Stress-Related Mortality and Social Organization

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ABSTRACT: Modern capitalist social organization, through intensified, conflicted work and the destruction of cooperative, supportive forms of social community, causes a large excess mortality among adults in developed countries. This excess mortality is most strikingly evident in the comparison of vital rates for advanced capitalist societies whith those of undisrupted hunter-gatherers.

In the twentieth century United States, this excess mortality has varied markedly with the social fate of successive generations entering the labor market. The excess was high for the large cohort entering the labor market before the depression, low for the small cohort entering in the 1930s and with the boom, 1940-55; and now high once again for the baby boom children, entering the labor market since about 1960. Though death rates for heart disease and other stress-related diseases are now declining as the small cohort moves into older middle age, death rates are rising for the baby boom children at ages 15-30. If past experience with the first large cohort of the twentieth century is a valid guide, this new large cohort of baby boom children will suffer a large increase in death rates for cirrosis of the liver, cancer, and heart disease, as it moves into maximal risk ages by the 1990s.

Contemporary medicine transforms a largescale social problem into a problem in the motivation of individuals, for which marketable commodities, including therapy programs, surgery, and drugs are seen as the typical solutions. Therefore it mystifies and defuses potential autonomous awareness and organization looking to a different kind of society. The reintegration of cooperative community, with its consequences in the reduction of work intensity and the dealienation of labor, is however associated with a marked reduction of stress. The cooperative assertion of mass-scale cooperative community may therefore prove to be the most effective therapy for the diseases of modern capitalism.

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Introduction

Since the late 1950's there have been dramatic increases in the death rates for adults of certain ages, particularly males. At ages 20-24, death rates have risen 21% for white males and 26% for blacks, 1961-68, and 7% and 30%, respectively at ages 35-39 (see Table 1). The problem is not really new, for despite the continuous expansion of medical care and its recent availability to the urban poor there has been little improvement in male life expectancy at older ages since the 19th century (Fig. 1).

This dismal record (United States ranks 23rd in male life expectancy) undoubtedly reflects in part inadequacies in the medical care system — its fragmentary nature, its focus on cures rather than on prevention, and its frequent failure to institute simple public health measures. For example, it seems likely that high infant mortality in the United States (we rank 15th) is closely related to poor nutrition and the lack of perinatal care, especially among the poor. With better food and care, infant mortality could be reduced from its present rates of 35 per 1000 in the worst ghetto areas to 10 per 1000 found in the white suburbs. In fact, this has been the trend since the introduction of Medicaid.[1]

On the other hand, the high, and in some cases, rising[2] death rates for ages beyond adolescence are less directly related to the defects in our system of medical care than they are to the organization of our whole society. In this article we argue that extremely important contributions

to adult death rates are made by the chronic stresses that result from the kinds of human relations that are fundamental to social organization under capitalism.[3] We start by summarizing what is meant by stress and review some of the mechanisms by which it can lead to pathology. Next, we describe some of the relations between stress and social organization. Finally, we examine the causes of death for various age groups and the historical variations of age-specific death rates, indicating how these point strongly to the role of stress in the deaths of adults under capitalism. One conclusion from the analysis is that the death rates that have risen for the 15-25 year-old age group are likely to remain high for some time and that, as this cohort ages, its death rate will remain elevated, contributing to a health crisis of a sort which is now largely unsuspected. A more general conclusion is that a large component of adult physical pathology and death must be considered neither acts of God nor of our genes, but a measure of the misery caused by our present social and economic organization.

Somatic Effects of Stress

Stress arises in situations in which an individual is called upon to respond with some sort of coping behavior but in which he is either unable to respond or uncertain that he will be able to. These conditions lead to psychological and physiological arousal. Arousal consists of a series of internal changes that prepare the body for "fight or flight" — or for dealing attentively and forcefully with the stimulus in some other way. Among the acute changes (over seconds, minutes) are: a rise in heart rate and blood pressure; changes in the distribution of blood, e.g., more to brain and muscle, less to skin and stomach; a release into the blood of energy-producing compounds such as glucose and fatty acids. Some changes, for example, a rise in metabolic rate, occur more slowly and last for hours, days, or weeks during which time there is a gradual restoration of the body to the pre-stress condition.

Both the acute and restorative changes are initiated and coordinated by the brain through its control of the autonomic and endocrine systems. For example, during the acute response the changes in blood pressure, blood flow, and heart rate are mediated by activation of many parts of the sympathetic nervous system and corresponding suppression of activity in many parts of the parasympathetic system. During this period there is also heightened release of such hormones as cortisol, epinephrine, norepinephrine, growth hormone, thyroxine, etc. from endocrine organs. At the same time release of other hormones, for example, insulin and sex hormones, is suppressed. The net effect of these hormonal changes is an accelerated breakdown of carbohydrates, fats, and proteins to provide energy (catabolism) and a slowing of the body's synthetic processes (anabolism). It is fair to say that not a single cell in the body is unaffected by these alterations of nervous and endocrine activity.[4]

The sources of stress may be either physical or psychological. Selye[5], for example, was able to produce in rats a characteristic stress syndrome (enlarged adrenal, reduced thymus, and stomach ulcers, etc.) by exposing them to a variety of noxious physical or emotional stimuli. Although there has been much emphasis in stress research on physical stress, it is now recognized that it is the emotional response to the physical change which causes the stress syndrome physiologically.[6] Furthermore in humans signals for arousal can be so thoroughly internalized that the full response can occur spontaneously or in response to objectively innocuous external stimuli.[7]

Pathophysiology of Stress

Many of the short and long term changes that occur during stress interact in complex ways to produce pathology. Coronary heart disease, which now kills 720,000 Americans per year (39% of all deaths), is a good example.[8] It is known that during acute stress there is a rise in the viscosity of the blood.[9] In young people the increase in viscosity can be compensated by widening of the coronary arterioles. If the coronary arteries are hardened and substantially occluded by atherosclerotic plaques, the arterioles may already be maximally dilated. In this case, a rise in viscosity results in reduced blood flow to the heart muscle. The muscle, starved for oxygen, becomes hyperexcitable and fibrillates (beats without coordination) and fails as an effective pump. Death follows quickly.[10]

There is evidence that the atherosclerotic process itself is stimulated by stress. Frequent

TABLE 1:

CAUSES OF RISING DEATH AMONG MALES IN THE UNITED STATES 1961-1968
Three leading causes of increased death rates in three age groups.
Numbers are death/100,000 population. Vietnam war deaths not included.

20-24 YEAR OLDS

	All Causes			*Motor Vehicles*			*Suicide*			*Homicide*		
	1961	*1968*	*% diff*	*1961*	*1968*	*% diff*	*1961*	*1968*	*% diff*	*1961*	*1968*	*% diff*
White	163	197	21	73	95	30	11	15	36	5	11	120
Non-White	271	366	26	62	89	44	12	14	17	67	115	72

35-39 YEAR OLDS

	All Causes			*Motor Vehicles*			*Suicide*			*Homicide*		
	1961	*1968*	*% diff*	*1961*	*1968*	*% diff*	*1961*	*1968*	*% diff*	*1961*	*1968*	*% diff*
White	246	265	7	28	35	25	20	22	10	6	11	83
Non-White	595	772	30	45	56	24	13	12	—8	75	121	61

55-59 YEAR OLDS

	All Causes			*Coronary Heart Disease*			*Lung Cancer*			*Cirrhosis of Liver*		
	1961	*1968*	*% diff*	*1961*	*1968*	*% diff*	*1961*	*1968*	*% diff*	*1961*	*1968*	*% diff*
White	1727	1817	5	699	756	8	125	153	22	50	63	26
Non-White	2358	2872	22	534	853	60	126	186	48	40	76	90

Source: Vital Statistics of United States 1961, 1968. U.S. National Office of Vital Statistics.

TABLE 2:

AGE-ADJUSTED DEATH RATES PER 100,000 POPULATION (1967)
FOR SOME CHRONIC DISEASES

	White Male	*Other Male*	*Difference*
Malignant neoplasm (cancer) of the respiratory system [a]	44.5	51.7	16%
Diabetes Mellitus	12.4	18.5	49%
Vascular lesions affecting central nervous system (strokes)	71.5	124.4	74%
Arteriosclerotic heart disease [b]	307	247	—24%
Other diseases of the circulatory system	15.3	18.6	22%
Cirrhosis of the liver [c]	17.2	27.2	58%

a. deaths from all other forms of cancer are more common at all ages in non-white than in white males.

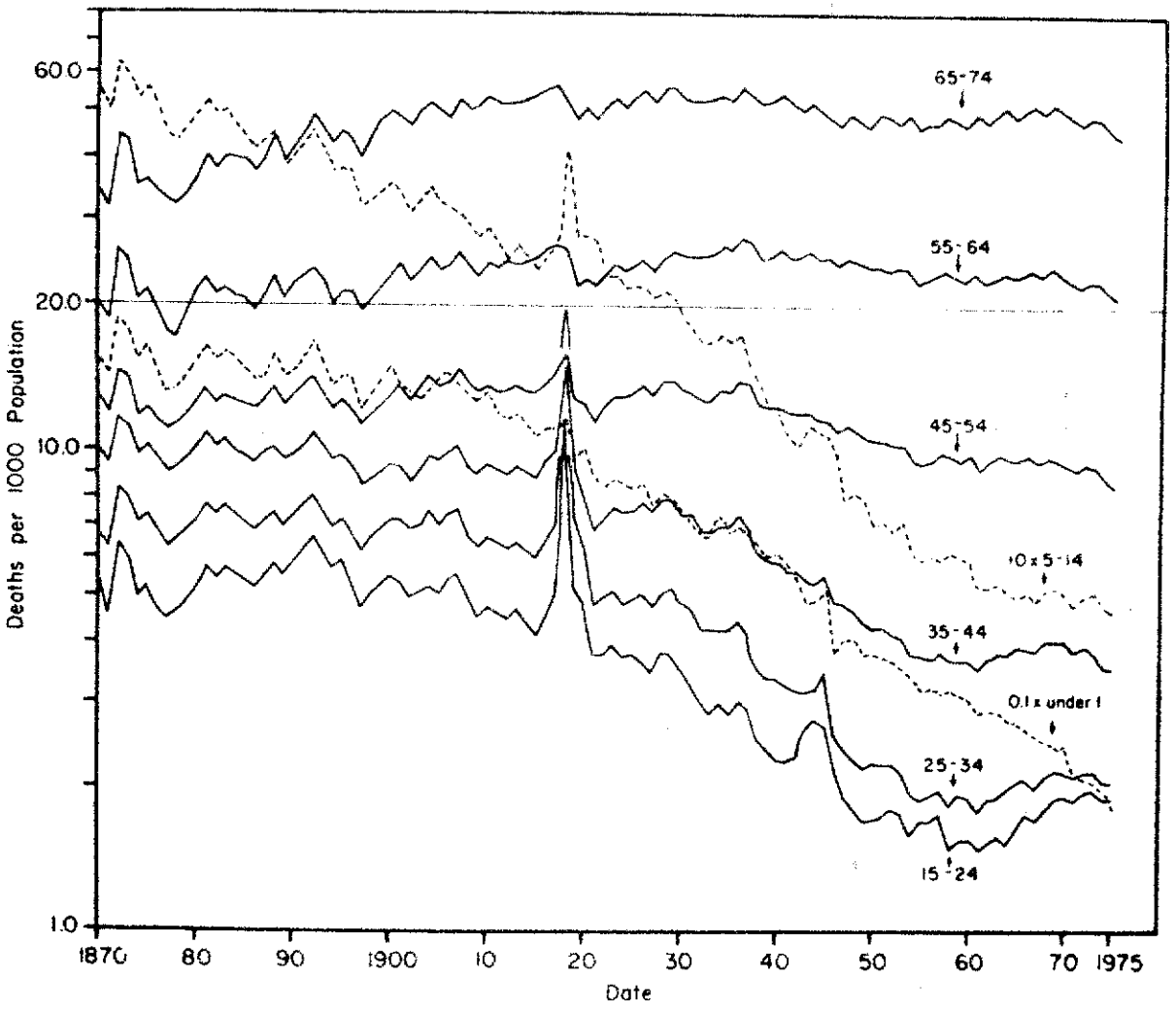
b. Although the age-adjusted death rate is higher for whites, the difference is diminishing. The rate for white males has hovered between 302-313/100,000 between 1960-1967 while the death rate for non-whites was increasing from 219 to 247 during the same period. Furthermore, the death rate from this cause is substantially lower among whites for most ages until age 50 when the white rate becomes higher.

c. Age-adjusted rate increased steadily for both white (14.4/100,000 in 1960) and non-white (14.9/100,000 in 1960).

Source: Leading components of upturn on mortality for men. United States — 1952-67. Vital and Health Statistics Series 20 — Number 11. DHEW 1971.

FIGURE 1.

MALE AGE-SPECIFIC DEATH RATES, UNITED STATES 1870-1975



Note log scale.

SOURCES: **U.S. Dept. of Health, Education and Welfare, Public Health Service, National Office of Vital Statistics: *Monthly Vital Statistics Reports 24* (13): 23 (1976) for 1968-75;_____: *Vital Statistics of the United States* for 1953-68;_____: *Vital Statistics Special Reports 43* (1-31), Oct. 1956, for 1900-1953; Vital Statistics Annual Registration Reports for Conn., Mass., Mich., N.H., R.I., Vt., 1870-1900 (States with reliable and complete registration data).**

and violent changes in blood pressure, resulting from acute activation of the sympathetic nervous system, leads to vascular damage through stretching and tearing of blood vessel walls. Chronic high blood pressure leads to fibrous deposition at points of mechanical stress in blood vessels. These points of injury and wear are thought to be foci for the formation by deposition of cholesterol of atherosclerotic plaques.[11]

Although the mechanisms for chronic elevation of blood pressure are not understood in detail, there is evidence that "essential hypertension" is stress-related. For example, blood pressure is highly correlated with plasma concentrations of norepinephrine in patients with essential hypertension, and the blood pressure levels seem to be related to sympathetic activity.[12]

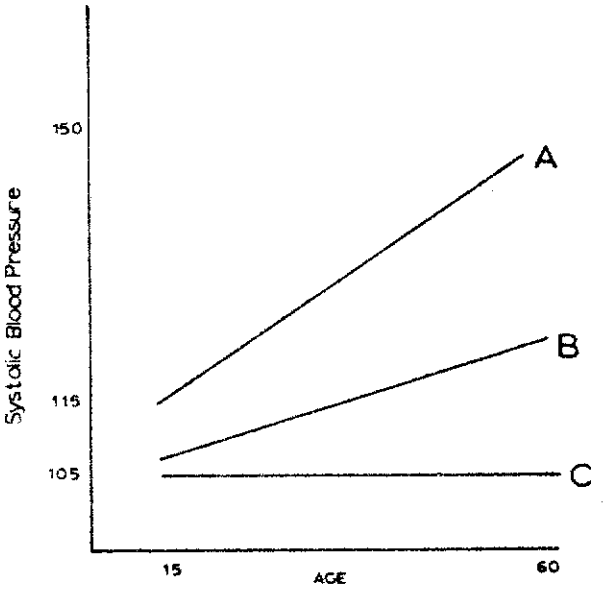
There is also epidemiological evidence for a relation between stress and hypertension. In urban societies average blood pressure is much

FIGURE 2.

MEAN SYSTOLIC BLOOD PRESSURE BY AGE, MALES

A: the average of means for highly developed urban areas, or specifically oppressed rural areas within developed countries (e.g. the former slave plantation areas in the American South, The West Indies, etc.); B: the average of means for disrupted traditional agricultural societies, not yet highly urbanized (e.g. most African tribal areas, including the areas from which slaves were derived); C: average of means for undisrupted hunter-gatherers.

