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Repopulating the Countryside: A 1980 Census Trend

Larry Long and Diana DeAre

Summary. Census data confirm that in the 1970's population grew more rapidly outside than inside metropolitan territory, reversing a historic pattern. The new data reveal that the dispersion of population growth beyond metropolitan areas was not so much a movement to small towns as a movement to the open countryside. The trends appear strong enough to suggest a new shift toward rural life-styles.

Censuses are a demographer's microscope, making it possible to examine individual places like towns, villages, cities, and smaller areas within them, including many geographical units that are too small for reliable estimation of intercensal population. Census data show where growth and decline are occurring and how demographic processes are affecting different types of places and altering the various components of the national settlement system. The census microscope can also be focused on specific demographic subgroups which may be of considerable analytical or policy significance but are virtually invisible in sample surveys.

The geographical information provided so far by the 20th decennial census, taken as of 1 April 1980, indicates that major realignments of the spatial structure of the American population are occurring. At one level of analysis, the data confirm various pieces of evidence and hypotheses that the decade 1970 to 1980 was unique in the degree of deconcentration of population beyond the boundaries of metropolitan areas (*1*). The census information also reveals that the dispersion of population beyond the suburban fringes entailed not so much a revival of small towns as a surge of growth outside of incorporated places. In this article we draw on the 1980 census to contrast continuities in basic settlement patterns with new patterns that reflect an unprecedented shift of population toward small urban clusters and rural territory.

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Metropolitan Areas

One aspect of the settlement system that did not change was the continued spatial and demographic expansion of metropolitan areas. A metropolitan area is now defined (by a federal committee) as an urban cluster with a population of at least 50,000 along with the rest of the county and other counties that are linked to the central county through commuting. Everything else is "nonmetropolitan" (*2*).

To some extent the distinction between metropolitan and nonmetropolitan is replacing the traditional urban-rural distinction. Urban and rural are spatial and physical concepts based on residence alone; today only a small proportion of rural residents are farmers. The metropolitan-nonmetropolitan concept embodies both a spatial element (a city and its associated suburbs) and an economic dimension (a more or less unified local labor market). A metropolitan area has both urban and rural parts (see below), as does the nonmetropolitan area.

Between 1970 and 1980 population continued to grow (by 8.8 percent) within the "old" (1970 census) metropolitan boundaries. As in previous decades, the total metropolitan territory increased as nonmetropolitan cities grew and acquired the metropolitan designation and as suburbs of preexisting metropolitan areas expanded into what was formerly nonmetropolitan territory. The newly designated metropolitan areas understandably had a high growth rate—a 21.4 percent increase in population between 1970 and 1980. The counties added to the fringes of the "old" metropolitan areas grew by 33.8 percent between 1970 and 1980.

What was different about the 1970's was that the total population within the updated metropolitan area boundaries grew less rapidly than the residual (nonmetropolitan) territory, reversing a his-

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toric relation. Within metropolitan boundaries updated to 1 January 1980, population grew by 10.0 percent between 1970 and 1980; in nonmetropolitan territory the growth rate was 17.1 percent. In the 1960's (in 1970 census boundaries) the metropolitan growth rate was 2.4 times the nonmetropolitan rate, and in the 1950's (in 1960 census boundaries) metropolitan areas collectively had a population growth rate 3.7 times the nonmetropolitan rate. In earlier decades the exact boundaries of metropolitan areas are disputable, but population concentration occurred as metropolitan areas grew faster than nonmetropolitan territory (*3*).

Clearly, a turnaround occurred in the 1970's as the growth rate of nonmetropolitan territory rose and exceeded the metropolitan growth rate, even while the national growth rate was slowing. Moreover, the surge in the nonmetropolitan growth rate extended to counties not adjacent to a 1980 metropolitan area and therefore probably beyond the outer limits of extended suburban sprawl. Collectively, the nonmetropolitan counties which are not adjacent to a metropolitan area grew by 13.8 percent between 1970 and 1980—more rapidly than metropolitan areas, though somewhat less rapidly than the adjacent nonmetropolitan counties.

The turnaround almost certainly reflects a rising rate of exodus from metropolitan areas and a declining rate of departure from nonmetropolitan locations between the 1960's and the 1970's. Growth in the nonmetropolitan sector was also augmented because the crude rate of natural increase (the rate of population change due to the excess of births over deaths) fell less than in metropolitan territory (*4*). Data are not now available for disentangling the relative importance of these factors.

