students are particularly encouraged. All papers submitted must be in accordance with the following specifications:

1) No person may present more than one paper, either as sole or joint author.

2) A typed, double-spaced original copy of the paper, on standard 8-1/2 by 11 inch shhets of bond-quality paper, and one additional identical copy of the full paper must be received.

3) The *maximum* acceptable length for each paper is to be *eight* (8) pages of text, double-spaced, *including* references cited. A limited number of bibliographical footnotes are permitted with each article, but informational footnotes cannot be accepted. Papers exceeding eight pages may not be accepted.

4) The heading for the paper should begin in the upper left-hand corner of the first page, 1-1/2 inches from the top and left hand margins, in the following format: title of paper (all upper-case); name of author (caps and lowercase, two lines below the title); address or affiliation (caps and lowercase, two lines below the name of the author). The main text of the paper should begin three lines below the last line of the address or affiliation. It should be indented 1-1/2 inches from the left-hand margin of the paper, at least 1 inch from the right-hand margin, and should be typed with paragraph indentation. Center headings, of one order only, should be typed entirely in uppercase letters and centered in the body of the text three lines below the last line of the paragraph which precedes them.

5) Authors who wish to cite references in the text should use a raised numeral following the passage to which it refers. All references should be listed in numerical order under a centered heading "REFERENCES CITED," following any "ACKNOWLEDGMENTS" at the end of the paper. Turabian (4th ed., 1973), *excluding chapter 12*, should be followed as a guide to all references. Examples:

   a) *Books:* Kate L. Turabian, *A Manual for Writers of Term Papers, Theses and Dissertations* (Chicago: University of Chicago Press, 1973), pp. 78-124.

   b) *Journals:* Richard L. Smith, "Reality in Reapportionment," *Political Annals* 52 (January 1972): 412-37.

   c) *Documents:* U.S., Department of Commerce, Bureau of the Census, *United States Census of Population: 1960*, vol.1, *Characteristics of the Population*, pt. 6, California.

6) All essential tables and/or black-and-white line drawings (such as maps or graphs) must be submitted in a format suitable for publication without further processing, preferably as photographic reproductions (positives) or original line drawings with maximum dimensions of 5 by 8 inches. Titles should be placed above tables and below line drawings.

7) *Abstract:* A separate one-page double-spaced abstract no longer than 250 words will be submitted with the paper. It should begin with the word "ABSTRACT" and should be a positive, factual statement of the substantive content of the paper.

8) Visual-aid requirements and other requests for equipment must be submitted with the contributed papers even if only to say that the requirements are nil.

9) Accepted papers may be published in the *Proceedings*, but no guarantee of publication can be offered. Final decisions on papers to be published will be made by the *Proceedings* Editorial Review Committee. Abstracts will be published of those papers not accepted in their entirety.

10) The Program Committee asks that authors not send material under consideration for publication in the *Proceedings* to any other journal or publisher until a decision on the paper has been reached.

11) Papers and special session proposals should be submitted by July 1 to the incoming President, Middle States Division.