SOURCE: Eds. Stamler, J., Stamler, R. and Pullman, T.: *The Epidemiology of Hypertension*, Grune and Stratton, New York (1967). For a detailed discussion of all known factors in blood pressure changes underlying these data, see Eyer, J. "Hypertension as a Disease of Modern Society", *Int. J. Health Serv.* 5(4): 539-558 (1975). In particular, changes in diet and salt consumption are not correlated with rise of blood pressure trends with development.



higher than in agricultural societies. Furthermore, in urban societies blood pressure generally increases with age once adulthood is reached. In agricultural and pastoral societies this increase is less marked and is entirely absent in some of those societies that are least affected by modern development (Fig. 2). Among the highest average blood pressures and the greatest incidence of essential hypertension in the world are found among blacks in the United States, particularly in the rural South.[13] This cannot be attributed in any simple way to a genetic predisposition because the tribal stocks from which United States blacks are descended are not hypertensive.[14] Neither can nutrition be a large factor in the population effect because there is no strong correlation between diet (salt consumption, for example) and average blood pressure levels.[15]

It is common knowledge that high levels of cholesterol promote atherosclerosis, and this, too, seems to be stress-related. It has been shown, for example, that in accountants working under the pressure of tax deadlines there are large rises in blood cholesterol.[16] These increases were not the result of changes in diet, but rather seem related to stress-induced metabolic changes such as the rise in circulating free fatty acids.

Finally, it has been found that when diet, blood pressure, smoking and exercise are controlled for, a certain behavioral style is associated with a 2-6 times increased risk of coronary heart disease. Some of the characteristics of the "coronary prone behavior pattern" are "extremes of competitiveness, striving for achievement, aggressiveness (sometimes stringently repressed), haste, impatience, restlessness, hyperalertness, explosiveness of speech, tenseness of facial musculature, and feelings of being under the pressure of time and under the challenge of responsibility".[17] These characteristics, of course, are signs of chronic arousal, so that all of the mechanisms mentioned above are working full-time. Furthermore, the "coronary prone behavior pattern" is often associated with many of the other characteristics that were controlled for in these studies, i.e., with consumption of cigarettes, little time for exercise and so on.[18] It is important in this connection that women with coronary prone behavior patterns have a death rate close to that of coronary prone men[19] despite the well-known large sex differential in coronary heart disease.[20]

Ulcers are another pathology in which chronic stress has a clear causal relation. Ulcers result from some combination of increased acid

and pepsinogen secretion, changes in gastric blood flow, and changes in the quality and quantity of the protective mucous secreted by the lining of the digestive system. All of these changes are controlled by the autonomic nervous system. In fact, one last resort "treatment" for an ulcer is sever its supply from the vagus nerve, the link between stress and acid secretion.[21] Fig. 3 illustrates the relation between an important social stressor and ulcer deaths. Until about 1950, when medical management of ulcers improved, each rise in unemployment was followed months later by a rise in the male death rate from ulcers.

There are other diseases whose pathogenesis are less clearly understood but in which chronic stress may have an important role. For example, the hormones secreted during arousal (e.g., epinephrine, growth hormone, corticosteroids) all promote increases in blood sugar that in turn requires increased release of insulin. In monkeys insulin secretion is apparently supressed during the early phases of stress but rises later and remains elevated for several days afterwards.[22] Chronic, heavy demand on the insulin secreting cells of the pancreas may exhaust the cells and promote the development of diabetes, an important cause of rising death rates at ages 25 and up.

In animals the body's immune system is powerfully suppressed by corticosteroids secreted during stress.[23] Such an effect in humans would lead to increased susceptibility to infectious diseases, such as pneumonia and influenza which are still important causes of death.[24] Through the same mechanism, stress may also have a role in cancer. Although the process by which normal cells become malignant is poorly understood, it is known that the body's immune system is essential in the defense against such cells.[25] Partial suppression of the immune system during stress, e.g., by elevated cortisol, may be partly responsible for the rising death rates from cancer.

Both cirrhosis of the liver and lung cancer have increased dramatically in modern America. Cirrhosis death rates are highest for lower class people; at many public hospitals, cirrhosis is now the leading cause of death. Liver cirrhosis is the outcome of chronic alcoholism, an adaptation to stress for 9 million Americans.[26] Among smokers, tobacco consumption increases markedly under stress. Per capita tobacco consumption has increased several hundredfold in the twentieth century, and has been the major underlying cause for the increase in lung cancer death rates during this period.[27].

It is frequently argued that the high death rates in the United States from chronic diseases are not the consequence of stress per se, but of the longer life expectancy generated by our excellent medical care. If this were so, one would expect the highest death rates from chronic disease in that part of the population with the longest life expectancy and the best medical care. Table 2 shows, however, that precisely the opposite is true. Black death rates for chronic diseases are in almost all cases higher than the white death rates despite the fact that blacks have poorer medical care and higher death rates at all ages from acute as well as chronic causes.[28] We shall return to this issue after considering some of the sources of stress.

Sources of Stress and Their Relation to Death Rates

When people are asked in surveys to rank stressful events, the top of the list is generally occupied by family break-up, death of relatives, job insecurity and job changes, and migration. All of these stresses that people feel to be major are associated with increased mortality.[29]

Divorce

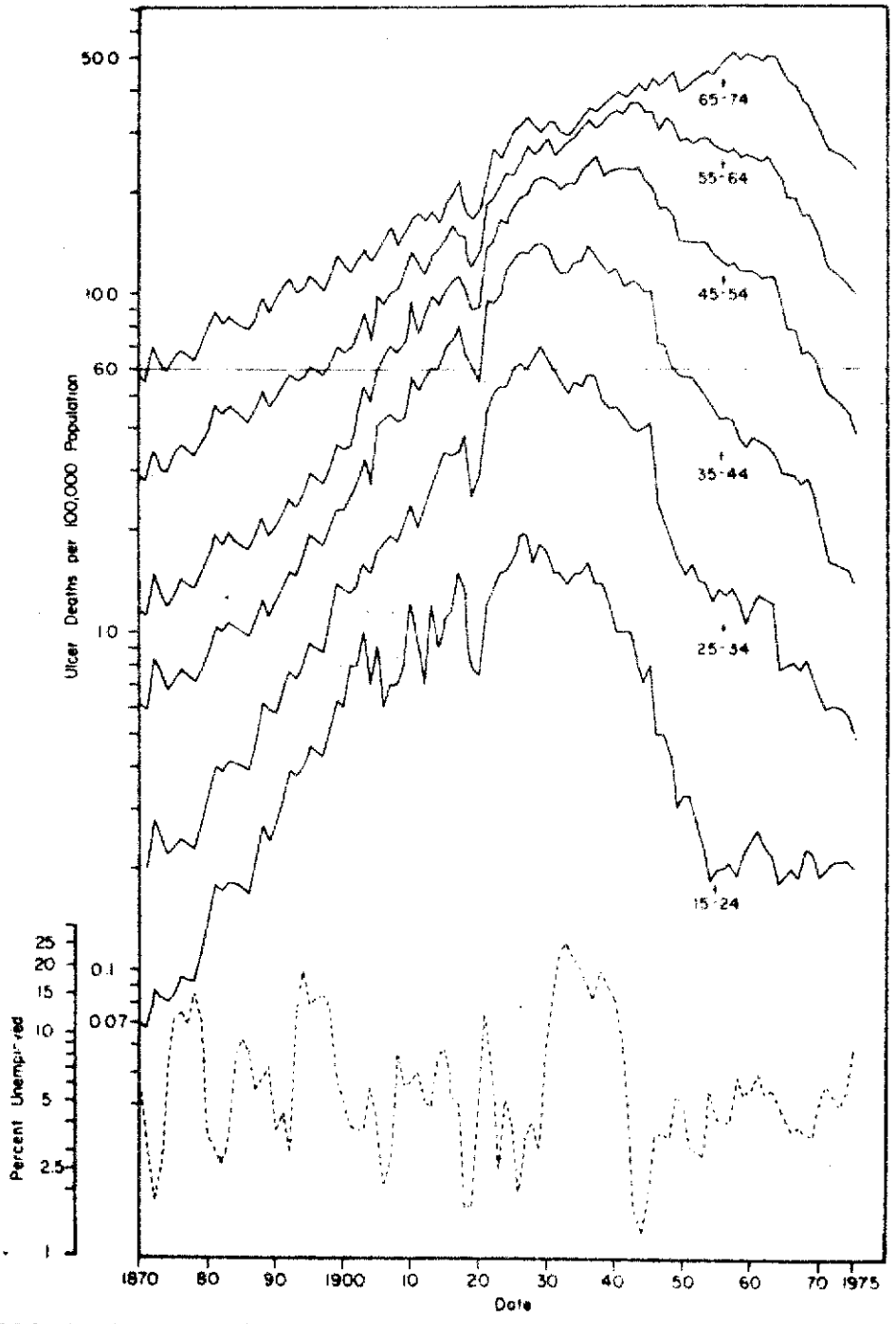
Fig. 4 shows that the death rates for divorced men are two to four times higher than for married men. These differences are true for almost all causes of death, for example, coronary heart disease and cancer[30] as much as suicide. There is a similar difference in age-specific death rates between married and divorced women, but the difference is somewhat smaller. This suggests that the protective effect of marriage against stress is smaller for women than for men.[31]

Bereavement

Figure 4 shows that widowers also have increased mortality. In a study[32] where surviving spouses were matched with controls for age and sex, surviving spouses showed a ten-fold excess deaths over the controls. As in the case of divorce, men had twice the increase in mortality risk from bereavement as women. In another study[33] the death rates of widowers were 40% greater than

FIGURE 3.

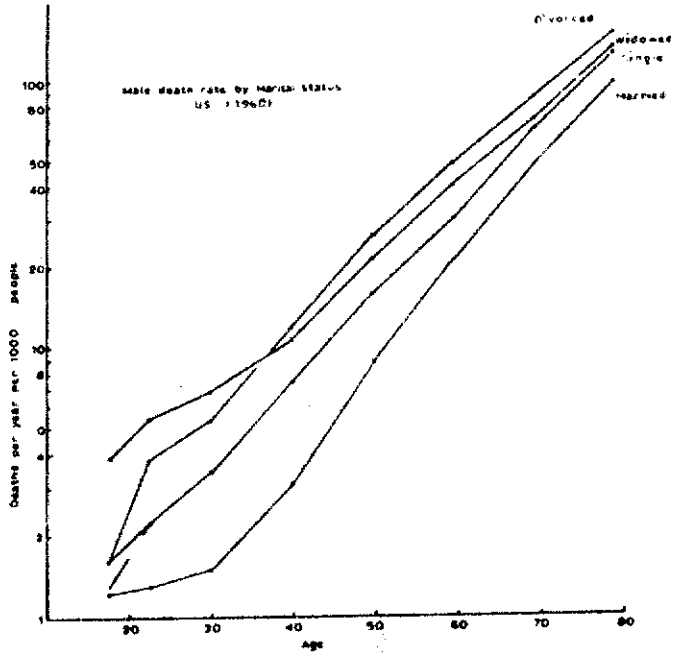
MALE AGE SPECIFIC ULCER DEATH RATES AND UNEMPLOYMENT RATE IN THE UNITED STATES, 1870-1975



SOURCES for Death rates, as in fig. 1. Unemployment rate: 1965-75, U.S. Dept. of Labor, Bureau of Labor Statistics: *Employment And Earnings*, Table A-1, April 1976: 1890-1965, Shiskin, J., Young, A. Donahoe, G. Bakka, N., and Taylor, R.: *Long Term Economic Growth in the United States, 1860-1965. A Statistical Compendium*, Series B-1 and B-2. U.S. Government Printing Office, Washington, D.C. 1966.; 1870-1890, estimated from a regression of the unemployment rate for 1890-1965 on industrial production, deviations from trend, for the same period (Shiskin, et. al. series A-15 and A-16).

FIGURE 4.

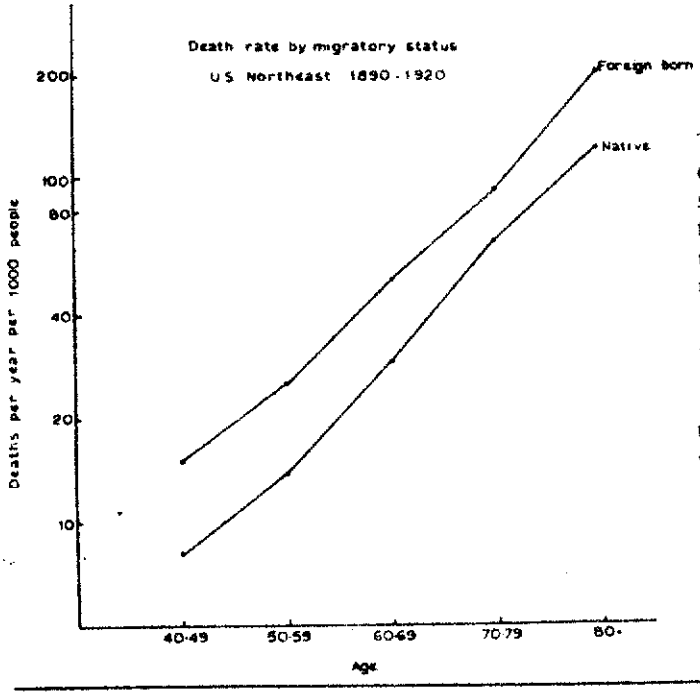
DEATH RATES BY MARITAL STATUS
males, United States 1960



For females, the differential pattern is the same but quantitatively a little less marked.
SOURCE: UN Demographic Yearbooks. A survey of all available data for marital death rate differentials shows that the features at many different stages of development are very much the same. For instance, there are no patterns in which separated people have lower death rates than married. Compare to footnote 31.

FIGURE 5

DEATH RATES BY MIGRATORY STATUS
All persons, U.S. Northeast Region
Average for 1890-1920



The differential shown parallels the urban-rural death rate differential at this time (figure 11), since most foreign born in the Northeast were then concentrated in the central cities, while most natives were in rural areas. Native people also tended to have higher incomes than foreign born. But since the foreign born originated in rural areas with even lower wage levels, but lower death rates, the elevation of their death rates cannot be attributed to income losses. Neither can it be attributed to infectious contagion in the urban environment alone, since the differential exists for many noninfectious causes of death as well. Rather, the community disruption attendant on migration is probably an important factor in accounting for the urban-rural differential.
SOURCE: Edgar Sydenstricker, ***Health and Environment***, McGraw-Hill, New York (1933), p. 202.

expected during the first six months following bereavement. Almost half of these deaths were from coronary heart disease, an incidence 67% above the expected.

Migration

Death rates for migrants also tend to be higher than for those who remain in stable communities. Figure 5 shows, for example, that death rates of foreign born are almost twice as high at all ages as for native born. This death rate differential is due at least in part to migration and not to simple differences in economic status between native and foreign born because the differential exists for many diseases, including ones such as coronary heart disease, for which the death rates of lower class people are only slightly higher than those of upperclass people.[34] Similar effects are known for internal migration. Goldsmith, for example, has noted that lung cancer is more common among migrants from farm to city than among lifetime city residents.[35] Cassel has shown that illness is more frequent in factory workers among migrants from rural regions than among second generation factory workers.[36]

Unemployment

The most dramatic indicator of the relation between job insecurity and stress is the suicide rate. Figure 6 compares the age-specific suicide rates with variation in unemployment. For men of all labor market ages there is a peak in suicide for each peak in unemployment. The fluctuations of suicide rate for women during this century are not nearly as large as those for men, presumably because women have not been as "exposed" to unemployment.

Death rates from ulcers also show clear fluctuations with the business cycle (Figure 3). Among working-age males, for each unemployment peak there is an ulcer death rate peak. On one interpretation, it is possible to relate each peak in ulcer deaths to a prior unemployment peak, with a lag of between 1 and 3 years. Alternatively, one might emphasize the stresses which rise with the boom of the business cycle, such as overwork. Ulcer death rate peaks, which generally occur during the boom, would then be produced without a lag.

With the introduction of antibiotics, the medical management of the complications of ulcers that lead to death improved after the late 1930s, resulting in a generally falling trend for the ulcer death rate at many ages. Despite medical improvements, however, the ulcer death rate for 15-24 year olds stopped falling in the late 1950's, showed a small rise in the early 1960's, and has since remained steady while the rates for all other age groups have continued to fall (Fig. 3). It might seem astonishing that modern medicine should be least successful in preventing ulcer deaths in the youngest age group. This can be understood, however, when it is recognized that stresses have been rising for this youngest group. Death rates of young people have risen significantly from a number of causes: suicide, homicide, accidents (Table 1). We shall return to this point later.