Smallness and Growth

Although metropolitan-nonmetropolitan contrasts indicate the reversal of a historic relation, they do not reveal some even more fundamental changes in the types of localities experiencing growth from the 1960's to the 1970's (Table 1). Some of the most striking changes were in rural counties. In earlier times counties with no settlement as large as 2500 population and not adjacent to a metropolitan area might have been thought of as isolated and unlikely to grow. In the 1960's counties of this type conformed to the traditional image and collectively lost 4.2 percent of their population. In the 1970's, however, this same set of counties grew by 14.6 percent—faster than the metropolitan average.

For nonmetropolitan counties generally, the traditional positive association between level of urbanization (measured by size of largest settlement) and rate of population growth disappeared in the 1970's. In general, growth was shifting to nonmetropolitan counties with relatively low urbanization and more accustomed to population stagnation or decline than to growth rates that exceed the national average.

Table 1. Population change in metropolitan and nonmetropolitan settings, 1960 to 1980. Metropolitan area boundaries are as of 1 January 1980. Population size categories are as of 1970.

Populations	Change in population (%)		Population in 1980 (in thousands)
	1960 to 1970	1970 to 1980	
United States	13.4	11.4	226,505
Nonmetropolitan counties not adjacent to a metropolitan area			
Largest settlement			
Under 2,500	−4.2	14.6	4,543
2,500 to 9,999	−2.1	13.1	10,255
10,000 to 24,999	5.3	13.7	7,120
25,000 or more	8.6	15.0	4,124
Nonmetropolitan counties adjacent to a metropolitan area			
Largest settlement			
Under 2,500	−0.8	19.0	3,157
2,500 to 9,999	3.5	17.0	13,236
10,000 to 24,999	9.0	17.8	12,467
25,000 or more	10.9	12.2	5,610
Metropolitan areas			
Under 100,000	14.8	20.4	3,611
100,000 to 249,999	16.2	17.8	18,461
250,000 to 499,999	17.0	16.9	24,883
500,000 to 999,999	17.0	11.6	28,640
1,000,000 to 2,999,999	23.8	12.2	50,524
3,000,000 or more	11.1	−0.8	39,875

Among metropolitan areas growth was also shifting down the size-of-place scale. In the 1960's, except for the largest metropolitan areas (a population of more than 3 million), the larger ones grew more rapidly than the smaller ones. In the 1970's smaller metropolitan areas grew faster than large ones, and the largest lost population (*5*). Not only was growth shifting toward the nonmetropolitan sector—an indicator of deconcentration—but within both the metropolitan and the nonmetropolitan sectors growth was also shifting toward less urbanized settings (Table 1). Thus in both the metropolitan and nonmetropolitan context smallness came to be associated with growth.

The Median Inhabitant

It would appear that a growing proportion of Americans are living in smaller settlements in what presumably is a less dense residential environment. One way of illustrating the effect on individuals of changes in growth rates of places is with the concept of the median inhabitant—a hypothetical individual at the midpoint of a hierarchical distribution of individuals. We computed the median inhabitant with respect to place size so that half the population lived in a larger place and half in a smaller place than our hypothetical individual, and with respect to county population density so that half lived in a more densely settled county and half at a lower density; we carried the calculations back to 1900 (Fig. 1). We used counties for the density measure because they are the smallest and most stable ecological units for which land area and population are available over long periods of time.

In the 1970's there was a clean break with past trends toward greater population concentration in large, dense settlements (Fig. 1). In 1980 the average person (our median inhabitant) was living in a smaller place in a less densely populated county than the average person in 1970.

In 1900 a majority of Americans lived outside of incorporated places. In the 1920's the median inhabitant lived in a town with a population of about 5,000, and that figure steadily rose to more than 12,000 in 1970 but fell to just over 9,000 by 1980. These types of data are sometimes cited as a basis for saying that Americans are predominantly a nation of small-towners, but the point to be emphasized is the decline in the 1970's in the place size of the median inhabitant.

The county population density associ-

ated with the median inhabitant also fell in the 1970's. Of course, the density of the nation as a whole is rising simply because the number of inhabitants is growing but land area is not. A nation's population density may be less meaningful than measures of how many persons are exposed to varying degrees of density (*6*). In 1900 half the population was living in counties with fewer than 23 persons per square kilometer (60 persons per square mile). By 1930 the county density of the median inhabitant had more than doubled, and between 1930 and 1970 (excluding Alaska and Hawaii) it tripled, so that by 1970 half the population was living in a county with under 163 persons per square kilometer (422 persons per square mile). But between 1970 and 1980 population density dropped to below 150 persons per square kilometer (383 persons per square mile).

