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ship today of this country with Europe is considerably different from the two decades immediately following the end of World War II.

And I think the President demonstrated, before he went to Europe, as well as while in Europe judging by the press reports, that he has long been aware of the changes which have taken place and that it was necessary for this country's leader to reestablish a dialog with the leaders of European nations.

This he has now done—admirably, in my viewpoint. He has set in motion the apparatus for this country to strengthen our ties with the European nations, not on the formula of the past in which these ties rested—in the main, on our strength to aid them in their protection—but in working together in the many, many areas in which we share the common aspiration of success, progress and liberty for our respective peoples.

The President's trip was particularly worthwhile in this latter respect in that it tends to turn our focus of attention on the positive points of our relationship with Europe and to direct our thinking to closer cooperation, to greater contacts and to a stronger association with Europe.

A number of our Presidents have visited Europe and have left with the people of those nations impressions of what our country is like on the basis of what our leaders are like.

We can all be exceedingly proud of this latest trip by an American President. I am confident that the European estimate of the character and substance of our people is immeasurably higher today as a result of President Nixon's historic visit to the European Continent.

#### TOWARD A SOCIAL REPORT: OUR PHYSICAL ENVIRONMENT

Mr. MONDALE. Mr. President, you have heard me speak often about the quality of American life in connection with the Full Opportunity Act of 1969—S. 5—which I introduced on January 15. It is unfortunate that so vital a matter is so difficult to talk about in a precise manner.

This, of course, points to the urgent need to develop a set of "social indicators" so we cannot only talk meaningfully about the quality of American life but also evaluate our social programs which are designed to improve that quality. Social indicators are also necessary if we are to formulate future social plans. Surely, the quality of American life can be improved faster by intelligently planning for the future rather than blindly stumbling into the future.

While it is difficult to talk about some of the factors associated with a better life, there are other factors which are relatively easy to talk about. The third chapter of "Toward a Social Report," dealing with the physical environment, isolated some of these factors. Specifically, the chapter deals with the pollution of our natural environment and the inadequacies of our manmade environment.

We now have developed, for instance, an air pollution index. We know, for ex-

ample, that New York has the worst air pollution problem in the country. Merely knowing this, of course, is no help to the asthmatic who must live and work in New York City. If we are to improve the quality of his life we must begin now to act on our present knowledge. Certainly, we can all agree that the quality of this asthmatic man's life will be improved by cleaner air.

Senators need not even look as far as New York City to see the adverse effects of pollution. Today, we do not need the social report to tell us that due to water pollution our very Potomac River is unsafe even for boating 70 percent of the time. It will not be long before we will be able to smell the effects of water pollution without so much as leaving this very Chamber. I am convinced that this would not have been allowed to happen had there been an annual social report even 20 years ago.

Mr. President, "Toward a Social Report" notes that in connection with our manmade environment there is a "more encouraging trend." Whereas in 1960, 84 percent of the housing in this country had been defined as "structurally sound," in 1966, 90 percent of the housing was considered "structurally sound." New and increased housing construction has meant better housing for most Americans.

The social report, however, points to what I consider to be an intolerable situation. I quote from the report:

Even though the housing stock is improving, racial segregation and other barriers keep many Americans from moving into the housing that is being built or vacated. . . .

Many of our citizens—mostly black—are thus denied a "full share in the benefits of the improvement in the Nation's housing supply." Again we can all agree that structurally sound housing is a necessary condition for a better life. I am sure we can all also agree that we must concentrate our efforts on the eradication of this intolerable situation of racial segregation in housing.

If full opportunity is a birthright of every American, then this effort is imperative. Future social reports can evaluate our present efforts and redirect us where necessary.

Mr. President, I ask unanimous consent that the third chapter of "Toward a Social Report" entitled "Our Physical Environment" be printed in the RECORD.

There being no objection, the chapter was ordered to be printed in the RECORD, as follows:

#### CHAPTER III. OUR PHYSICAL ENVIRONMENT ARE CONDITIONS IMPROVING?

In this chapter we are concerned with our physical surroundings: with the air we breathe, the water we use, the housing we occupy, the landscapes we see, and the transportation systems and urban patterns that determine the spatial dimensions of our lives.