Distribution of Major Life Stresses by Age and Income

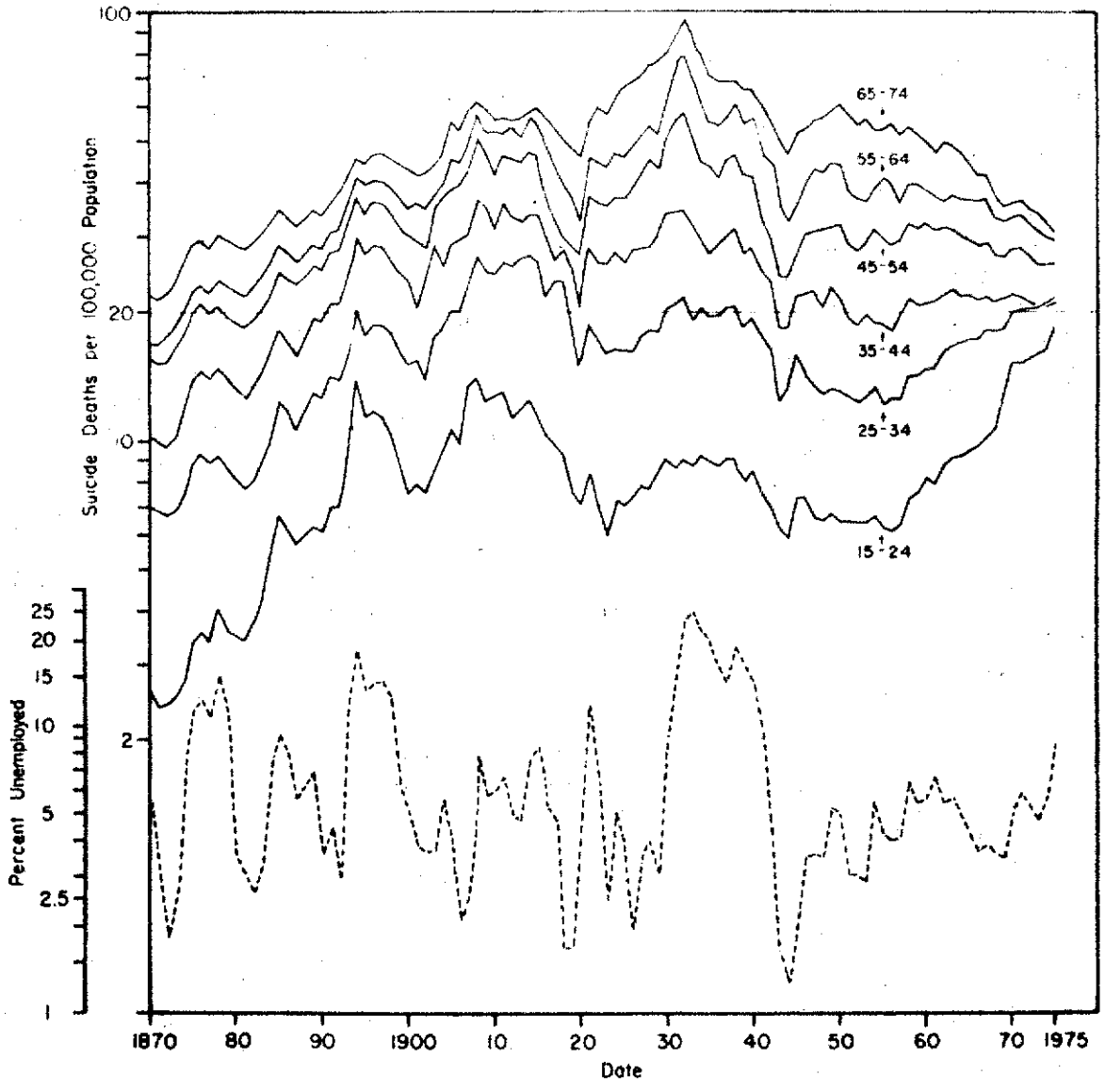
If the major social stresses described above are important causes of mortality, we should expect that the age and income groups in the population for which these stresses are most intense should show pronounced elevations of mortality. The major stresses are focused particularly on the 15-30 age group. This is the stage in the life cycle in which people look for work, migrate, and marry. Figure 7 shows that migration, unemployment, job turnover and marriage all peak in this period. Divorce also peaks at ages 20-30 (the average length of a marriage that ends in divorce is seven years). The other age group that is particularly subject to major stresses is the 55-65 year age group. Unemployment rises at this end of the age scale, as does the drastic life change of retirement. Loss of friends and relatives through death becomes an increasingly significant stress.

The effect of these stresses on mortality can be seen in the shape of the age specific death rate curves for industrialized societies. Note in figure 14 the large "hump" in the death rate for both males and females at ages 15-30.

Finally, the distribution of life stresses is also related to income. Figure 8 shows that unemployment, job turnover, migration, divorce and separation are all highest for the poor. These are the concrete social stresses that probably account for

FIGURE 6.

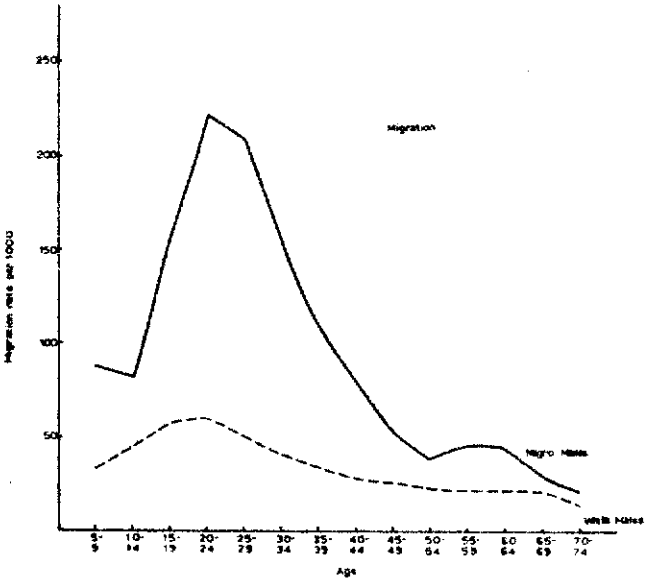
MALE AGE SPECIFIC SUICIDE RATES AND UNEMPLOYMENT RATE IN THE UNITED STATES, 1870-1975



SOURCES for death rates as in Fig. 1; unemployment, as in Fig. 3.

FIGURE 7A

MIGRATION RATES BY AGE, MALES, UNITED STATES 1950

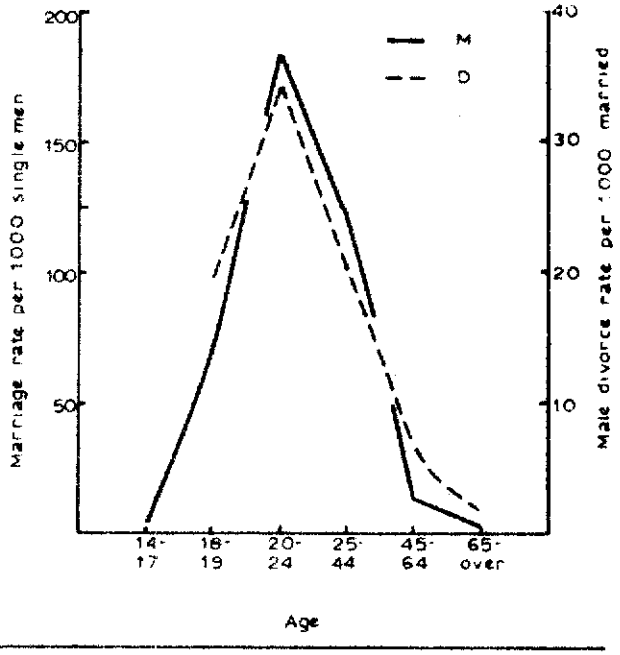


The long trend historical pattern for the groups identifiable in Census statistics show native whites having the highest migration rates before the Civil War, and again recently with the decline of the family farm; foreign born whites show a migration rate peak early in the twentieth century, with somewhat lower rates as the urban ethnic communities stabilized up to 1950. Blacks show low migration rates just after the Civil War, which rise at an accelerating rate to the present. These patterns roughly correspond to the sequence of creation of successive urban lower classes by rural-urban migration.

SOURCE: Eldridge, H.T. and Thomas, D.S.: *Population Redistribution and Economic Growth, United States, 1870-1950*, vol. 3, American Philosophical Society, Philadelphia (1964). Current data are available in the *Current Population Reports*, Series P-20, of the Census Bureau. The age pattern remains the same, but the differential between white and nonwhite has lessened somewhat, since 1950.

FIGURE 7b

AGE SPECIFIC MARRIAGE AND DIVORCE RATES UNITED STATES, 1967

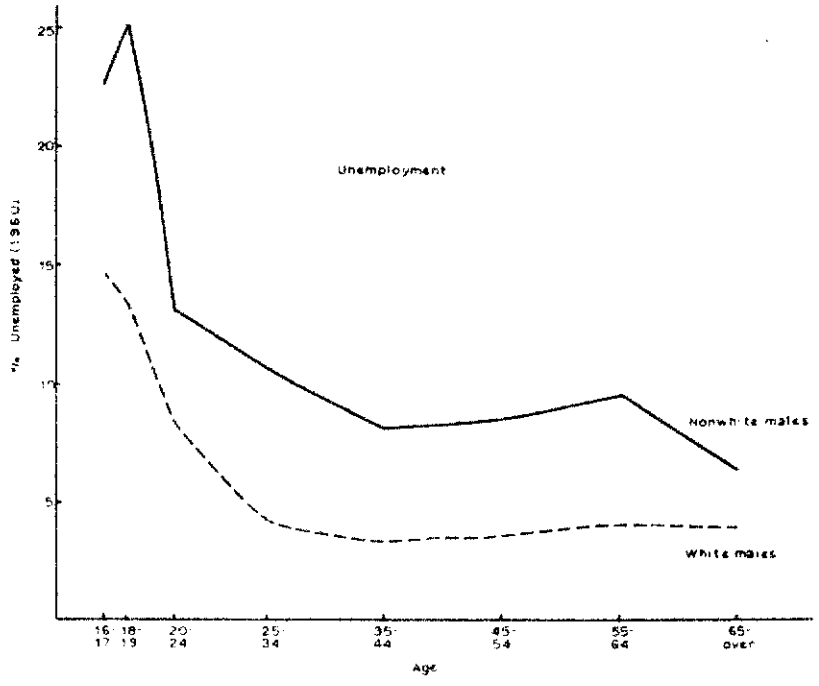


Note scale change on bottom axis. As economic development proceeds, the peak of the marriage rate moves from teenage years to the late twenties, and has recently temporarily returned as far as the early twenties. The divorce and separation rates were much smaller early in development and peaked in the thirties. As marriage was delayed with development, the peak of the divorce and separation rate moved toward overlap with the marriage rate.

SOURCE: Marriages: Trends and Characteristics, United States: series 21, number 21 in the Vital Statistics Special Reports Series (1971); Divorces: Analysis of Changes, United States, 1969, Series 21, no. 22 (1973).

FIGURE 7c.

UNEMPLOYMENT RATE BY AGE,
White and Nonwhite



The age pattern for job turnover is very similar to that of unemployment.

SOURCE: Bureau of Labor Statistics, *Handbook of Labor Statistics*, 1969.

FIGURE 8a

UNEMPLOYMENT RATE FOR OCCUPATIONS VERSUS MEDIAN EARNINGS OF EACH OCCUPATION
United States 1972

SOURCE: Current Population Reports, and *Unemployment and Earnings.*

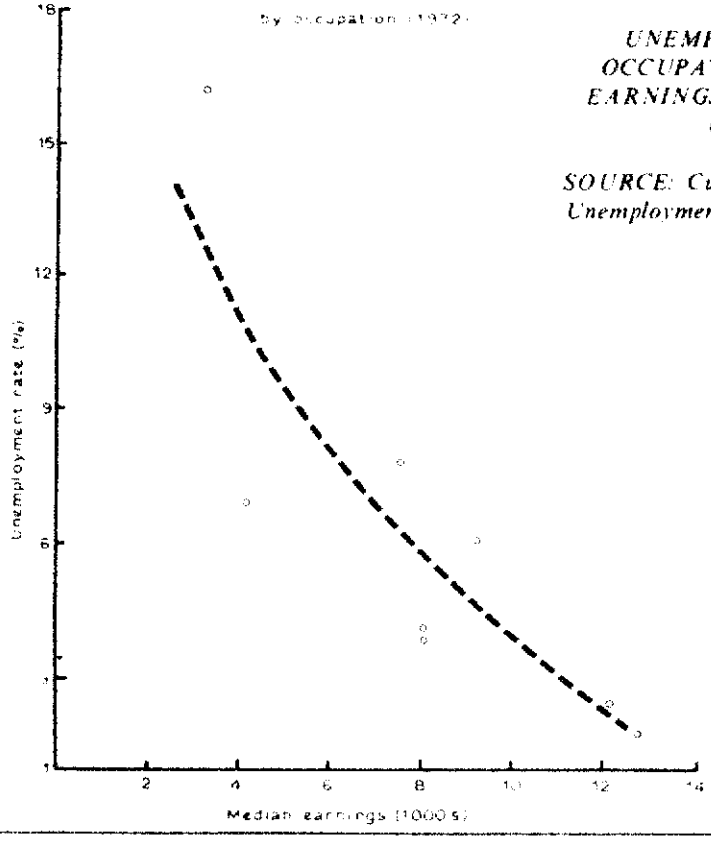
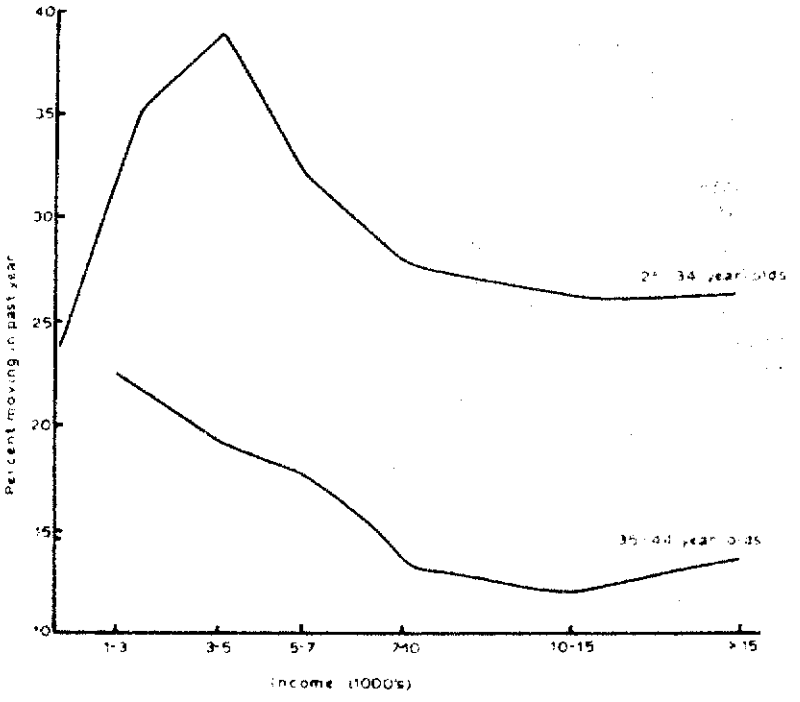


FIGURE 8b.