The place size and county population density for the median inhabitant continued to rise in the 1950's and 1960's even though these were decades when millions of Americans were moving from large, dense cities to smaller, less dense suburban communities. These were also decades, however, when other millions of persons were moving from sparsely settled rural counties to large- and medium-sized cities, and these concentrating moves tended to offset the deconcentrating moves to suburbia, at least for the measures of the median inhabitant (Fig. 1). The fact that both the place size and county population density of the median inhabitant fell in the 1970's and not earlier is a sign that population redistribution in the 1970's constituted a point of inflection in the changing residential landscape of America.

As a further check of the uniqueness of population redistribution in the 1970's we computed the Hoover index of concentration (H_t)

$$H_t = 1/2 \sum_{i=1}^{k} | P_{it} - a_i | 100$$

where P_{it} is the proportion of total population in area i in year t, a_i is the proportion of total land area in subarea i, and k is the number of subareas. H_t ranges from 0, which represents a perfectly uniform distribution in which each subarea has the same proportion of total population as it does of land area, to 100, which represents the concentration of all population in a single subarea. With counties as subareas, the index was 54.8 in 1900, declined to 53.0 in 1910, climbed steadily to 58.9 in 1950, to 61.6 in 1960, and to 63.2 in 1970. By 1980 the index had fallen to 61.9, indicating a shift of population toward a more even spatial distribution.

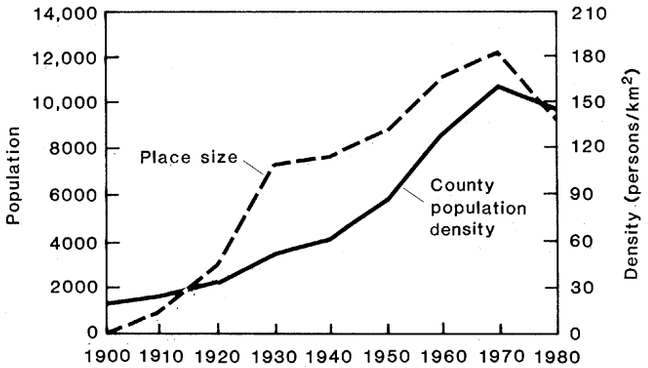

Fig. 1. County population density and size of place for the median inhabitant from 1900 to 1980.

The rise in the index in the 1950's and 1960's and the decline in the 1970's is another indication that the population deconcentration of the 1970's is more profound than the suburbanization of earlier decades.

We also computed the Hoover index with states, nine divisions (groups of states), and a scheme based on four regions as the subareas. In the case of the four regions and the nine divisions, the index declined rather steadily throughout the 20th century. In the case of states, the index declined in the early decades of the century, remained relatively unchanged from 1930 to 1970, and then declined from 1970 to 1980. The decline in the index in the 1970's indicates that population deconcentration occurred for the first time at all these levels of geography, as had been expected (*7*).

Regional Contexts

The foregoing evidence supports the view that deconcentrating trends occurred in the 1970's and led to important alterations in the national settlement system. But this evidence is national and could conceivably represent population movements from larger metropolitan areas of the North to smaller metropolitan areas and nonmetropolitan locations in the Sun Belt. Actually, much more is involved than just a regional shift from dense urban agglomerations of the North to more diffuse settlements in the South and West.

In each of the major regions of the country census data indicate deconcentrating trends toward rural areas outside of metropolitan boundaries. But the data indicate not so much a revival of small towns as a surge of population growth in settings outside of incorporated cities, towns, or villages (Table 2). For example, incorporated municipalities of 2,500 to 10,000 population that are outside of metropolitan areas grew by 9.7 percent between 1970 and 1980 for the nation as a whole—below the national average of 11.4 percent. In the Northeast places of this size declined in population in the 1970's, in the North Central region they grew by a modest 4.7 percent, and in the South they grew by 11.0 percent (*8*). Only in the West, where they grew 26.4 percent, did nonmetropolitan towns of

Table 2. Population and population change in small towns and unincorporated territory outside of metropolitan areas, 1970 to 1980. Data refer to territory outside metropolitan area boundaries as of 1 January 1980. Population size categories are as of 1970.