##### THE NATURAL ENVIRONMENT

The natural environment is different for each community. In one community the air is polluted, but the water is reasonably clean; in another the reverse may be true. In a third place solid wastes—expanding graveyards of abandoned cars, or piles of trash—may be the most serious problems. In one place problems are getting worse; in another they are getting better. Programs designed to deal

with pollution are as diverse as the problems themselves. Air, water, and land pollution are treated as separate and independent problems; the two Federal agencies with primary responsibilities for air and water pollution are in separate cabinet departments. Many State and local agencies also deal with one pollution problem or another.

To summarize the vast variety of environmental problems and policies we need to consider the interdependence of air, water, and land pollution, and the level and composition of the National Income. The "materials balance" framework provides an approach which can enable us to do this.

##### The materials balance framework

We start with the fact that the total weight of materials taken into the economy from nature must ultimately equal the total weight of the wastes discharged, plus any materials recycled. This means that a reduction in any one kind of waste, such as particulate matter into the atmosphere, must be accompanied by an increase in some other kind of waste, such as dry solids or solids discharged into waterways, or else by a continual recycling of this material. Except for respiratory carbon dioxide and water, it is technologically possible to stop most of the present discharge of wastes into the air and watersheds. But the result would be an accumulation of solid wastes that might be equally objectionable.

The economy uses almost 1.5 billion tons of fuel each year.<sup>1</sup> The main products of combustion are gaseous oxides or carbon, hydrogen, sulfur, and nitrogen. These plus a portion of the solid ash are normally discharged into the atmosphere. The economy also takes in about another billion tons of minerals and food and forest products. Consumers use these goods in the form they receive them, or further transform them (e.g., by eating), but must sooner or later dispose of the end product, whether it be empty tin cans, "throw-away" bottles, worn-out refrigerators, plastic toys or human excreta.

Thus we can see that the pollution problem will probably increase as the economy grows. If, for example, industrial production tends to grow at 4½ percent per year, it will have increased fourfold by the year 2000 and almost tenfold by 2020. Unless there are changes in technology or the composition of output, the total weight of materials going through the economy, and the wastes generated, will have increased by a like amount. Surely this will not be allowed to happen. The society must continuously recycle more of the materials it uses, or reduce pollution in some other way. Still, this hypothetical projection alerts us to the fact that a new type of natural resource scarcity is emerging.

Since Malthus' time, the possibility of resource scarcity has held the attention of economists and laymen alike. Available evidence today suggests, however, that resource scarcity has not posed a threat to American economic growth over the last 60 years, nor is it likely to over the next 50 years.

The same cannot be said of the new type of scarcity: nature's limited capacity to absorb wastes. The present levels of pollution are serious enough. But unless we develop new technologies of recycling, they could become much worse.

We cannot draw any direct lines from the amount of wastes discharged in an area to the damage done by pollution. Some wastes, such as carbon dioxide, are not usually considered pollutants. In some areas, especially rural areas, the level of pollution may be be-

<sup>1</sup> This and the following estimates are from Ayres and Kneese, "Environmental Pollution," *Federal Programs for the Development of Human Resources, A Compendium of Papers Submitted to the Subcommittee on Economic Progress of the Joint Economic Committee, Congress of the United States, 1968.*

low the threshold at which it begins to do damage. It is also possible that some parts of the environment can specialize as receivers of waste. Certain land areas and rivers could be loaded with wastes almost without limit, and other areas and rivers kept in good condition for other uses. We must therefore look at each type of pollution in turn, along with its sources, effects, and geographic dispersion.

#### Air pollution

In most of our large cities today more wastes are being discharged into the atmosphere than can be dissipated. The result is air pollution. Polluted air can contribute to sickness, disability, and premature death; it can soil and damage buildings and materials of all kinds; it can injure and destroy farm crops and other vegetation; and it can blight our cities and degrade the quality of our lives. In addition, the more distant future holds the ominous possibility of radical changes in climatic conditions.