MIGRATION RATES BY INCOME AND AGE
Males, United States, 1960

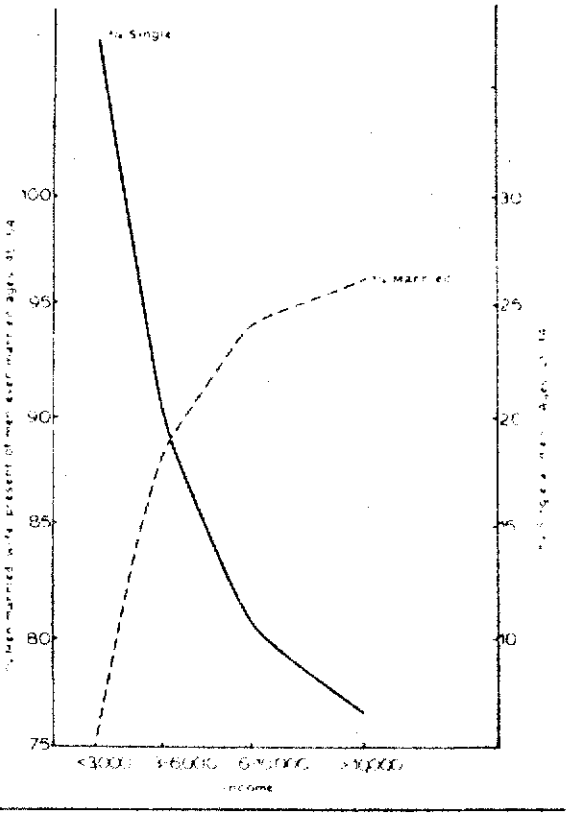


At ages 15-24, the migration rate (not shown) rises from low incomes up to $5,000 - $7,000, then falls slowly toward higher incomes. While the curves age 25 and beyond probably reflect mainly migration to jobs, below age 25 there is a mix of job migration or military migration — at lower incomes — and college migration — at higher incomes.

SOURCE: Current Population Reports, Series P-20.

FIGURE 8c

PROPORTIONS MARRIED OR SINGLE AMONG MEN, BY INCOME AND SELECTED AGES, UNITED STATES, 1960



At younger ages the differentials by income are similar, but not as marked. These data represent the outcomes, therefore, of a social status placement process.

SOURCE: Current Population Reports.

the largest part of the differential in death rates by income.[37] Given the combination of sex, age, and income differentials in stresses, we should expect that lower class young males should show the most pronounced stress effects. This can easily be seen in a comparison of death rates for black males with the death rates of the total U.S. population (see Tables 1 and 2).

The evidence presented thus far suggests: (1) physiological mechanisms exist through which stress can produce pathology; (2) there are strong correlations between age-specific death rates and events that people report as stressful; (3) the death rates from chronic disease that have risen in the United States during the twentieth century are not merely the result of reducing deaths from infectious disease; they probably reflect increased social stress. We may now ask how these stressful events are related to social structure, how there came to be so much stress.

Cultural Variation in Stress

It is often argued that man is naturally aggressive and territorial and that, given these inborn propensities, socially generated stress is inevitable. This is the argument of Lorenz, Ardrey, and a host of other currently popular writers. Their appeal is understandable. If the sources of social stress have always existed and indeed are in our genes, then the problems are irremediable, and we have no responsibility. In the following pages we sketch the relation between social organization and stress in several types of societies and present evidence against the Lorenz-Ardrey view.

Hunter-Gatherers

In thinking about the selection pressures under which human evolution occurred, it is essential to consider hunter-gatherer societies, for all humans lived by hunting and gathering for two million years, 99% of the time that humans have existed. Ninety percent of the humans that have ever lived have been hunter-gatherers, 6% have been agricultural (10,000 years), and only 4% have been industrial (a few hundred years). Although the life of primitive man has been viewed, since Hobbes, as "nasty, brutish, and short", quite a different picture emerges from current anthropological research.[38]

Most of the hunter-gatherer societies that remain today exist in extremely harsh environments unattractive to more advanced societies. Despite the harsh environmental conditions, in most areas hunter-gatherers do not live marginally. Malnutrition and starvation are uncommon even during droughts when famine is widespread in neighboring agricultural societies. Furthermore, the people do not work hard. For example, the Kung bushmen in the Kalahari desert of Southwest Africa[39] and the Hazda[40], in a dry and rocky region of East Africa work only about 12-20 hours per week. While a fairly leisurely year for United States workers (including a full month of summer vacation) involves about 221 working days, the comparable figure for the Kung would be 121 days. Even the short work week is enough to support not only the workers but the 40% of the population that is non-productive. The Kung youth do not work regularly until they marry (age 15-20 for women, 20-25 for men), and the aged, blind, and crippled are not only supported but are respected for their technical and ritual skills. Childhood, adolescence, and old age are carefree, at least economically.

The economic success of the hunter-gatherers apparently stems from their flexible lifestyle and limitation of population size. Living in small groups with few possessions, they can move easily to where the food and water is most plentiful. Except in the Arctic, 60-80% of their diet is from gathering, not hunting. Although methods of food storage are known to the groups, little surplus is accumulated. There is no need because the population lives far below the limits of what the immediate environment can provide. Probably for the same reason, there is no worry that environmental resources will be appropriated by another group. As a consequence, the ranges of the different groups may overlap, and there is no territorial defense. Since movement is easy, both geographically and between groups, what conflicts arise are resolved by "fission", i.e., people move to another group when they get angry.

Within the group, there being little property and little division of labor (except between the sexes), there are few social distinctions — certainly no hierarchy. Much of the time not spent working or in domestic chores is spent visiting or entertaining, dancing (Kung), gambling

(Hazda), and in other social activities. Although there is no lack of space, the Kung choose to live extremely close together and without privacy. Their small, closely-spaced huts are only for storage and not for living. These people, even the men, spend a great deal of time in actual physical contact, arms brushing, crossed-legs overlapping, leaning against each other.[41] In random observation girls (14 and under) were in physical contact with at least one other person in 57% of the observations; the score for boys of the same age was 35%. These are very high local densities, compared even with the most degraded urban slum populations. That stress indices are very low for these populations is a strong argument that density, per se, is not a factor in stress mortality.

It is evident that the sources of stress important in modern societies hardly exist among hunter-gatherers. There is little economic competition, and conflicts that cannot be resolved within the group are resolved by "fission". The terms "unemployment" and "job insecurity" have no meaning. Migration, in the sense of leaving the familiar range and social group, does not occur. Though death of relatives and family break-up do, of course, occur, it seems unlikely that a single, individual relationship is as important as in our society where the family has become, in Margaret Mead's words, "desperately autonomous".[42]

Medical statistics for hunter-gatherer societies are scarce, and it is particularly difficult to evaluate the prevalence of chronic disease because the age structures of the populations are difficult to determine. One can say, however, that degenerative diseases such as coronary heart disease, hypertension and cancer are quite rare. Blood pressures are not only low, but show little change with age.[43]

Agricultural Societies

The development of agriculture brought many changes in social organization. Probably at this time, there came the establishment of fixed territories that had to be defended periodically. With the ability to support larger populations and the accumulation of surpluses, came class societies and later towns and cities.[44] These and other changes that evolved over 10,000 years are quite dramatic. Nevertheless, on the time scale of human life, change was very slow. Under many circumstances the source of social stress that we have listed earlier remained small.

Family and kinship structures among peasant villagers were highly developed and stable. The family network was the basis of the production process, both in craft work and in agriculture. The peasant family controlled the basic means of production far more than the modern worker.[45]

With agriculture the work week did not increase very much. It is estimated that "slash and burn" agriculture requires about 10-30 hours per week and that plow agriculture, such as was prevalent in Europe during the Middle Ages, requires 30-35 hours per week.[46] This figure is similar for nonagricultural occupations in the Middle Ages. It has been estimated, for example, that the average work week of miners in the 15th century was 35 hours. Much time remained for leisure and ritual activities. There were prohibitions against working at night and during religious holidays, which in 16th century Bavaria occupied 99-190 days of the year. The situation was dramatically reversed with the development of capitalism. Thus, the number of weeks per year that British workers had to work for subsistence increased five-fold in a little over two centuries: 10 weeks in 1495, 20 weeks in 1564, 48 weeks in 1684, 52 weeks in 1726.[47]

The division of labor was small by today's standards and little technical change occurred in the course of a single generation. As a consequence, youth followed their parent's occupations and were incorporated into the economy without strain. Furthermore, because the pace of work and technological change was slow, older people could continue to be wise and useful. Unemployment and job insecurity were still meaningless concepts. A feudal lord could not "fire" his serfs. Nor was migration common; in fact, in Europe in the Middle Ages, there were specific prohibitions against it.[48]

This is not to paint a universal agricultural idyll. For example, the estimated work week under irrigation agriculture is 50-70 hours, and this form was frequently associated with intense class exploitation, e.g., in China, Egypt and in the Incan civilization.[49] In general, where it was possible to accumulate large surpluses, they were unequally divided, undoubtedly through bitter struggle, and there is ample historical evidence of periodic upheaval — war, famine, and plague — during which stress levels must have been ele-

vated. Nevertheless, the periods of upheaval were brief episodes in the long periods of stable social forms in these agricultural empires.

In the daily life of agricultural societies all activities were governed by tradition and ritual. All the members of the society were bound together by rules. The essential relationships were between people and not between people and things. The rules did not change suddenly, and there was little uncertainty about how to behave in a given situation. By and large, stress was low in agricultural societies. As we shall see, there is much evidence of its rapid rise with industrial development under capitalism.

Sources of Stress Under Capitalism

The social relations that bound people together in agricultural societies were shattered by the development of commodity production under competitive capitalism. The competition demands continuous improvements in efficiency and productivity. These are achieved with a "flexible" labor force, a fast pace, and relentless technological change.[50]

The Labor Force: External Controls

The "flexible" labor force required under capitalism is one that is treated, not according to rules fixed by tradition, but one that can be manipulated as required by the opportunities for investment and profit. There are a number of features to this flexibility, each of which contributes to social stress.

Perhaps the most stressful period is during the creation of the labor force. The removal of the family and kin system from its central position of control over production is the first step in capitalist development. This has been accomplished in all cases by taking advantage of every natural, legal and economic opportunity to force people off the land and into the cities, and by taking the craft tools out of the hands of the craftsman and the regulation of production from the craft guild. The result is a "free" labor force, which has no way to live but to sell its labor power. This process occurred in Europe during the 17-19th centuries and was the source of labor not only for European, but also for American industrialization. The process has been repeated in the United States during this century, in the dust bowl during the 1930's, in the rural South since the 1940's, in Puerto Rico, etc. The laborers arrive in the city streamlined, stripped of all ties but those of the nuclear family, ready to work anywhere, at any job, for any wage.[51]

Mobility and turnover are hallmarks of the "flexible" work-force. A recent United States Department of Labor survey revealed that the average worker had held his job for an average of 4.2 years. In the United States and Western Europe, estimates of job turnover are between 20-40% per year, and this does not include changes within a company.[52] Each change of jobs means a loss of friends and the necessity of making new ones. Often a change in jobs means migration. Roughly 20% of Americans move every year, and three-fourths of these moves are primarily for economic reasons.[53] Inevitably such mobility is accompanied by continuous disruption of workers' post-migration attempts to reestablish stable communal relationships.

Another aspect of "flexibility" is the infinite division of labor required for efficient capitalist production. Workers must submit to this division though it robs most work of any intrinsic pleasure.[54] The rapid pace of this type of production is itself a chronic stress and, further, robs workers of the pleasure of socializing that to some extent would mitigate the dullness of the labor. Shaped by these requirements most work has become so unpleasant in quality, in pace, or both that workers "burn out" quickly. The automobile workers, for example, are now demanding "30 and out." They want to stop work after 30 years even though no mechanisms exist for their reincorporation elsewhere in the economy. The consequences are all the more damaging because in urban society work is the major form of social participation. Even in less strenuous jobs it is impossible for most people to continue working into old age. Given the pace of technological change, the accumulated experience of age is not only valueless, it is laughable. The accumulated social experience is also useless because of the demoralization of older people and their physical separation from the youth.

Unemployment is a phenomenon of modern society. Wherever economists study "underdeveloped" peoples, they must study unemployment, not as an overt phenomenon of joblessness and lack of income, leading to individual destitution — but as "hidden unemployment". The kin and friendship relations of peasant societies support people who are not working to the limits of their capacity. Individual productivity thus becomes the criterion for creating an "unemployment" statistic for these societies. Clearly this is

nothing like unemployment as we know it, especially in the area of stressful social impact.

Given the negative characteristics of modern work detailed above, unemployment and the threat of it play an important role in manipulating the labor force to maintain flexibility and efficiency. The highly stressful effects of joblessness or job insecurity are prime motivators, ranking beside the wage in workers' awareness. Thus unemployment is not simply an unfortunate by-product of more efficient, flexible, progressive economic organization, it is essential to its functioning as a social system.

Another feature of capitalist organization that disrupts community and the possibilities for its formation are the economic cycles: the 3-4 year business cycle and the large (15-30 year) swings. Associated with each of these cycles, there is invariably a rise of most of the stressful events we have listed: job insecurity and turnover, migration (in search of work), family breakup, and slowing of the rate of new family formation.[55]

Internal Control of the Work Force

The molding of a flexible, fast-paced labor force only begins with the extraction of the worker from communal ties and his subjection to the forces of the market. Faced with the impossibility of satisfying his affiliative impulses, he adapts by steering his tension and frustration into work. The competitive nature of production reinforces the cycle: the harder and more effectively he works, the further he draws away from his co-workers,[56] and the less there is to satisfy him but work itself.

Confronted with this adaptation, the culture through religion, school, child rearing practices, etc. have transformed it into an ideal.[57] The *best* men are free of communal ties, affiliative needs, in perfect control of their own impulses, which they steer spontaneously and single-mindedly into "productive channels". Deviations from this ideal are manifestations of moral weakness, femininity, childishness, etc. for which the individual must take personal responsibility. For example, automobile workers, feeling trapped and humiliated in their jobs, blame their failure to rise in the hierarchy on their own lack of initiative, foresight, and intelligence despite the objective fact that there are so few supervisory positions that only a minority can rise.[58]

The molding of the work force is complete when the longings and fantasies that remain after the suppression of affiliative and sensual impulses are used to stimulate consumption.[59] This helps the economy and helps maintain the level of striving. In fact, work, striving, and competition, that were in earlier societies means to get something, have been in our culture so internalized that they are ends in themselves. The goods, power, security, etc. that accumulate in the struggle are rarely satisfying.[60] It is no wonder that professors do not relax on achieving tenure or that the highest Federal officials cannot keep their hands from the till.

This chronic, competitive striving, the central adaptation for success under capitalism, is synonymous with chronic stress since it requires and generates constant physiological arousal. This primary adaptation is seen in extreme form in the coronary-prone behavior pattern described earlier. There are, of course, those who fail to adapt or for whom the cost of adaptation is very high. The cost takes myriad forms: alcoholism (8 million Americans), withdrawal into chronic illness such as ulcer,[61] mental "illness",[62] and suicide.[63]

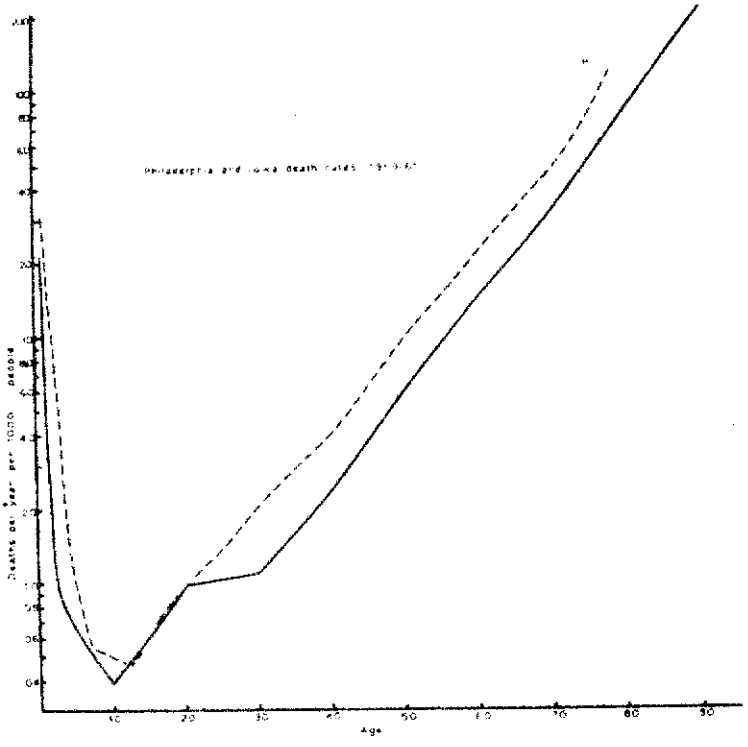
In summary, we argue that the economic and cultural forces in capitalist society create chronic stress by (1) disrupting attempts to reestablish communal ties, (2) molding competitive, striving people who find it difficult to build these ties even when external forces of disruption are removed. In the next section we describe the changes in mortality patterns that accompany capitalist development and that provide quantitative evidence for the relation between stress-mortality and capitalism.