Type of settlement	United States	Northeast	North Central	South	West
	Population in 1980 (in thousands)				
Unincorporated	33,023	4,920	7,948	15,781	4,374
Incorporated					
Under 1,000	3,390	184	1,639	1,149	419
1,000 to 2,499	4,018	322	1,591	1,579	527
2,500 to 9,999	8,936	782	2,899	3,848	1,407
10,000 to 24,999	7,182	784	2,255	2,868	1,275
25,000 to 49,999	3,962	428	1,357	1,428	749
	Percent change in population, 1970 to 1980				
Unincorporated	21.3	22.6	11.5	22.2	37.4
Incorporated					
Under 1,000	14.1	−0.3	7.8	20.5	33.5
1,000 to 2,499	11.8	1.0	7.4	13.4	31.0
2,500 to 9,999	9.7	−2.1	4.7	11.0	26.4
10,000 to 24,999	7.2	−3.6	2.2	7.7	25.2
25,000 to 49,999	5.1	−5.1	−0.3	6.7	21.0

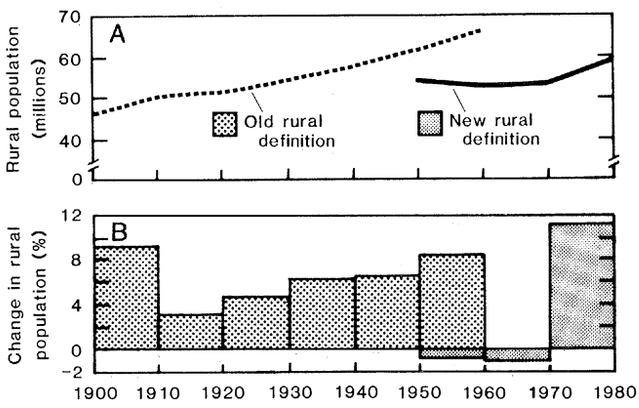

Fig. 2 (left). Change in the rural population of the United States from 1900 to 1980.

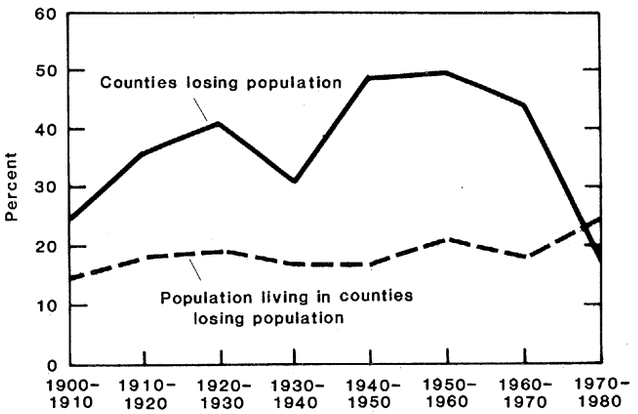

Fig. 3 (right). Population loss: measures of incidence and exposure from 1900 to 1980.

this size show booming growth. Places over 10,000 population showed weaker growth. Places under 2500 population grew more rapidly, but such places have not traditionally been considered urban by the Census Bureau. Thus in each of the four major regions there was a fairly consistent inverse association between place size and rate of population growth from 1970 to 1980.

In nonmetropolitan unincorporated territory, population grew by 22.6 percent in the Northeast, 11.5 percent in the North Central region, 22.2 percent in the South, and 37.4 percent in the West. Even in the Northeast, where small towns and metropolitan areas recorded population declines, there was rapid growth in the nonmetropolitan population living outside incorporated places. The nonmetropolitan population in unincorporated territory of the Northeast grew faster than the South's population in this category, and the growth rate is comparable with a number of booming Sun Belt cities. For example, the city of Houston's population grew by 29.2 percent between 1970 and 1980, but some of this growth was through annexation. With adjustment for annexation, Houston's growth rate would have been about the same as that of the Northeast's nonmetropolitan, countryside population.

The rate of growth of the nonmetropolitan population living in unincorporated territory outpaced that of towns of various sites (Table 2) in each of the four regions, but this population also increased faster than the metropolitan total in each of the regions. In essence, these figures indicate that although population deconcentration in the 1970's was by no means uniform throughout the regions, there was a general shift of growth to rural territory away from metropolitan areas. Some of this growth is truly in the open countryside, but some (at present an unknown proportion) is close to the corporate boundaries of towns. In a sense, small towns may be undergoing suburbanization, a process usually associated with cities.