#### a. Major Pollutants and Their Adverse Effects

*Carbon monoxide* is the most important air pollutant in terms of weight emitted into the atmosphere. Generated principally from transport vehicles and combustion processes, it can cause physical and mental impairment, and death.

*Oxides of nitrogen and hydrocarbons* (from autos and industrial sources) photochemically react to produce photochemical smog, the most irritating effect of which is eye irritation. Smog makes breathing more difficult, especially for those with respiratory diseases, and it has been known to cause serious plant damage.

*Sulfur dioxide*, from burning of coal and oil, damages vegetation, affects the lungs adversely, and has been associated with an increase in respiratory death rates and cardiovascular ailments among older persons. Sulfur trioxide, from the same source, converts to sulfuric acid in the air and causes corrosion and deterioration of certain fabrics and of steel and stone structures.

*Particulate matter*, such as lead from auto exhausts, may be directly harmful to human beings. Other particulates may magnify the adverse effects of other pollutants on the lungs, and soil structures and materials. Major sources are ash products of combustion in electric power and industrial production.

#### b. Air Pollution Levels

Are the levels of air pollution high enough in major American cities to create serious problems? Some idea of the significance of the air pollution problem can be obtained by comparing the actual levels of each type of pollutant in various cities with some standards for air quality, to see if air pollution exceeds an acceptable level.

It should be emphasized here that the best presently available information on air pollution problems is incomplete—hence the tentative nature of the goals. Because of the dire consequences of continued increases in pollution we have to take precautionary measures in the face of information which is not only insufficient but subject to change as our knowledge grows.

Two different sets of tentative air quality goals have been adopted. If the "tentative short range goals" were achieved, most of the undesirable effects now understood would be eliminated. The long range goals set more rigorous standards, since not all of the effects of air pollutants are known, and there is evidence which suggests that still lower levels must be reached to eliminate all of their detrimental effects.

An index of air pollution can be obtained by comparing a city's maximum pollution levels to the tentative air quality standards. There are six major American cities for which the index exists. None of the six cities meets even the tentative short range standards, suggesting that the air pollution prob-

lem is quite significant. A comparison of the maximum air pollution levels of the six cities with the long range standards indicates an even worse situation.

TABLE 1.—Air Pollution Index (1 is barely adequate air; the higher the number the greater the pollution)

	Based on tentative short range standards
Chicago	2.7
Los Angeles	2.2
Philadelphia	2.2
Washington	1.6
Cincinnati	1.6
San Francisco	1.1

On the basis of less detailed information, the National Center for Air Pollution Control (NCAPC) has ranked 65 metropolitan areas in order of the seriousness of their air pollution problems. The ten with the most serious problems are, in order:

1. New York.
2. Chicago.
3. Philadelphia.
4. LA—Long Beach.
5. Cleveland.
6. Pittsburgh.
7. Boston.
8. Newark.
9. Detroit.
10. St. Louis.

A glance at the major sources of air pollution makes it evident that substantial reductions in air pollution will not be easy. The NCAPC has estimated that energy conversion in the transportation system is the source of nearly 60 percent of all the major air pollutants, and 90 percent of the carbon monoxide. This suggests that a major reduction in the extent of air pollution would require either a substantial limitation in the use of the automobile, or else a type of automobile (like a steam or electric car) capable of generating less pollution.

Less radical and costly changes—such as smaller cars or more extensive use of trains—could, however, make a significant contribution. So would more emission control measures in industry and public utilities. Industrial sources account for 18 percent of all pollutants, and utilities and other energy conversion for another 21 percent. In the case of particulate matter resulting from electric power generation, for example, it has been estimated that rates of emission could be reduced by 80 percent by the year 2000 at a cost of \$11 million per year, which is quite small in relation to total production cost.

#### Water pollution

Water, like air, is often used as a waste receptacle. The accumulation of wastes that cannot be dissipated leads to pollution. The uses of water are more numerous and the relationships more complex than for air. Water which is too polluted to swim in may not be too polluted for fish. Water too polluted for fish may still be suitable for sailing or hydro-electric power generation. The uses of water must accordingly be taken into account before the severity of water pollution can be judged.