Capitalism and Stress-Related Mortality

Rural-Urban Differences in Death Rates

The stressful effects of the continuous social disruption imposed by capitalist organization show up very clearly in age-specific death rate statistics: urban death rates for most ages are substantially higher than rural ones. Fig. 9 shows age-specific death rates for Philadelphia and Iowa for the years 1959-1969. The rates (plotted on a log scale) are higher for all ages for Philadelphia than for Iowa, and for many ages almost twice as high. The higher Philadelphia rates are not con-

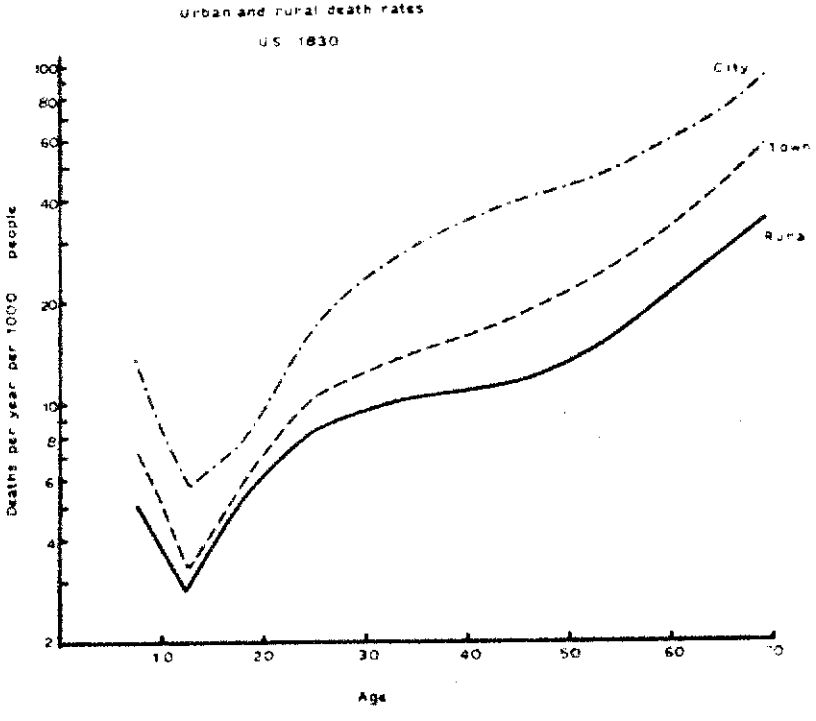
FIGURE 9.
AGE-SPECIFIC DEATH RATES
(total population) for Philadelphia (dotted) and Iowa (solid), 1959-61



Note the "hump" in the Iowa death rate at age 20, and the lack of this feature in the Philadelphia rate at that time. Death rate humps at labor market entry ages emerge in rural death rates as the family farm declines and heavy emigration occurs. Prior to the fifties, and again with the rise of death rates for young people in the 1960s, the death rate hump has reappeared in the Philadelphia data.

SOURCE: Philadelphia Statistical Report, 1959-61; Vital Statistics of the United States, 1959-61.

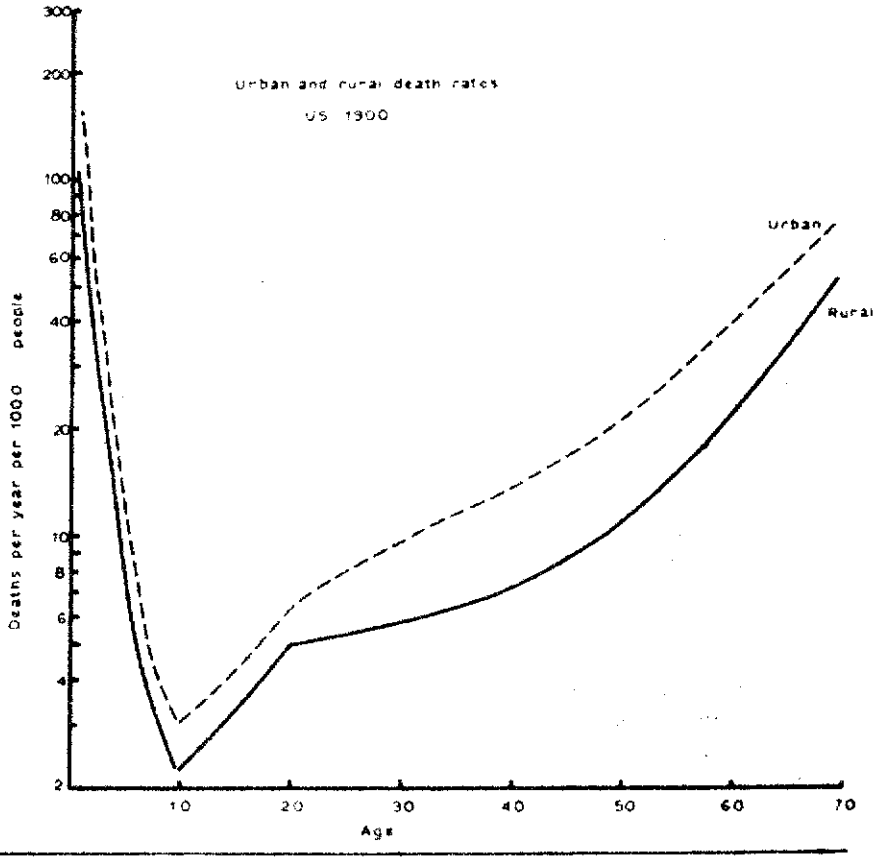
FIGURE 10.
AGE SPECIFIC DEATH RATES
(total population) for the United States, 1830, by size of place.



Compare the rural data in this figure with the earliest (largely rural) data for Sweden and other underdeveloped countries (fig. 13). Plainly, immigration and emigration, a phenomenon of the American farm area from its inception, is showing its impact in the elevation of death rates at migratory ages.

SOURCE: A. Jaffe and W. Lourie, An Abridged Life Table for the White Population of the U.S. in 1830. *Human Biology 14*: 357 (1942).

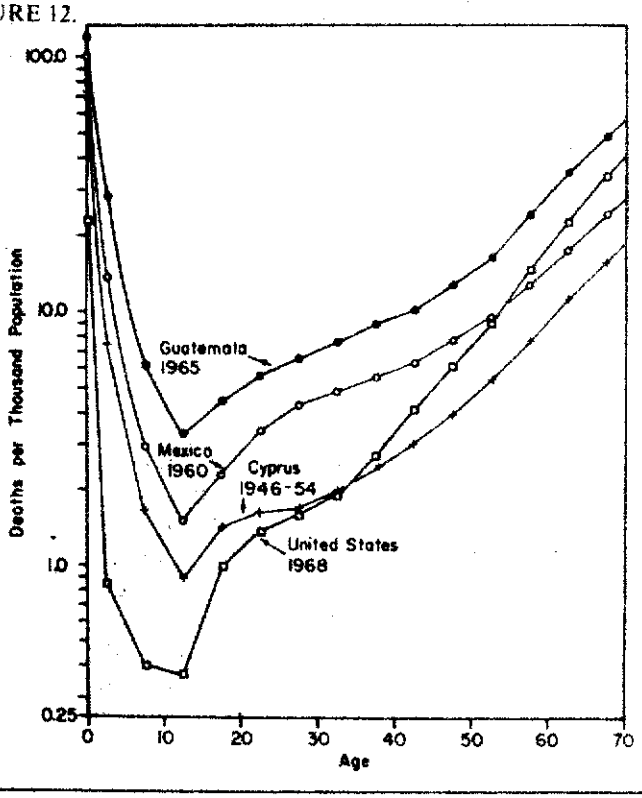
FIGURE 11.
AGE SPECIFIC DEATH RATES
(total population) for urban and rural areas in the United States, 1900.



SOURCE: A. Lotka and M. Spiegelman, *Length of Life*, New York (1936).

FIGURE 12.

AGE SPECIFIC DEATH RATES
(total population)
For the United States (1968); Guatamala (1965), Mexico (1960) and Cyprus (1946-54)



SOURCE: U.N. Demographic Yearbooks. The vital statisticians at the United Nations classify all of the data shown as complete and fairly reliable; data also exist for Cyprus after 1954, showing even lower death rates throughout the age span, but this data is classified as "of unknown reliability".

fined to a single caregory, but are found for both infectious causes (rheumatic fever and rheumatic heart disease) and chronic diseases such as coronary heart disease, cancer, hypertension, cirrhosis of the liver, ulcers of the stomach and duodenum, and diabetes as well as suicide and homicide. Similar patterns appear in other comparisons of urban and rural areas, e.g., Middle Atlantic vs North Central U.S.[64]

The urban-rural differential in death rates is not new but is demonstrable in U.S. statistics from 1830 and 1900 (Figs. 10, 11). Although the overall death rates have fallen since 1900, the urban-rural differential is about the same proportionally now as it was then. Finally, the same differential can be seen in comparisons between the largely urban U.S. and largely rural countries where public health has been introduced. Fig. 12, for example, shows that Cyprus has strikingly lower death rates than the United States for all ages beyond age 35. Puerto Rico, too, has lower death rates than the U.S. for all ages above 25 (Fig. 17). Considering that modern medical care is concentrated in cities and in urban countries, these figures seem particularly dramatic.

Only a small part of the urban-rural differential can be attributed to the deteriorated physical environment of our cities, for example, to the presence of respiratory pollutants, carcinogens, etc. The environmental disruption, of course, stems from the same causes as the social disruption, namely capitalist development, and undoubtedly contributes to it as well. Nevertheless, for most of the diseases listed above, environmental pollution is probably not a serious factor.[65] The rural-urban differences in age-specific death rates cannot be simply attributed to differences in physical exercise, because the urban death rates are highest in the poorest parts of the population, among those that live by manual labor.[66] Nor can the difference be attributed in any simple way to "high density" living, for density per se has been shown to have little effect on death rates and because the death rates are rising rapidly in cities whose populations are declining.[67]

Another observation that argues against explanations such as differences in exercise, pollution, etc. is that the urban-rural differential first appears at age 20-25 and thereafter remains roughly the same for all ages. It seems very unlikely that the effect of pollution and exercise, the differential for which are always present, should appear all at once at age 20. Stress, as pointed out earlier, is not evenly distributed but is focused on the 15-30 age group.

TABLE 3:

Suicide Rate Per 100,000 Population, Sweden 1785-1965

Date	*Total*	*Urban*	*Rural*
1785	2.1	—	—
1855	6.4	14.5	5.5
1915	15.0	20.0	12.0
1935	16.5	19.2	14.0
1965	19.0	—	—

Source: Statistical Yearbook

Rise of Stress-Related Mortality with Industrialization

The relation between stress and mortality can be seen even more clearly by examining the mortality patterns in countries that shift from a predominately traditional, agricultural to a predominately industrial, capitalist social organization. Two features are the same wherever comparative statistics are available. First, there is a rise in those causes of death that show the greatest modern urban-rural differential: suicide, homicide, ulcer, coronary heart disease, etc. Table 3 shows, for example, that suicide increased in Sweden by almost a factor of 10 between 1785-1965. The increase was dramatic for the rural as well as the urban areas. This is not surprising since, as already noted, the transition to urban life depends upon severe economic and social disruption in the countryside.[68]

The second constant feature in the mortality patterns during the rural-urban transition is the sharp rise in the death rates of young adults. Before industrialization, mortality is high in infancy, low in childhood, and shows a continuous, but gradual, rise after adolescence. Fig. 13 shows this pattern for Sweden in 1840-50 and for several underdeveloped countries a century later. As development begins, there is a dramatic increase in the death rates of the 15-30 year old age group, creating a "hump" in the age-specific

death rate curve. Death rates rise for older groups as this initially stressed group ("cohort") moves through the age structure.[69]

The pattern can be seen clearly in the age-specific death rate series for Sweden (Fig. 14). The curves for 1840-50 show the typical nondisrupted pattern. The curve for 1910-20 shows that industrialization had begun to take its toll among the 15-30 year olds. The elevation in death rates beginning about age 15 is still evident in the curve for 1961-62. The "hump" for the 15-30 group is not as pronounced as in the 1910-20 curve because the elevated death rates due to stress have spread to the older age groups and because of improvements in working conditions such as shorter hours won by organized labor.[70]

The absolute death rates declined by 1910-20 (except for the 15-30 year olds) and even further by 1961-62. These declines resulted largely from the introduction of public health measures and, later, antibiotics. The dotted lines on the 1910-20 and the 1961-62 curves suggest what the curves would have looked like if these measures had affected all ages equally, that is, if the curves had retained their preindustrialization form. The shaded areas suggest the amount of "excess mortality" that may be attributed to industrialization.

The justification for drawing these dotted lines is that where public health measures have been introduced to non-disrupted populations, death rates have fallen roughly equally for all ages. The death rates for Thailand are shown as an example in Fig. 15. There the death rates at ages 15, 30, 45, and 60 were all reduced by roughly half. The pattern for Thailand is not unique but resembles that of a number of undeveloped countries that underwent advances in public health after World War II.[71] Apparently, significant gains in health can be made for older people, and it is not inevitable that a second set of pathologies substitute for removal of the first.

The pattern of an elevated death rate for 15-30 year olds and its later spread to older ages appears in all regions where capitalist development occurs. Fig. 16 shows this hump for Massachusetts in 1865. By 1900 these stressed young people had reached ages 50-65, and had higher death rates than people of corresponding ages in 1865, despite the spread of public health practices.

The same phenomenon can be seen today in the comparison of death rates for the U.S. and Puerto Rico (Fig. 17). Since World War II there has been massive development in Puerto Rico, accompanied by emigration of one-third of the population and other extensive social disruption. This has led to the development of a labor market entry hump (ages 15-30) in the death rate quite similar to that in the United States. Similar causes of death are responsible for this hump — suicide, homicide and accidents. Puerto Rican death rates are higher than the U.S. for infancy and childhood, reflecting poorer public health practices (in many places limited only to immunizations and the rudiments of sanitation) and the lesser availability of medical care. But past labor market entry ages, the older cohorts not exposed to as much massive social disruption show lower death rates at each age than the United States. This is particularly true for heart disease, as an NIH study team has recently verified. If the historical pattern holds, the Puerto Rican death rates will rise for older ages as the young, stressed cohort moves through the age structure.

The causes of death responsible for the "labor market entry hump" are manifold. Fig. 18 shows this particularly clearly for Japan. There are elevations in the death rates from tuberculosis, pneumonia and bronchitis, diseases of the digestive system, heart disease, accidents, that parallel the rise in overall death rates for the 15-30 year age group. A similar pattern exists for ulcers, suicide, and many other causes. This reemphasizes the point made earlier, that chronic stress affects many different kinds of pathology.

As each cohort moves into the ages of maximal life changes (15-30) its members are continuously stressed by the social disruption and die of such acute behavioral causes as suicide, homicide, and accidents. Before public health and antibiotics, tuberculosis and pneumonia were important causes of death at these ages as well, reflecting the impact of stress on immunity to upper respiratory disease.[72] Beyond age 30, the preponderant causes of death shift to chronic diseases, such as coronary heart disease, hypertension, cirrhosis of the liver, or lung cancer, which reflect the accumulation of stress-induced bodily insults. The rise of death rates for causes such as these is responsible for the failure of male life expectancy to increase significantly at older ages in this century (Fig. 1).