Growth of the Rural Population

Only decennial censuses provide definitive figures on the rural population, and the 1980 census shows that the growth rate of the nation's rural population during the last decade was unprecedented in the 20th century (Fig. 2).

From 1900 through 1940 the Census Bureau defined as rural a person who lived outside of any city or town with 2500 or more inhabitants. According to this definition, the rural population grew by a fairly substantial amount—9.1 percent—between 1900 and 1910. Rapid industrialization during World War I may have been the reason for the slowing of the growth rate of this population to 3.2 percent in the next decade. The growth rate of the rural population rose successively during the 1920's, the 1930's, and the 1940's, in part because of an increasing degree of suburbanization in unincorporated territory around cities. In 1950 the Census Bureau started counting as urban, instead of rural, people living in fairly densely populated areas (1000 persons per square mile) in the immediate vicinity of cities of 50,000 or more population. This change in definition caused about 6.7 million persons to be transferred from the rural to the urban category, and as a result the former growth of the rural population was converted to a pattern of decline.

In the 1950's the rural population of the nation as a whole fell by 0.8 percent and in the 1960's by 0.9 percent. By 1980, the concept of urban was broadened to include any agglomeration (regardless of the size of the central city) that had a population of at least 50,000 and met the density requirement of 1,000 persons per square mile on its periphery. In spite of this expanded application of the urban definition, the rural population of the United States grew by 5.9 million persons in the 1970's—an increase of 11.1 percent over the 1970 figure.

The urban population also increased in the 1970's and only slightly more rapidly than the rural population. The percentage of the nation's population classified as urban rose by only one-tenth of a percentage point, from 73.6 percent in 1970 to 73.7 percent in 1980. This increase in the proportion of urban population is the smallest in the nation's history, except for the 1810 to 1820 decade when there was a decline of one-tenth of a percentage point in the proportion of urban population. Although the intercensal county population estimates had shown a renewal of growth in many predominantly rural counties in the 1970's, the near halt in urbanization was not foreseen.

Some of the growth of the rural population occurred in metropolitan territory. Since the territory designated metropolitan usually expands by entire counties, the spreading metropolitan system engulfs the rural population, and in this way the countryside is metropolitanized. In the 1970's this expansion was associated with an increase in the proportion of metropolitan residents classified as rural. In 1950 about 13.6 percent of metropolitan residents were rural, most often found in the outer fringes of suburban developments. In 1960 and 1970 only 11.8 percent of metropolitan territory residents were classified as rural, but in 1980 the percentage rose to 14.8—that is,

about one metropolitan resident in seven was living in rural surroundings. These statistics are an indicator of growing diffuseness of the nation's metropolitan system: as it expanded into the countryside in the 1970's, the system itself was transformed in a manner different from the pattern of the 1950's or 1960's. As parts of the countryside were metropolitanized, the metropolitan system as a whole was ruralized in the 1970's.

Slowing Growth at the National Level

In the 1970's the national population growth rate was slowing because of declines in fertility rates. In fact, only in the depression decade of the 1930's did the nation's population grow as slowly as it did in the 1970's. An irony of the 1970's, however, is that as the nation's growth rate slowed, the number of counties experiencing growth increased. The diffusion of growth toward less urban counties has been accompanied by deepening population losses in central counties of many metropolitan areas. Localities experiencing severe population loss in the 1940's, 1950's, or 1960's were typically rural, whereas now they tend more often to be urban counties with large populations. The result is that although fewer localities are experiencing decline, a larger proportion of the population is exposed to population loss (Fig. 3).

During the 1940's, 1950's, and 1960's, when the nation's population was growing more rapidly than it is now, a large proportion of counties were experiencing population decreases. Between 1940 and 1950 almost half the 3100 counties in the United States lost population. Again in the 1950's nearly half the counties lost population, and in the 1960's 44 percent of the counties lost population. A sure sign of population concentration is for high growth rates nationally to be accompanied by widespread population losses among individual localities. In the 1970's, however, only 18 percent of the nation's counties lost population. The number of counties that lost population was cut from 1349 in the 1960's to 545 in the 1970's. Never before in the 20th century had so few counties lost population. But never before was so large a proportion of Americans exposed to population loss by virtue of living in counties with declining populations. In the 1950's the proportion of Americans living in such counties reached a relative peak of just under 21 percent; the figure declined to 18 percent in the 1960's. In the 1970's nearly a quarter of the population lived in counties that lost population.