In recent years the use of water for recreational purposes has become more important. But the dumping of industrial wastes and municipal sewage into the Nation's waterways has diminished their ability to serve the rising demand for recreational facilities, which require higher water quality. It is necessary, therefore, not simply to maintain but to raise water quality.

The most common standard by which the quality of water is judged is the quantity of dissolved oxygen (d.o.) in it. When considerable quantities of organic materials are dumped into a river, the oxygen-using bacteria in these wastes draw down the level of dissolved oxygen. Since oxygen is necessary to support all forms of animal life, plankton and higher orders of animal life in the food chain, including fish, disappear. The depletion of oxygen also ultimately keeps the

oxygen-using bacteria from decomposing the organic substances in the water into their basic chemical constituents, and a septic situation develops. Anaerobic or non-oxygen using processes continue to bring about some decomposition of wastes, but these processes produce foul smelling gases.

Though they do not usually cause disease themselves, the presence of those forms of coliform bacteria normally found in the feces of warmblooded animals, including humans, indicates that there is a serious danger of harmful organisms in water. Thus the concentration of fecal coliforms, which normally come from municipal sewage, is another measure of water quality. So is the concentration of synthetic organic compound (from detergents), toxic substances (from herbicides and pesticides), plant nutrients, and specific industrial wastes, such as sediment, dissolved solids, and radioactivity. Industrial processes, and especially the generation of nuclear power, can also cause "thermal pollution" by heating the water and thereby harming fish. The acid drainages resulting from coal mining also make water unsuitable for fish or drinking, yet may make water clearer and more attractive and enhances its usefulness for some industrial purposes.

Some standards for water quality have been determined by a Technical Advisory Committee convened in 1967 to advise the Secretary of the Interior. This committee took account of both recreational and industrial uses, and the danger of polluted water to health. It established different standards of quality for different water uses.

These criteria can be compared with actual measurements of quality to determine where and how often water pollution forecloses certain uses of water. A sample of 25 stations in the Federal surveillance system was drawn, and the levels of dissolved oxygen and fecal coliform observed. Seventeen of the stations reported at least one reading below the dissolved oxygen standard needed for fish and wildlife, and nine stations experienced such a condition more than 5 percent of the time. All of the stations observed had maximum coliform counts above the standard for general recreation use and public water supplies, and 10 had average counts above this standard. The Missouri-Mississippi Basin and the Cuyahoga, Sacramento, Delaware, and Potomac Rivers were unsafe even for boating more than 70 percent of the time. Thus, it appears that many major rivers are in appalling condition much of the time. On the other hand many rivers, particularly in the West, are relatively free of pollution.

The primary sources of water pollution are municipal and industrial wastes. The households of about 125 million people, or almost 90 percent of the urban population, are connected to sewer systems. Manufacturing wastes are also discharged through the same sewers and produce an organic waste load three times as great as households. Industrial wastes are probably responsible for a substantial part of the water pollution problem.

The extent of treatment of manufacturing wastes is not known, but we do know that sewer systems serving about 104 million people treat the wastes before they are discharged. About three-fifths of these, in turn, have both "primary" and "secondary" treatment, which removes at least 85 percent of the biological oxygen demand of the wastes.

If all municipal wastes were treated and if the effectiveness of treatment were raised to 85 percent, on average, actual municipal discharges into rivers would still be greater in 1980 than they were in 1962, and would have doubled by 2020. If, on the other hand, we raised the effectiveness of all treatment to 95 percent, municipal waste discharges into rivers would probably decline over the next 60 years. But 95 percent treatment goes

to the outer limits of present technology, and would perhaps triple or quadruple treatment costs.

One estimate puts the costs of building and operating treatment plants that would remove at least 85 percent of the organic wastes from both municipal and industrial effluents by 1973 at over \$20 billion, or \$4 to \$6 billion a year.

#### *Pollution of the land*

Solid wastes are increasing both in variety and in volume. They include, in addition to garbage and ashes, considerable quantities of industrial wastes, old appliances, construction refuse, junked cars, agricultural chemicals, "throw away" cans, bottles, or plastic containers, and even radioactive materials. In an earlier period solid wastes were mainly organic materials that would be degraded over time, but they are now about 65 percent inorganic solids.