The historical trend of the male-female

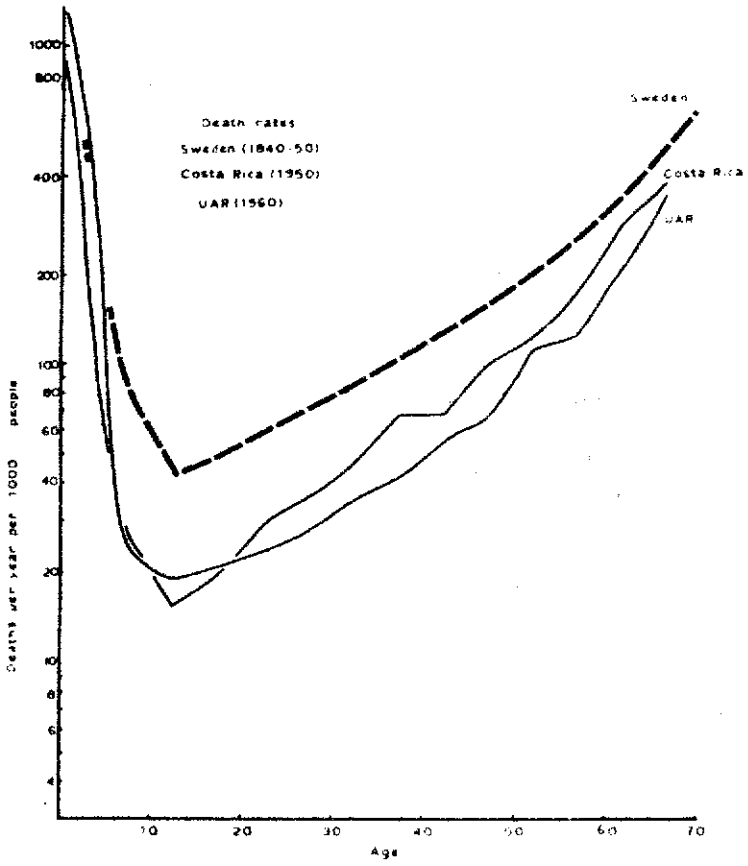


FIGURE 13.

AGE SPECIFIC DEATH RATES
(total population)
for Sweden, 1840-50; Costa Rica, 1950; and the United Arab Republic, 1960.

Note the lack of labor market entry humps in these curves, and the similar overall shape at death rates different by a factor of 2 or 3.

SOURCE: U.N. Demographic Yearbooks; Keyfitz and Flieger, op. cit.

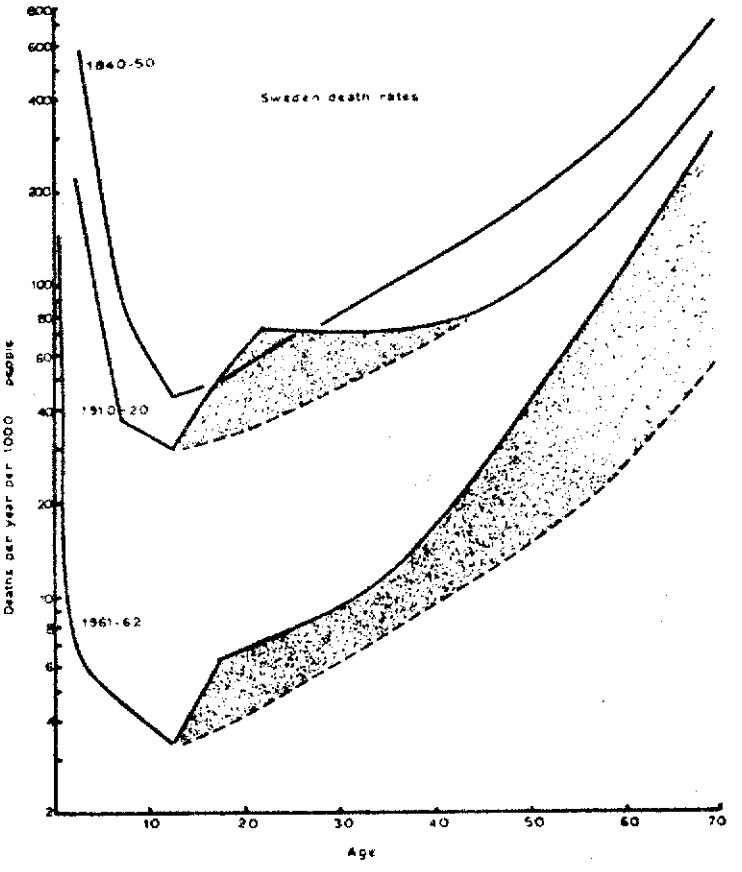
differential in age-specific death rates indicates that the socially disruptive effects of industrialization have been especially serious for men. In the United States, for instance, the sex differential in life expectancy has widened since 1900 from 2 years to 7. Fig. 19 shows that the sex difference in mortality becomes large at labor market entry ages. This is the age of maximal stress, especially for men; and we have already noted that the effects of divorce and bereavement on age-specific death rates are larger for men than for women.

The sex differential in mortality is widest for the causes which are also prominent in the urban-rural differential: at younger ages, suicide, homicide, and accidents; at older ages, coronary heart disease, cirrhosis of the liver, lung cancer, ulcers, and so on (Table 1). The differential in the total death rate has widened with development because women have benefited more from public health and medical measures reducing infectious disease, while suffering less rise of coronary heart disease, hypertension, ulcers, suicide, cirrhosis and other stress-related causes. These data clearly imply that there has been a disproportionately large rise of social stress, for men, in modern development.[73]

The rise of deaths from chronic disease is commonly viewed as a natural consequence of the reduction of deaths from acute causes at younger ages. It is assumed that there can be no net gain in health, at least not without "further research". Thus, William Glazier states in a recent article in *Scientific American*, "The inescapable legacy of improved health in early and middle life is the increased prevalence of these less tractable forms of disease and disability in middle and later life."[74] The position seems intuitively reasonable since everyone must eventually die of something. Yet, the evidence presented in this section argues strongly for the opposite view.

In whichever populations one compares, high death rates from chronic disease in later life invariably follows *high* death rates from acute causes at younger ages. Thus, blacks have higher death rates at *all* ages than whites; urban death rates are higher at *all* ages than rural (despite the concentration of medical care in cities); men have higher death rates at all ages than women. Historically, the rise of death rates from chronic

FIGURE 14.
AGE SPECIFIC DEATH RATES
(total population)
for Sweden, 1840-1962.

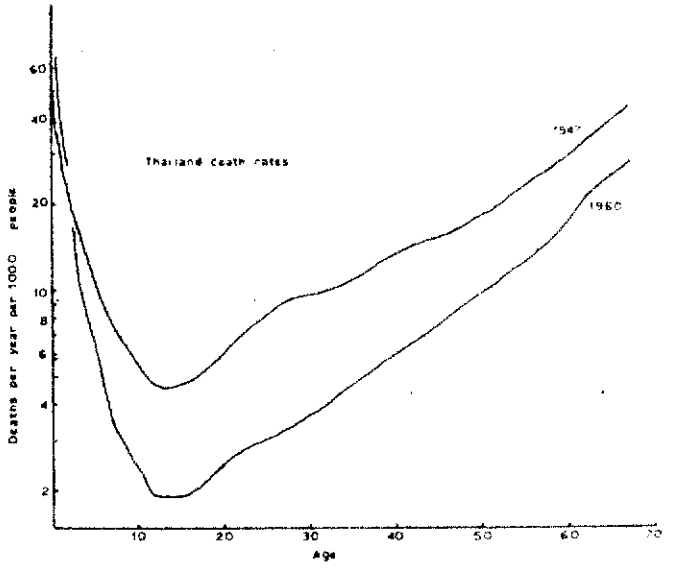


The developing labor market entry hump, so evident in 1910-20, shows a progressive enlargement up to this size in each ten-year average of death rates between 1850 and 1910. Note that the death rate shown in figure 13 for the UAR is already well below the 1910-20 level in Sweden, without the emergence of a hump at labor market entry ages.

SOURCE: Keyfitz and Fleiger, op. cit.

FIGURE 15.

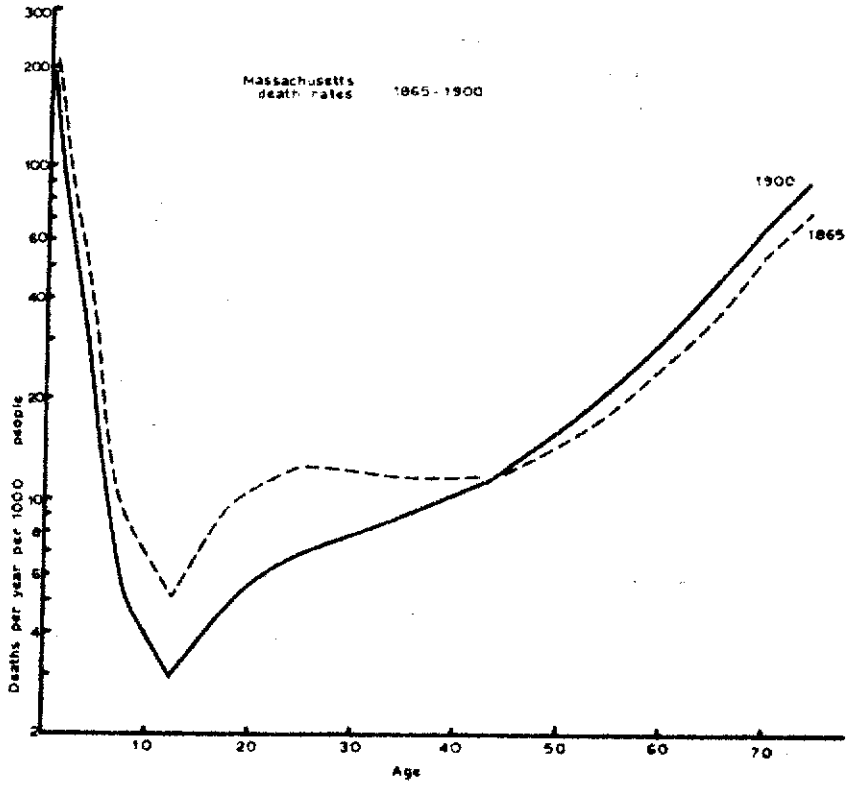
AGE SPECIFIC DEATH RATES
(total population)
for Thailand, 1947 and 1960.



On the assumption that the death rates reported for 1947 are underreported especially for infancy and older ages (common problem areas for a newly developed statistical system) the adjusted death rates would be even more proportionally parallel than they are in this figure. Needless to say, the recent data for Thailand, after the involvement in the Southeast Asian war, will show massive death rate increases in young adulthood, if they are accurately collected.

SOURCE: Demographic Yearbooks.

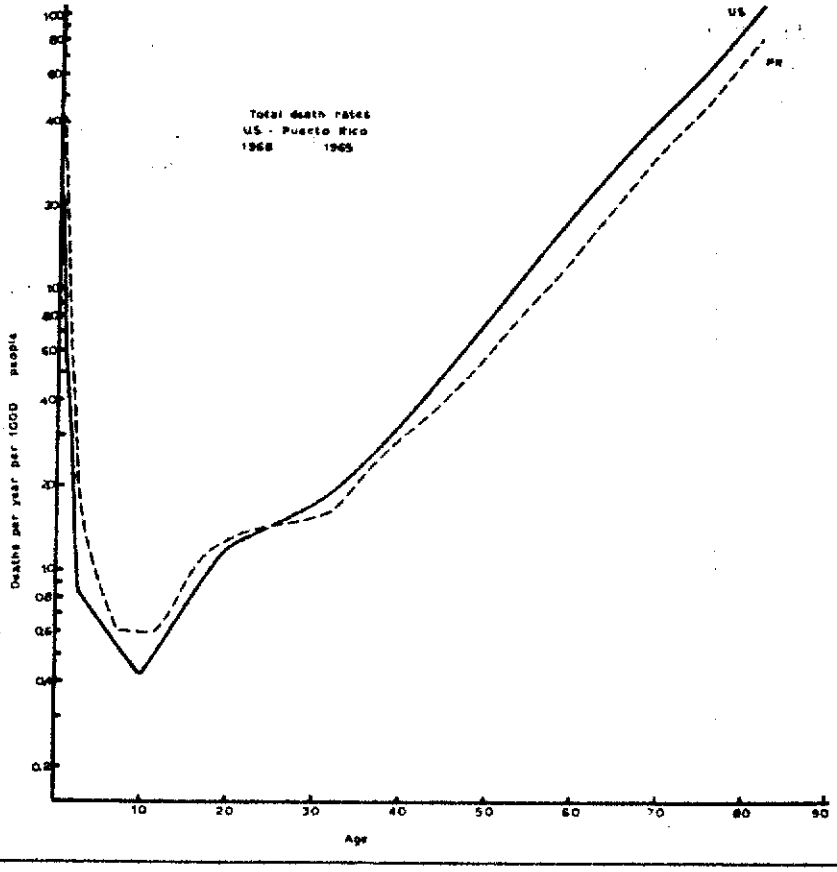
FIGURE 16.
AGE SPECIFIC DEATH RATES
(total population)
for Massachusetts, 1865 and 1900.



Note that the general level of the Massachusetts death rate in 1865 is above the level for the largely rural Sweden in 1840-50. As in the Swedish death rates, the large hump develops gradually and progressively before 1865 — it is not an aberration of the Civil War. With the introduction of immunization and public health measures, death rates declined slightly in infancy, a great deal in childhood, and significantly at labor market and marriage ages, but rose past age 40.

SOURCE: Massachusetts Vital Statistics Reports.

FIGURE 17.
AGE SPECIFIC DEATH RATES
(total population)
for Puerto Rico, 1965, and the United States, 1968.

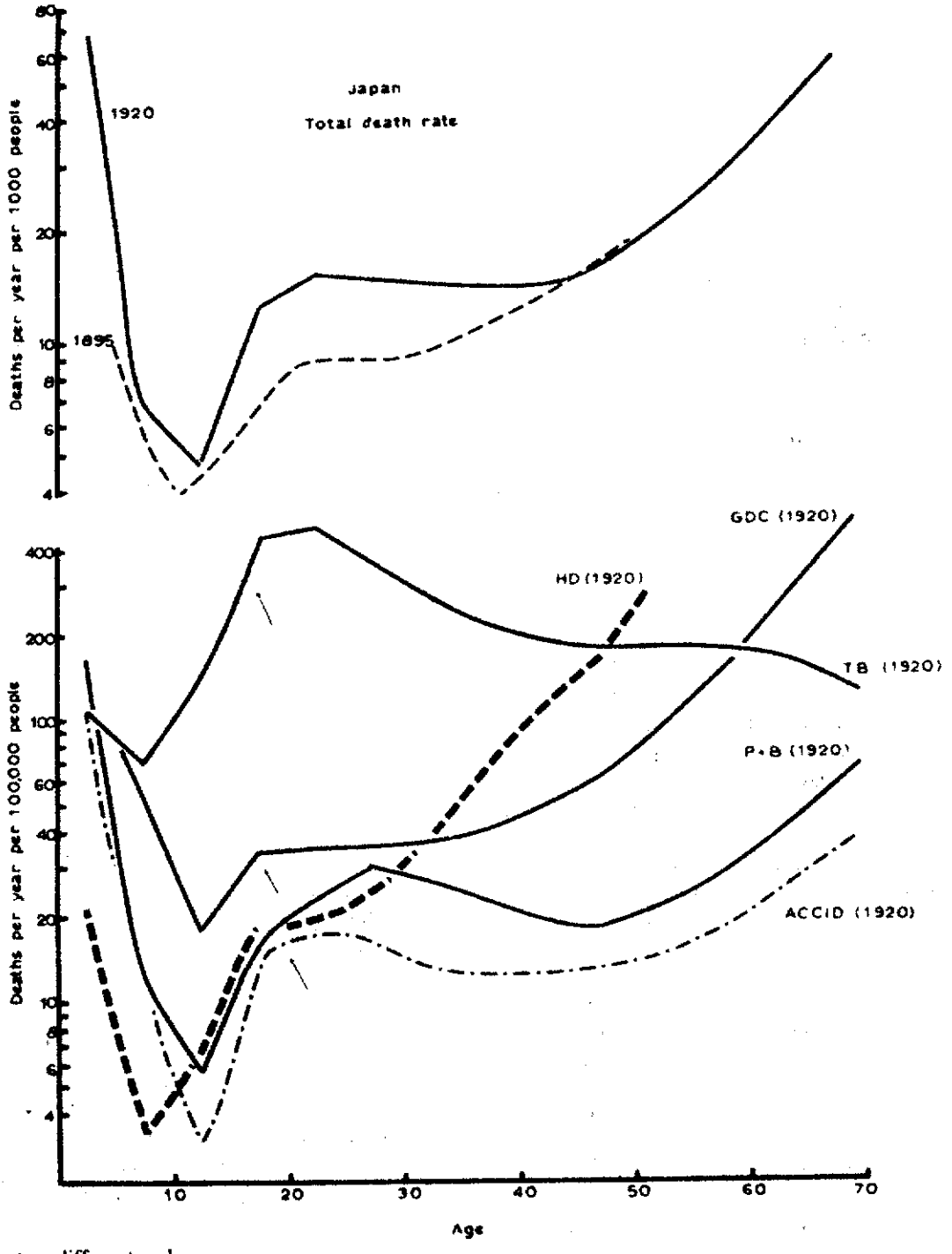


Note effect of log scale: beyond age 40, the curves differ by a factor of 1.6. In the late sixties, Puerto Rican death rates declined rapidly in infancy and early childhood, bringing the infant mortality rate below levels prevalent in the Contemporary U.S., despite much lower per capita medical resources.