Some of the greatest population losses in the 1970's occurred in large cities. St. Louis lost over 27 percent of its population, and Cleveland and Detroit lost 24 percent and 21 percent of their populations, respectively. The population of New York City, which grew modestly in the 1960's, declined in the 1970's. As populations in a number of other major cities marked a transition from growth to decline, a growing number and proportion of Americans became exposed to population decline.

Almost any shift in pattern—from growth to decline, from slow growth to fast growth, and so on—requires some kind of governmental adjustment in response. With population growth, new roads, schools, various municipal services, or other forms of "infrastructure" have to be provided. Because population decline is often accompanied by declining revenue sources, new ways have to be found to finance existing facilities and services. In the 1980's more governments may petition for assistance in adjusting to the problems of growth, whereas places trying to adjust to decline can claim that they represent a growing share of the nation's population. The dilemma of whether to direct assistance to the largest number of places or the largest number of persons is a vexing problem for any governmental system, and it is one that could become more acute in the 1980's.

Conclusions

In the 1970's population growth in the nation's metropolitan territory slowed as growth rates in nonmetropolitan territory rose to surpass the metropolitan average, thereby reversing a historic relation. Prior to the 1970's relatively large settlements offered numerous advantages to induce population growth, but in the 1970's small size—in both metropolitan and nonmetropolitan contexts—acquired unexpected advantages in being able to attract growth.

A substantial part of the growth beyond metropolitan boundaries represents what appears to be a trend toward living outside of incorporated places. This type of development seems to be in basic accord with reported residential preferences of Americans, although many people surveyed expressed the simultaneous preference for low density and proximity to a metropolitan area (*9*). The achievement of residential preferences may be facilitated by social changes that have lowered retirement ages and instituted more generous pensions for retirees, many of whom are predisposed to move to rural locations, especially where recreational facilities are present. Access to such areas has been increased through long-term improvements in transportation and communication, the extension of many types of municipal services, and the institutionalization of 3-day weekends.

A more immediate set of factors associated with population dispersion in the 1970's is the movement of a variety of jobs toward smaller metropolitan areas and nonmetropolitan locations. In the period of general economic expansion from 1975 to 1979, the number of jobs in nonmetropolitan territory increased more rapidly than did jobs in metropolitan areas. During this 4-year period, the number of jobs available in construction, manufacturing, transportation and public utilities, finance, insurance, and real estate grew faster outside than inside metropolitan areas. Although they started from a small base, even rural counties (no settlement of 2500 or larger) not adjacent to a metropolitan area collectively expanded their employment in manufacturing more rapidly than did metropolitan areas and became more dependent than metropolitan areas on manufacturing as a source of employment growth from 1975 to 1979 (*10*). These types of data suggest a dispersion of employment centers and an expansion of individuals' choices as to type of residential environment.

Among the reasons cited for employment deconcentration are strictly cost-benefit calculations (lower taxes, land costs, and wage rates in less urban locations), manufacturing techniques that require large amounts of land, and simply changes in the basic nature of the economy (for example, a shift from bulky output toward lightweight, high-technology products that can be transported by truck or air rather than by rail) (*11*). Although these alleged effects have not been quantified, they suggest the need for some rethinking of the concept of agglomeration economies insofar as settlement size is concerned.

The dispersion of employment beyond metropolitan boundaries does not necessarily imply a lengthening of commuting distances. A 1975 national survey found that on the average nonmetropolitan residents commuted somewhat shorter distances to work than did suburbanites (*12*). Still, energy developments consti-

tute a major element of uncertainty about the duration of present population and employment deconcentration. Suburban sprawl of the 1950's and 1960's is sometimes explained as the product of cheap energy and profligate automobile use; the logical corollary seems to be that rising energy prices and potential gasoline shortages might serve to recentralize population. Although population began to grow faster outside than inside metropolitan areas before the 1973–1974 oil embargo that set in motion gasoline price increases, there is no evidence that the rate of population dispersion was slowed in the late 1970's (*4*). Little is known, however, about what the long-term constraints on population dispersion may be.