In 1966, the Nation disposed of an estimated 165 million tons of solid wastes. This total is expected to grow to about 265 million tons in 1976. Household wastes alone are considerable. Data in the late fifties showed that several cities collected close to four pounds of refuse per capita per day, and this level has since increased. In 1965, the Nation also disposed of about 6 to 6½ million motor vehicles. The burden of junked automobiles is, however, lessened by the fact that much of the material can be profitably reused; in 1965, about 15 percent of the rubber, and at least 90 percent of the steel was recovered from junked automobiles.

The accumulation of solid wastes has almost exhausted convenient landfills in many urban areas.<sup>2</sup> Solid wastes can be transported to rural areas, though at increasing cost. Landfills can also be used to reclaim swamps and marshes for urban uses, although there is evidence that this may have adverse effects on marine life. Filling coastal marshlands also appears to have an impact on fisheries which is not yet properly understood or measured.

Solid wastes also can be (and often are) incinerated, composed, or barged to the sea. This can increase air and water pollution. Indeed, the incineration of certain types of plastics found in solid wastes (especially Teflon, and fluorinated and vinyl plastics) produces chemical contaminants whose physiological effects may be similar to those of phosgene gas, a severe respiratory irritant used in World War I.

The costs of disposing of solid wastes are often considerable. Ayres and Kneese estimated that local governments spend about a billion and a half dollars on collecting and disposing of such wastes. Schools and roads are the only items on which local governments spend more. These costs vary considerably with the level of service provided. A study of refuse collection in St. Louis showed that changing the pickups from the curb to the house doubled costs, and that an increase from two to three pickups a week increased costs by almost a third.<sup>3</sup>

The costs of different methods of disposal and locations for dumps are particularly crucial. Even with present technology, it is possible to prevent great damage to the quality of the environment, if only by hauling the wastes to uninhabited areas. But measures that completely protect the quality of the environment may be so costly they are not worthwhile. A wise policy concerning solid wastes must therefore be based on informed judgments about the benefits and

costs of the relevant alternatives in each local situation.

#### *Other environmental hazards*

Some problems of the natural environment cannot be described in terms of the flow of materials through the economy. This is true of floods, droughts, erosion, hurricanes, and other natural hazards. Increased meteorological knowledge, better transportation and communication, new dams, irrigation work and drainage systems, and better housing have greatly eased the problem of such natural disasters. Because of these and other protective measures, more people are able to live in disaster-prone areas. However, this tends to increase the population at risk to natural disasters.

Another environmental problem is noise. Noise is not only unpleasant and disruptive, but can also be a threat to health. Clinical evidence shows conclusively that noise can damage hearing. It has been estimated that more than 6 million Americans are subjected to hazardous noise levels at their jobs. Current levels of electronic amplification of music have also been shown to lead to at least temporary impairment of hearing. With increased crowding, electronic amplification of sound, use of machinery, sonic booms and other noises from the transportation system, the average noise level rises each year.

#### *Outdoor recreation*

The natural environment is a source of esthetic satisfaction and the setting for outdoor recreation. Vast rural areas are almost totally unspoiled, and even some areas with significant pollution problems can be used for outdoor recreation.

Outdoor recreation is accordingly enjoyed on a wide scale. The Bureau of Outdoor Recreation has estimated the total number of "occasions" of outdoor recreation at 6.5 billion in 1965, or up 50 per cent from 1960. This figure is expected to rise to 10 billion by 1980. The forms of outdoor activity that attract the greatest number of people are walking for pleasure, swimming, picnics, and pleasure driving.

In 1965 there were some 345 million acres of designated rural recreation lands administered by Federal, State, and local agencies, or about 1.8 acres per capita. The Mountain States have 20,000 acres of such land per person, but New Jersey has only .06 acre per person.

The Bureau of Outdoor Recreation has indicated that outdoor recreation rises with income. This suggests that the extremely unequal distribution of public recreation land is a problem, and that the demand for outdoor recreation can be expected to increase as incomes rise.

#### THE MANMADE ENVIRONMENT

The quality of life obviously depends on the places we live in—our homes and communities.