SOURCE: Demographic Yearbooks, and *Vital Statistics of the United States.*

FIGURE 18.

AGE SPECIFIC DEATH RATES
(total population) total and by selected causes
Japan, 1895 and 1920.

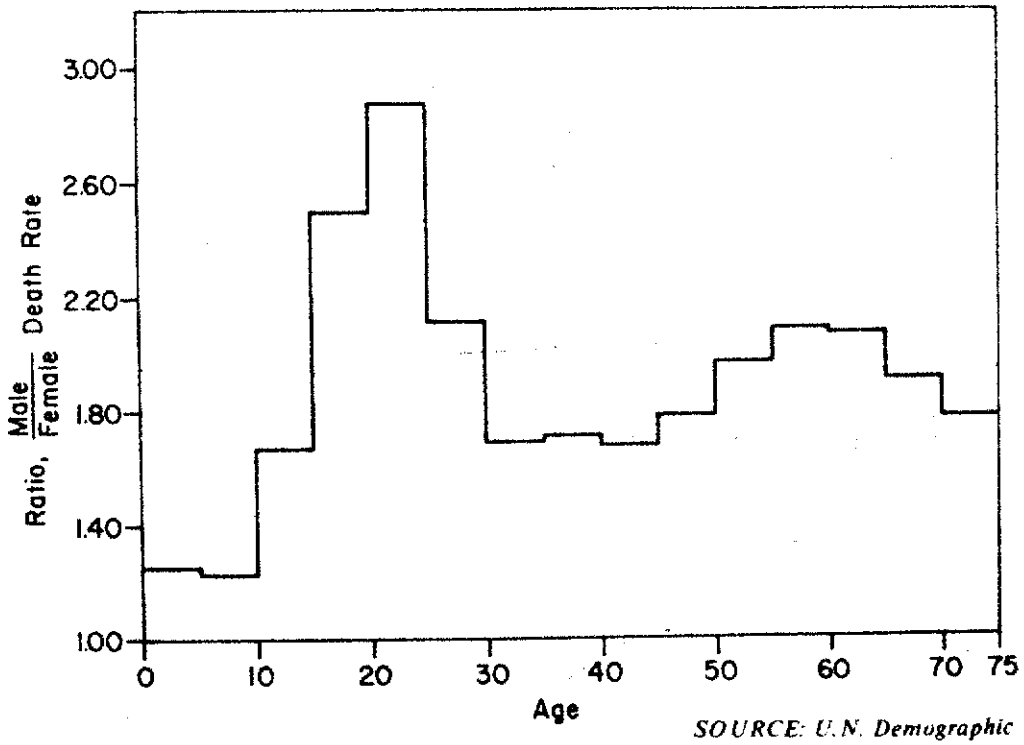


Note two different scales.

SOURCE: Vital Statistics of Japan, summary volume 1920-1960. HD=heart disease; GDC=gastritus, duodenitis and colitis; TB=tuberculosis; P+B=pneumonia and bronchitis; ACCID=accidents.

FIGURE 19.

RATIO OF MALE TO FEMALE DEATH RATES BY AGE, UNITED STATES 1966.



SOURCE: U.N. Demographic Yearbook.

disease at older ages follows the *rise* in death rates at younger ages that invariably accompanies the social disruption that is an inextricable part of capitalist development. In all the examples the differential first appears and is most marked at ages 15-30, the period during which the stress of social disruption is the greatest. Finally, where medical care is supplied to relatively undisrupted populations, the net gains for all ages stand out quite clearly (Thailand, Fig. 15; U.S. women, Fig. 19).

The common view that reduction in death rates at younger ages is naturally followed by an increase of chronic causes at older ages contradicts these fact, and cannot explain them. Neither can theories which account for the rise of coronary heart disease, ulcers, cirrhosis, hypertension or suicide through environmental pollutants, density, or other factors which operate on all age groups in the population. The social stress hypothesis we have outlined successfully predicts all of these phenomena.

Rise in Stress for Youth: 1957-1970s

Rising Death Rates

We noted earlier (Table 1, Figs. 1,3,6) that the death rates for people of labor market entry ages have risen steadily since the late 1950s. A particularly striking example has occurred in Philadelphia, where mortality fell for infants, but quadrupled for nonwhite males, and doubled for white males, at ages 15-24; at older ages, death rates either levelled off or fell (Table 4). Leading causes of the increase for youth are homicide, suicide and motor vehicle accidents; smaller contributions came from influenza and pneumonia and drug deaths. Ulcer death rates also increased for the 15-24 age group while falling markedly for older ages.[75] The increases have been especially large for males, particularly black males, and are reflected in massive changes during this period in the ratio between male and female death rates at these ages (Table 5).[76]

TABLE 4:

AGE-SPECIFIC DEATH RATES IN PHILADELPHIA, 1958 and 1972
By Age, Race and Sex

	Under 5 years	*15-24*	*45-54*
white males	68.0/37.9	6.7/12.0	110.0/104.3
white females	48.0/26.1	4.4/4.6	55.0/51.2
non-white males	110.2/71.1	11.2/45.0	180.1/187.6
non-white females	100.0/60.1	8.0/15.1	130.0/99.5

The first number in each category is the death rate per 10,000 population in 1958; the second number is the death rate in 1972.

Source: Computed from data in *Phila. Annual Statistical Reports, 1958* and *1972.*

TABLE 5:

PERCENT EXCESS OF MALE/FEMALE DEATH RATES

	White			*Other*		
AGE	*1948*	*1960*	*1968*	*1948*	*1960*	*1968*
15-19	89.7	148.9	155.5	13.2	106.2	163.9
20-24	103.5	176.3	205.0	28.1	102.4	164.5
25-29	63.9	112.4	135.8	22.2	63.2	126.9

Source: Leading Components of Upturn in Mortality for Men. United States 1952-67. Vital and Health Statistics Series 20, #11. U.S. Dept. HEW.

Parallelling the rise in mortality there have been increases in other stress indicators at these ages: a rise in mental hospital admissions and residency rates,[77] rise in illegitimacy,[78] venereal disease,[79] and a fall in the rate of marriage accompanied by increased marital breakup.[80] While alcohol consumption has risen among all age groups, there is some evidence[81] that it has risen faster for young people recently. The birth rate has fallen to a level below the previous historical low in the Depression of the 1930s; and the suicide rate for 15-24 year olds is now at a new historical high.[82]

Similar changes, though less marked, have occurred during this period in Canada and many Western European countries. This implies that the phenomena are not solely attributable to particular national events (such as the Vietnam war, racial conflict), but are probably related to social conditions common to highly industrialized countries. The recent pattern in death rates resembles the "labor market entry hump" that accompanies the early phase of industrialization.

In discussing the emergence of this feature in the death rate, we emphasized the role of increased social disruption experienced by this first cohort, in the process of breakup of stable kin relations, migration to the city, exposure to unemployment and job instability. One further fact is important in the social history of this stressed cohort: it was abnormally large, compared with previous groups coming to labor market ages. This enlargement was due in most cases to a decline of the death rate in childhood, reflecting public health advances, while the birth rates remained high for a period of 20 to 30 years beyond the point of death rate decline. Thus larger numbers survived through to labor market entry ages. A very similar phenomenon is now occurring in underdeveloped countries all over

the world, as a result of the large death rate decline that occurred under the impact of public health measures immediately after the second world war.

In the section to follow, we examine the possibility that the present increase in death rates for young people in the United States is also due to the emergence of a large cohort into a labor market not expanding rapidly enough to absorb it without a rise of stressful social conditions. If this parallel is valid, we may expect a continued rise of death rates at successively older ages, as the presently young cohort passes through the age structure. This process will generate a health care crisis the enormous dimensions of which are now largely unsuspected.

Death Rates and Long Economic-Demographic Cycles

The short cycles in the capitalist economy are superimposed on longer, larger, economic-demographic swings. Figure 20 shows that over the last century the American economy has expanded in a series of cycles, each lasting roughly 20 years. Each cycle has a phase of relatively rapid growth, a plateau, and then a downturn into a major depression.

In the 19th and early 20th centuries each increase in jobs created during the growth phase tended to be matched by an increase in the immigration rate, and vice versa for decreases. Consequently the level of competition within the labor market did not undergo large swings. Thus the suicide rate, one measure of stress, showed smaller fluctuations than in the period since 1930.[83] Parallelling the rise of suicide was a large decline in marriage and the historic decline of the birth rate with development.

The birth rate decline ends in most developed countries in the 1930s. Since that time, the birth rate has undergone wide swings, generating cohorts of greatly differing size. In the United States, large scale immigration was brought to a halt by legal measures in the 1920s. The net result of these two changes has been that the number of young people entering the labor market has been poorly matched with the number of jobs available, with consequent large fluctuations in the level of competition and stress experienced by successsive cohorts.

The cohort born 1920-1940 and entering the labor market 1935-55 was small because of the low birth and immigration rates. The birth rates began to rise again around 1940, and particularly strongly after 1945. Also, the period 1940-74 has been a period of massive internal rural-urban migration: a consequence of the final mechanization of agriculture and the elimination of the family farm in America. Thus the cohort entering the urban labor market 1955-1980 is and will continue to be extraordinarily large.[84]

The competitive experience of the small (born 1920-40) and large (born 1940-60) cohorts has been quite different, and seems to be reflected in the differences in death rates of these two groups from suicide, ulcers, coronary heart disease, and many other causes. Although the small cohort began to enter the labor market in the midst of the Great Depression, it was stressed less than the large, older cohorts, and its suicide rate (Fig. 6), though elevated, did not show the massive peaks of the older groups. The part of this small cohort that entered the labor market during and after World War II found an extremely favorable situation. Not only were there plenty of jobs, but they were protected by strong unions, the fruits of the stresses borne by the earlier large cohort in the organizing struggles of the 1930s. Fig. 6 shows that the suicide rate of this small cohort (15-34 year olds, 1940-60) fell sharply after 1945 and remained low with little fluctuation until the late 1950s. There was no strong rise with the Korean war, or with the sharp rise in youth unemployment in the post-Korean war recession (1954). In comparison, suicide

TABLE 6:

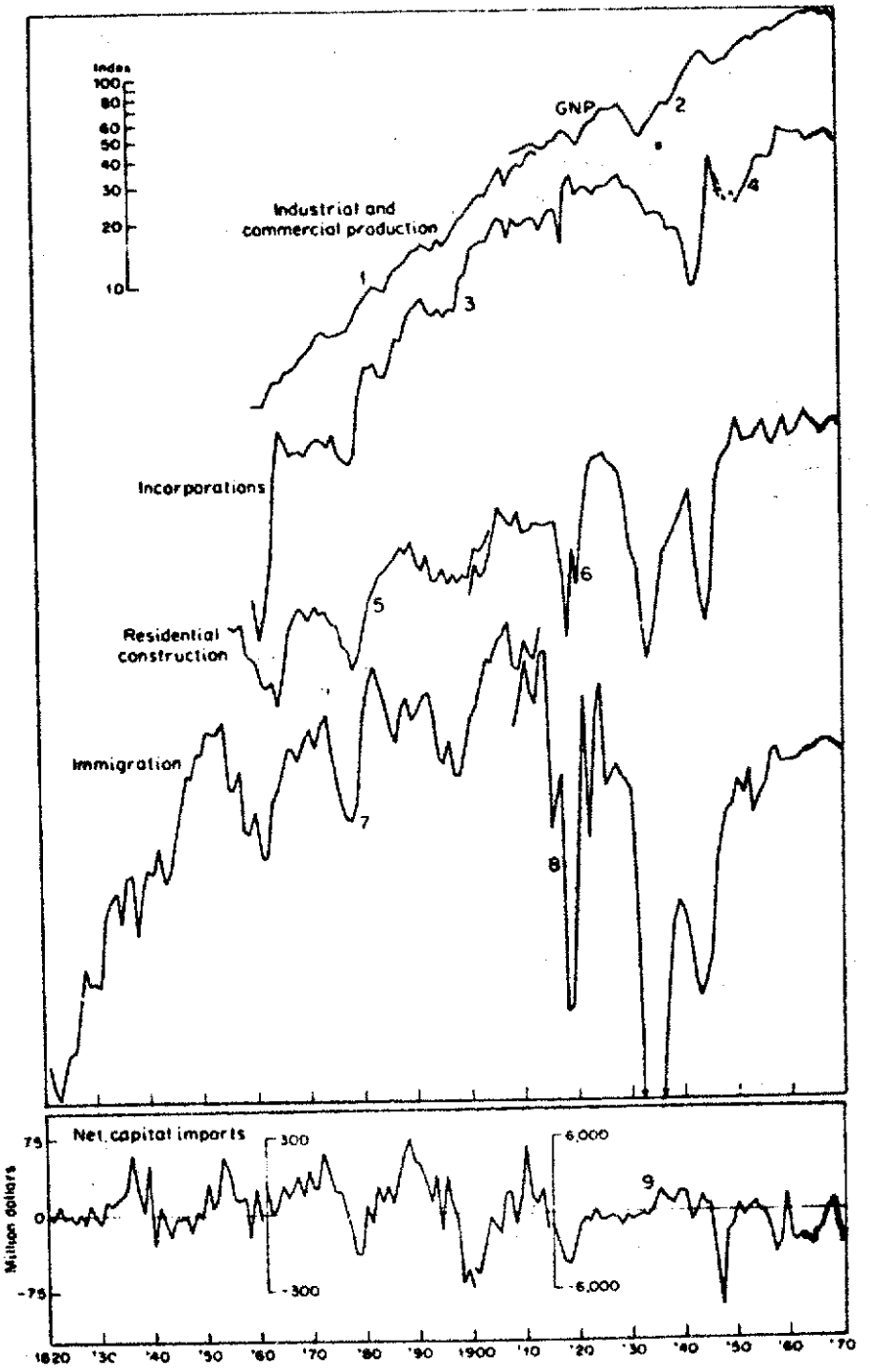
Unemployment Rate Among Males, Aged 18-19, not enrolled in school

Years	*Percent unemployed*
1950-55	12
1955-60	17
1960-65	20
1965-70	20
1970-75	25

Computed from "percent employed among males, 18-19, not enrolled in school," in the *Handbook of Labor Statistics*, and *Employment and Earnings*.

FIGURE 20. *LONG CYCLES AND BUSINESS CYCLES*
in the economic data for the United States, 1820-1964.