What is more certain at present is that enough people and jobs located in rural settings in the 1970's to effect considerable mixing of life-styles ordinarily thought to be discrete. As manufacturing jobs were moving to the countryside, some evidence of an increase in small-scale (possibly part-time) farming was reported (*13*). There is no evidence of a return to agriculture as a primary way of making a living, but there seems to be greater mixing of farm and nonfarm employment and more combining of retirement with employment in rural settings. Options for combining life-styles in these ways are both cause and consequence of new patterns of population dispersion.

References and Notes

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2. In this article "metropolitan" refers to Standard Metropolitan Statistical areas (SMSA's) or to New England County Metropolitan Areas (NECMA's). In New England, the basic units for constructing SMSA's are towns and cities rather than counties, but we have used the NECMA scheme, which employs whole counties.
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5. An issue in examining the relation between size and growth in the metropolitan context is whether to use the SMSA's and NECMA's shown in Table 1, groups of SMSA's known as Standard Consolidated Statistical Areas (SCSA's), or some other clustering of individual metropolitan areas into larger agglomerations. For example, should a resident of Norwalk, Connecticut, be considered as living in an area of 127,000 (the population of the Norwalk SMSA), an area of 16 million (the population of the New York–Newark–Jersey City, N.Y.–N.J.–Conn. SCSA), or an area of 42 million, the population of Jean Gottmann's megalopolis, the urbanized northeastern seaboard extending from Boston to Washington, D.C. Below we show population change in terms of the SCSA scheme; the basic conclusion that highest growth rates shifted to the smallest size category in the 1970's is unchanged.

Population	Increase (%)	
	1960–70	1970–80
Under 100,000	14.8	20.4
100,000 to 249,999	15.7	17.9
250,000 to 499,999	15.4	17.8
500,000 to 999,999	16.1	12.0
1,000,000 to 2,999,999	25.2	13.9
3,000,000 or more	13.8	1.6

6. A. T. Day and L. H. Day, *Science* **181**, 1016 (1973).
7. D. Vining and A. Strauss, *Environ. Plann. A* **9**, 752 (1977).
8. The Northeast consists of New England and the Middle Atlantic states of New York, Pennsylvania, and New Jersey. The North Central region consists of the Great Lakes states and Missouri, Kansas, Iowa, Nebraska, and the Dakotas. The South is made up of all states south of the Mason-Dixon line (including Delaware, Maryland, West Virginia, and Kentucky) and extends as far west as Texas and Oklahoma. The rest of the states are in the West.
9. G. V. Fuguitt and J. J. Zuiches, *Demography* **12**, 491 (1975).
10. L. Long and D. DeAre, *The Economic Base of Recent Population Growth in Nonmetropolitan Settings* (Center for Demographic Studies, Bureau of the Census, Washington, D.C., 1982).
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12. Bureau of the Census, *Current Population Reports*, P-23, No. 99 (Government Printing Office, Washington, D.C., 1979), p. 11.
13. B. Chapman, *New York Times*, 16 December 1981, p. A13.

Education, Science, and National Economic Competitiveness

John R. Opel

The United States still ranks first in the world in its total economic, educational, and technological strength. But there is a national problem which is seen in international competition: that we risk losing out against tougher, more pragmatic, more adventurous international contenders in the years ahead. We have seen signs of slippage: our imports of Japanese and German automobiles, steel, and television sets (not to mention semiconductor memory chips); our loss of market share in exports of manufactured goods; and above all our rate of increase in manufacturing productivity, which has been lagging behind that of virtually every other industrialized country in the world.

These signs of decline, of course, have many causes and require many solutions, including more savings and more investment in plant and equipment. But I want to focus on the trend that to me seems most alarming of all: that the United States is slipping in the race to strengthen not its capacity in buildings and machines, vital as they are, but the capabilities of its people: talented, educated, and trained human beings—the ultimate resource in any nation.

Nearly a quarter-century ago the Russians put up Sputnik, the first earth satellite. That event took us by surprise. It frightened us into a sustained national effort, and 12 years later we landed the first man on the moon.

Today we face, I believe, an even more ominous threat. In contrast to Sputnik, we have no spectacular event to jolt us into action. We have only a succession of facts—facts so subtle that we often overlook them or bury them on the inside pages.

For nearly two decades, the average combined verbal and mathematical scores on Scholastic Aptitude Tests (SAT's) given to U.S. high school students have been falling; they have fallen by a total of 90 points.

Half of all U.S. high school students take no mathematics at all after the tenth grade. Only one junior or senior in six takes a science course. Only one in fourteen takes physics.

No wonder so many students graduate from high school unqualified to enter

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