##### *a. The quantity and quality of housing*

When high- or middle-income families build new homes at a faster rate than that at which the population grows, this tends to improve housing for low income people as well. The housing that is vacated by those who move into the new housing is usually sold or rented to families with lower incomes, and the housing these families occupied is usually then taken up by families with still lower incomes. We shall see that this process has led to better housing for Americans at all income levels, but that some Americans have been denied the full benefits of the increase in the housing supply.

The quality of housing has improved substantially in recent years. The 1960 census revealed that 39 percent of the Nation's occupied housing failed to meet minimum standards, in the sense that it was either "dilapidated" or "deteriorating," or lacked

adequate plumbing facilities. By 1960 only 16 percent, and by 1966 only 10 percent, of the Nation's housing failed to meet those standards.

Suburban areas had the lowest percentage of inadequate units with center cities second and nonmetropolitan areas the highest. The reduction in the amount of unsatisfactory housing was greatest in nonmetropolitan areas, next greatest in city centers, and least in the suburbs. The improvement, in other words, was greatest in the areas where the need was greatest.

The proportion of overcrowded housing has also declined. In 1950, 16 percent of the housing units were overcrowded, i.e., contained 1.01 or more persons per room. In 1960 the percentage of overcrowded units by this standard had fallen to 12 percent.

Admittedly, the change in the proportion of Americans with substandard or overcrowded housing is in some respects misleading. The minimal standards are too low to have any meaning for the average American, whose housing has exceeded the standards for some time. The unchanging standards also ignore the rising expectations that accompany the Nation's rising standard of living. Still, they do fairly reveal a substantial absolute improvement in the quality of housing for most of those who have lived in the poorest housing.

##### *b. Causes of the improvement*

The principal reason for improvement is the construction of new housing, most of which has apparently been built for middle and upper income families. Between 1960 and 1967, 11.5 million new housing units were started in the United States. Of these, 98 percent were privately owned and 2 percent publicly owned. As was pointed out earlier, new housing construction has helped to elevate the quality of housing available to all.

Urban renewal has provided better housing for some poor families, but its effect has been slight. From the inception of the 1949 housing act through fiscal 1967, urban renewal provided only 107,000 new and 75,000 rehabilitated housing units. Urban renewal projects usually take from 6 to 9 years to complete.<sup>4</sup> As of July 1967, the urban renewal program had demolished 383,000 dwelling units, or more than it had built and rehabilitated. This is due in part to the fact that new construction in many of the urban renewal areas is not yet complete. Urban renewal efforts have not, in any case, been generally designed to add to the housing of the very poor. Of the new units built in urban renewal projects, only 10 percent were low rent public housing. Most of the 636,000 low rent federally administered housing units in existence at the end of 1966 were outside of urban renewal projects. These 636,000 housing units, though dwarfed by the size of the increase in new private housing, have nonetheless made a very important contribution to the housing of the poor.

##### *c. Barriers and inequities in the housing market*

Unnecessary barriers and inequities have denied many Americans a fair share of the gain from the increase in the supply of good housing. A lack of access to credit, ignorance of available housing, zoning laws, and above all racial segregation have put many Americans at a disadvantage in the housing market, and limited the extent to which the construction of new housing has added to the housing available to them. Racial segre-

<sup>4</sup> This estimate was made by staff members of the National Commission on Urban Problems. See Anthony Downs, "Moving Toward Realistic Housing Goals," in *Agenda for the Nation*, Kermit Gordon, ed. (Washington: The Brookings Institution, 1968), pp. 141-178.

<sup>2</sup> A Strategy for a Livable Environment. Report to the Secretary of HEW by the Task Force on Environmental Health and Related Problems, June 1967.

<sup>3</sup> Werner Hirsch, "Cost Functions of an Urban Government: Refuse Collection," *The Review of Economics and Statistics* (1965).

gation in housing, for example, makes it difficult for Negroes to obtain new houses in the suburbs or even the housing vacated by others within the city. Most of the increased housing supply is reversed for white, and blacks are left to compete for such housing as exists in the ghetto. Zoning laws which prohibit apartments, or houses on small lots, can similarly restrict the supply of housing of a kind that the poor can afford.

The importance of these barriers in the case of the Negro is clear. There is an almost total segregation of Negroes in most American cities. Table 2 shows that more than 85 percent of the Negroes in 109 cities would have to move from the block in which they live in order to achieve a random distribution of Negroes and whites over the entire metropolitan area.

The extent of segregation, moreover, is apparently not decreasing. As table 2 reveals, segregation has probably even increased from 1950 to 1960, because of the considerable increase in urban segregation in the South. The exact extent of housing segregation since the 1960 census is not known, but studies conducted since then suggest that there has been little progress since 1960.<sup>5</sup>

TABLE 2.—AVERAGE INDEXES OF RESIDENTIAL SEGREGATION OF THE WHITE AND NONWHITE POPULATION, FOR 109 CITIES, 1940 TO 1960

Year	Total	North and West	South
1940.....	85.2	85.5	84.9
1950.....	87.3	86.3	88.5
1960.....	86.1	82.8	90.7

Source: Karl E. Taeuber and Alma F. Taeuber, "Negroes in Cities," Chicago, Aldine Publishing Co., 1965, table 5, p. 44.

The different income levels of whites and Negroes contribute to the segregated pattern in housing. But race is a far better predictor of where a person will live than is income—or any other attribute. For example, a disproportionate number of Negroes with incomes high enough to afford to live in more prosperous neighborhoods nonetheless live in poverty areas. In 1960 only 12 percent of whites with incomes above the poverty level were living in poverty areas, but two-thirds of all Negroes who had incomes above the poverty line lived in poverty areas. The tendency for Negroes with middle-level incomes to be confined to poverty areas may also help explain the fact, noted in the chapter on "Social Mobility," that middle class Negroes are less likely to be able to pass their status on to their sons than middle class whites.

Racial segregation in housing not only has "social" costs of the sort just described, but also operates as a barrier in the housing market which sometimes denies Negroes their share of the benefits from the increase in the Nation's housing supply. The extent and rigidity of racial segregation in housing suggest that Negroes cannot move into white residential areas without considerable difficulty. To the extent this is true, they are denied access to most of the Nation's housing supply. This in turn would imply that Negroes would have to pay higher rents for comparable housing than whites.

There is evidence that this is often the case. As table 3 shows, in three of the places studied, rents are much higher in mainly Negro neighborhoods than in mainly white neighborhoods with the same percentage of "sound" housing (housing with adequate plumbing, and neither deteriorating nor dilapidated) and the same number of rooms per dwelling. In four other cities, there was probably no meaningful difference in the rent for housing of comparable quality.

<sup>5</sup> Reynolds Farley and Karl E. Taeuber, "Population Trends and Residential Segregation Since 1960," *Science* (March, 1969), p. 955.

TABLE 3.—RENTS PAID BY NEGROES AND WHITES FOR COMPARABLE HOUSING

City	Average monthly rent in median Negro census tract	Average monthly rent in white census tract with comparable housing	Negro rent minus white rent for comparable housing
Atlanta.....	\$37	\$38	-1
Baltimore.....	66	55	11
Detroit.....	61	60	1
Los Angeles.....	58	56	2
New York:			
Manhattan....	59	61	-2
Brooklyn.....	60	51	9
Philadelphia...	49	40	9

Note: This estimate was provided by Prof. Barbara Bergmann of the Department of Economics at the University of Maryland.

Though the complexity of this problem and the limitations of the data call for caution, these results tend to strengthen the logical presumption that practices which exclude Negroes from most of the housing supply will mean that the pressure of increasing demand by Negroes will force up the prices of the housing they are allowed to occupy. The barrier of residential segregation is particularly important when the Nation's housing supply grows faster than the population: it limits the process by which new housing for the well-to-do can open up better housing for the poor. Since this process is the main source of better housing for the poor, segregation, along with credit, zoning, and other barriers which limit the access of the poor to available housing, are outstandingly important.

#### CITY SPACE AND URBAN AMENITIES

Most Americans now live in cities or suburbs. Thus the manmade physical environment includes not only the house or apartment, but also that complex of structures, streets, and services we call the city—or the metropolitan area. The geography of the city, and the transportation system that lets the resident move within it or escape outside it, are therefore important parts of our physical environment.

The metropolitan environment is infinitely varied. But there is a common problem that links the lives of all the residents of a metropolitan area. This problem is the scarcity of urban space, for which all the residents of a metropolis compete, whether they are buying homes or looking for a place to park.

#### a. Population and urban space

As we argued earlier, Malthus' dismal prediction that population tends to grow faster than food production has lost its credibility, at least for the economically developed nations. But population growth in the United States is posing new kinds of problems, different from those that were expected. One of these is the scarcity of urban space. The growth and increasing concentration of our population deny us privacy and elbow room. Our increasingly congested cities are already depriving many people of the satisfaction of open space. As cities continue to grow, it will be even more difficult to find a quiet park, an open space, or a secluded beach. This problem may already be serious in such areas as Harlem, which has a sardine-can density of 67,000 persons per square mile.

It is not possible to say for certain whether such crowding degrades the quality of life significantly for very many people. Perhaps only a minority want privacy or open space, or can experience claustrophobia. It is evident from any number of parks and beaches that, just as a few seek secluded spots, so many others congregate wherever the most people are.

Animal experiments have shown, however, that severe congestion tend to increase aggressive behavior, to break down normal mating, nesting, and maternal activity, and to contribute to higher rates of illness and death. There may also be a limit to the congestion that human beings can tolerate.

The number of persons that can be accommodated per square mile without serious crowding depends in part on what might be called the "technology" of urban space. It is possible to build more living space on each acre, by building up rather than out, providing communal landscaping and recreational space, using underground transportation, and the like. There are undoubtedly limitations to the number of people who can live satisfactorily in each square mile—the amount of open space with access to sunlight is inherently limited—but a great deal can be done, through imaginative city planning, to make a congested environment congenial.

#### b. Urban transportation and space

The scarcity of urban space can also be eased by more extensive use of transportation. The people of a metropolis can have more space simply by traveling farther out, and that is what many Americans have been doing. They have "traded off" the time and money spent in commuting for the open space available in the suburbs. The move to suburban, single family homes on separate lots suggests that many Americans value space and privacy very highly. There are also, of course, other factors that draw many people to the suburbs. This move has to some extent been subsidized by public policy, encouraged by the desire for better schools, and even hurried at times by prejudice against the groups in the central city.

There is an important, if implicit, subsidy for the move to the suburbs in the tax advantages given homeowners. Homeownership is most common where single family dwellings are common, as in the suburbs, and homeowners pay no income tax on the imputed rent (the extra money they would have had to earn and pay in rent to have the same standard of living with an equivalent rented dwelling) on an owner-occupied dwelling. Homeownership is also subsidized through FHA loans and government loans to veterans. Subsidies to rapid transit systems, though not usually so regarded, sometimes also subsidize the flight to the suburbs. The fact that the central city government must provide services to those who work in the city, yet cannot tax their property in the suburbs, has a similar effect.

The patterns of segregation, and even some zoning laws, suggest that a desire to exclude low income and low status groups also accounts for some movement to the suburbs. This exclusion also creates a further monetary incentive for emigration to the suburbs, since the central city must assume the burden of dealing with poverty and other social problems. The suburbanite often enjoys both better schooling for his children and lower taxes as well.

The desire for space and privacy, along with the inducements to suburbanization, have led to "urban sprawl." Metropolitan areas will tend to expand to the point where they grow together. The vision of one sprawling megalopolis reaching from Boston to Washington, comes closer to reality each year.

The collision of metropolitan areas shows the undeniable reality of the problem of urban space. But even then the cities can grow in other directions. If the technology of commuter transportation can be made to improve fast enough, and the quality of city planning and land use can be increased fast enough, the sprawling metropolis can still provide a wholesome environment for man.

#### UNDERSTANDING: THE KEY TO BUSINESS-GOVERNMENT COOPERATION

Mr. PERCY. Mr. President, on December 12, 1968, Mr. J. M. Roche, chairman of General Motors, made a speech before the Illinois Manufacturers Association on the subject of business-Government cooperation.