UNPROCESSED ANNUAL DATA ON OUTPUT, INCORPORATIONS, RESIDENTIAL CONSTRUCTION, IMMIGRATION, AND NET CAPITAL IMPORTS, 1820–1964



SOURCE: Easterlin, R.: *Population, Labor Force, and Long Swings in Economic Growth,* N.B.E.R. N.Y. (1968).

among the older cohorts remained high after 1945 and continued to show strong fluctuation with unemployment.

After 1955 the new, large cohort began to enter the labor market, and the competitive situation for young people intensified. Even though the proportions of young people going to high school and college expanded markedly through this period, and after 1964, the draft absorbed temporarily up to 80% of the increase in new labor market entrants, the unemployment rate of young people not in school or the army doubled from the fifties to the sixties (Table 6). This increase was matched by the beginning of the rise of suicide and other causes of death (Fig. 6, Table 1), during a period in which the unemployment and suicide rates for the older, small cohort were steady or falling.

The behavior of the unemployment rate alone cannot account for the *accelerating* rise of stress pathology for young people in the 1960s and early 1970s. In the next section we examine other social changes which have added successively to the stress experienced by the large cohort, and help to account for this accelerating rise of stress death rates.

Additional Sources of Social Stress

Accompanying the intensified competition within the young, large cohort have been a series of shifts in the stucture of the labor market which cause increased stress. Since the second world war, the distribution of newly available jobs has progressively shifted toward those requiring greater education — toward white collar and service jobs and away from manual labor. The black and poor white migrants from the family farm, who were easily absorbed into the urban labor market, 1940-55, have been increasingly unemployable in the economy of the sixties and seventies.[85] The migration has not abated, however, since welfare payments have enormously expanded in the Northern and Western cities. The net impact of these changes has been to create a demoralized population, living in rundown ghettos on very little money, but not starving to death. This transition has been accompanied by a massive breakdown of marriage among the recent migrants and a disruption of previously stable ethnic neighborhoods.[86]

Within the young, large, cohort, the rich have gotten richer and the poor poorer.[87] The lower ¼ of the income distribution declined absolutely in real income, 1958-1970; perhaps these are the migrants described above. For the rest of the large cohort, real incomes have risen, but much more slowly than for the previous small cohort at corresponding ages.

Easterlin has pointed out that the present large cohort, the children of the small cohort, grew up in a period when their parents' incomes were at a high level and rising sharply. Expectations were that their children would be still better off, particularly in view of the expansion of educational opportunities. These expectations were in many cases reinforced by the great value many parents placed on material success, emerging from their experience of relative poverty in the Depression.[88]

Although the early phase of the educational expansion conferred some advantages, the final result has been the devaluation of most educational degress. Young people must now subject themselves to the discipline of school for a longer period merely to maintain their competitive position. This devaluation was complete for the high school degree by the mid-fifties, and commenced for college degrees about 1967. Recent graduates no longer achieve successively higher incomes for each year of schooling completed.[89]

Only law and medicine still appear to offer some net advantage, and the competition for entrance into these fields has risen to staggering proportions.[90] Meanwhile, high schools have been transformed by tracking and class segregation of neighborhoods. The majority of high schools now serve merely to keep kids off the streets; as the futureless aspect of schooling has become evident, drug use, gangs and racial conflict have proliferated, matched by the now routine patrol of police in the corridors.

The large number of new labor market entrants absorbed by the military were dumped back into the labor market after 1968 with the decline of the draft and the return of Vietnam veterans. In contrast to the situation of the Korean War veterans who were easily absorbed by the expanding economy of the midfifties, the Vietnam veterans have confronted high unemployment rates. This has been in part due to the stagnation of the economy, and also to their relative educational disadvantages, since most vets have only a high school education. The demoralization

TABLE 7.

AGE-STANDARDIZED DEATH RATES FOR MASSACHUSETTS
1870-1968

	1870	*1900*	*1930*	*1968*
Heart Disease	110.	278.	450.	570.
Diabetes	8.	19.	27.	20.
Cancer	103.	136.	155.	180.
Ulcers	1.2	3.5	6.1	5.8
Suicide	4.3	10.	14.	9.2
Cirrhosis of the Liver	9.7	16.	8.2	19.
Homicide	1.5	0.9	2.1	1.7
Accidents	52.	108.	105.	49.
Tuberculosis	460.	264.	68.	4.5

Sources: 1870-1930, *Vital Statistics Registration Reports* for Massachusetts; 1968, *Vital Statistics of the United States*. Rates per 100,000 population, standardized to the 1900 population.

of the Vietnam experience itself has combined with these factors to produce an extraordinary rise of stress for veterans.

In response to this worsening of conditions, there has been a decline of marriage, increased marital breakdown, and a dramatic fall in the birth rate, accompanied by a rise of illegitimacy. These changes are themselves further sources of stress (see Fig. 4).

Young people have responded vigorously to these changes by attempting to create new forms of community. These attempts were at the heart of the civil rights movement, the peace movement, the creation of the youth counterculture, the expansion of premarital sexual relations, and the movement toward communal and cooperative forms of living. The defeat of these movements by mass shootings, government-directed counter-insurgency disruption, and divisive cooptation, as well as the disappearance of a mass base with the end of the draft, has undoubtedly added another substantial component to the rise of stress for young people in the early 1970s.

Health Prospects for the Baby Boom Children

Turning back to Figures 3 and 6, we can see that the baby boom cohort is not the first in capitalist social history to suffer a dramatic rise of stress pathology. The groups entering the labor market between 1880 and 1925 experienced a larger upswing of pathology, starting from lower levels. Of the many factors contributing to this rise of stress at the turn of the century, the alienation and intensification of work[91] was perhaps the most important. The specific pattern of diseases expressing stress was also influenced by the switch from alcohol to tobacco as the major drug of alienated work in the population.

Comparison of Table 7 with figures 3 and 6 suggests that this older, highly-stressed cohort shows a definite pattern of succession of diseases as it ages. Suicide rates rise first at labor market entry ages, followed by the rise of ulcers somewhat later. As the whole highly stressed group ages, heart disease and cancer show large elevations when the peak stress group passes into maximal risk ages for these diseases, 30 to 50 years after entering the labor market.

Members of the baby boom cohort are now dying of behavioral causes which reflect acute stress: suicide, homicide, accidents, drug deaths. The suicide rate for this group has surpassed previous historical peaks and is still rising. The ulcer death rate has turned upward, in contrast to the rapidly falling rates at older ages. If past experience with the first highly-stressed cohort of the twentieth century is a valid guide, the baby boom children will suffer a large increase in death rates for cirrhosis of the liver, cancer, and heart disease as they move into maximal risk ages for these diseases by the 1990s.

TABLE 8:

Mean Systolic Blood Pressure of Adults in the United States, 1960-62 and 1971-74

Age	*1960-62*	*1971-74*	*Change (mm Hg.)*
18-24	116.5	119.0	+2.5
25-34	120.1	120.9	+0.8
35-44	125.6	125.6	0.0
45-54	133.6	133.8	+0.2
55-64	144.1	142.0	—2.1
65-74	154.9	150.1	—4.8

Sources: Department of Health, Education and Welfare, Public Health Service, National Office of Vital Statistics: *Vital and Health Statistics*, Series 11#5 (Data from the National Health Survey), p. 10 (July 1964); _____: *Advance Data from Vital and Health Statistics*, No. 1, p. 4 (Oct. 18, 1976).

The exact pattern of diseases characteristic of the baby boom cohort as it ages will depend in part on the choice of drug of alienation. The early twentieth century cohorts switched from alcohol to smoking, and experienced corresponding extraordinary increases of lung cancer and coronary heart disease, but reductions in cirrhosis of the liver, accidents, other cancers, tuberculosis and suicide. The baby boom children, along with the rest of adults since the early 1960s, appear to be undergoing a switch back from smoking to alcohol, as the proportions of smokers fall and per capita alcohol consumption rises at an accelerating rate.

We will not begin to see the large impacts of the baby boom cohort on the death rate as a whole for at least two decades. Meanwhile, the reduction of stress within the now older small cohort described in a previous section dominates the movement of the death rate (figures 1,3 and 6). The highly unionized white males of this cohort have in particular succeeded in winning for themselves throughout their life cycle a strong labor market position, which in turn makes possible a substantial reduction in stress.

The benefits of this labor market strength range from the reduction in weekly hours of work, achieved in the 1930s and 1940s, through the establishment of considerable control over production, especially among highly-paid craft workers, to the partial re-creation of neighborhood community in working-class suburbia. These achievements may underly the decline of smoking, which began in the early 1950s, as workpace relaxed for a majority of workers. Average population blood pressure has also fallen at older ages since the early 1960s, while it has risen at younger ages (Table 8). The gains of the small cohort have extended to older people, with the establishment of Social Security and Medicare largely through labor's political struggles (cf. Fig. 6).

The Impact of Depression and Recovery

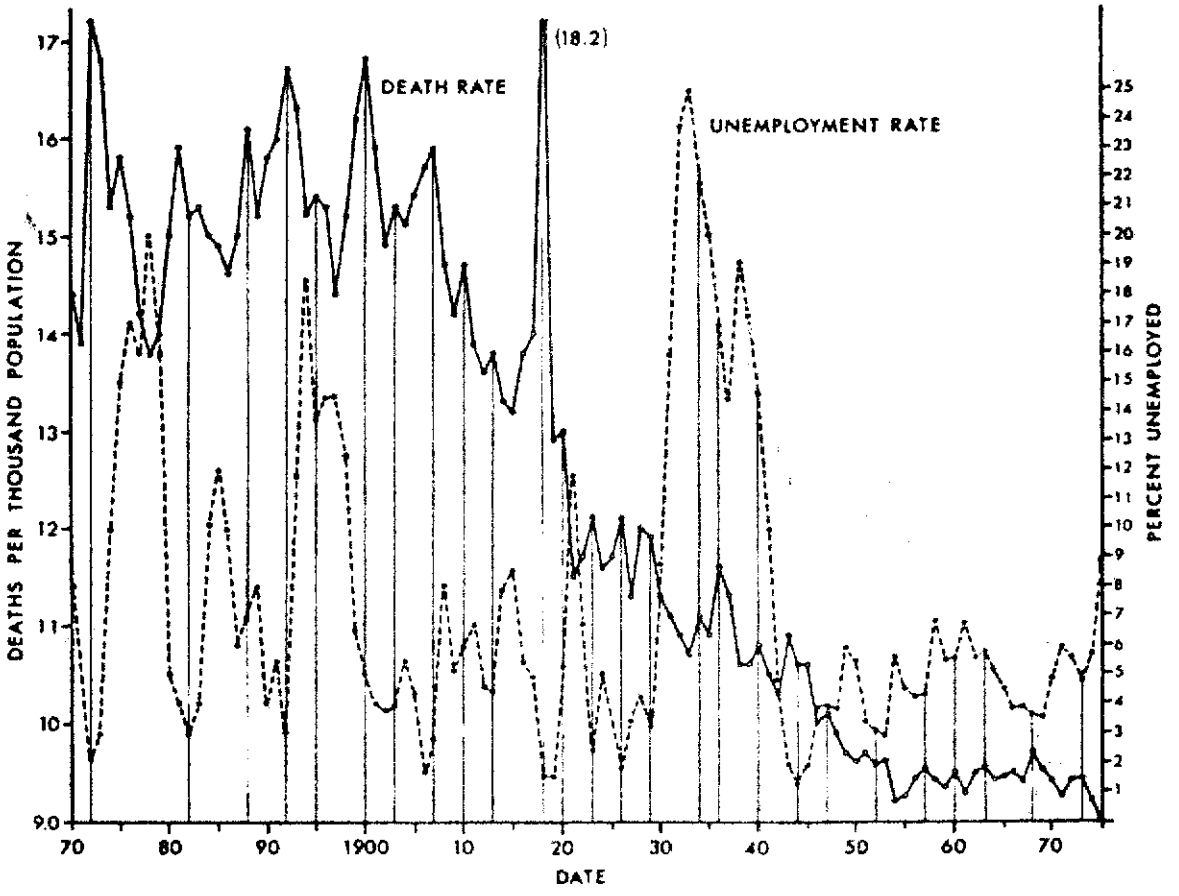
Superimposed on the effects of the various cohorts is the impact of movement toward economic depression since 1968. Figure 21 shows that the death rate as a whole rises during business booms and declines during depressions. The most rapid and sustained death rate *declines* in the whole series — 1872-78, 1881-86, 1892-97, 1908-15, 1919-21, 1929-33, 1936-38, 1942-49, and 1968-75 — all occurred when unemployment was *rising*.

This seemingly paradoxical relationship reflects the fact that heart disease, stroke, cancer, cirrhosis, diabetes, accidents, influenza-pneumonia, and many smaller causes of death such as ulcers rise during the boom with the lengthening of hours of work, the increase of migration, and its attendant community disintegration. Only suicide and homicide, among death rates, rise and fall with unemployment and its family consequences during depressions. Clearly the social sources of stress which rise during boom outweigh the effects of economic depression on the death rate as a whole.[92]

The combination of the small cohort effect with the fall in hours of work and migration since 1968 has resulted in a large decline in death rates beyond age 35 (Fig. 1). After rising for a long time to the peak in 1968, heart disease has declined 15%, 1968-76, largely because of this interaction. The beneficial impact of oncoming economic depression at ages 15-30 has come primarily through the reduction of auto accidents, which have been cut by a third since 1973 as a result of higher gasoline prices and the imposition of the 55-mile-an-hour speed limit. While homicide and suicide continue to rise dramatically at these ages (Fig. 6), the impact of the accident reduction is large enough to stop the rise of the total death rate

FIGURE 21.

TOTAL DEATH RATE AND UNEMPLOYMENT RATE in the United States, 1870-1975.



SOURCES for death rate, as in Figure 1; for unemployment rate, as in Figure 3. Reprinted by permission from the *International Journal of Health Services* 7 (1): 37-62 (1977).

at ages 15-24 after 1972, and to produce a slight reduction, 1975-76 (Fig. 1).

The recent health gains are clearly the product of the labor market strength of a majority of workers — the small cohort. This same labor market strength, by limiting hours of work and the intensity of work, while ensuring higher wages, has retarded the advance of the productivity of labor and squeezed capitalists' profits. The strength of the small cohort workers has thus been a fundamental factor in bringing on the depression of the mid-1970s, which in turn has further beneficial impacts on health by reducing the hours of work and community disruption still more.

Traditionally, capitalism has resolved this kind of problem by the introduction of new technology designed to undermine the control over life and work exerted by worker groups in strong positions.[93] Such transformation of the workplace requires an expansion of investable surplus. Since the late 1960s, the ruling class has sought to gain this new capital by cutbacks in the use of surplus for social welfare, education and

health care services won by the political struggles of the small cohort. In addition, an economic strategy of raising unemployment rates to moderately high levels — enough to break the small cohort's strength, but not enough to stimulate mass disaffection and independent initiative — has been consistently pursued. These policies have not yet resulted in a fundamental redistribution of social surplus in favor of capital.

The movement of death rates in the next decade will depend on whether and how capitalism recovers in the United States. A full-scale recovery from depression has in the past required world war to readjust international capitalist relationships. Short of this, a recovery can only be produced by extraordinary extraction of surplus from one or more worker groups. If the small cohort is the object of this intensification, its health gains will be lost. If the baby boom children continue to bear the brunt of redistributive measures, the prospective increase in death rates for this group as it moves into maximal risk ages for heart disease, cancer, and cirrhosis will be that much larger.

How Has Medicine Responded to These Problems?

So far, only superficial technical solutions have been offered. For example, a major response to the drug problem has been the introduction of methadone and a push to develop an arsenal of narcotics antagonists.[94] In fact, the major response to psychological disorder has been for the last 20 years pharmacological: for depression, "antidepressants"; for anxiety, "anti-anxiety" agents;[95] for hyperactive children, stimulants,[96] etc.

Ironically, many treatments for a variety of stress-related illnesses act not by removing the causes of the illness but by destroying the capacity of the organ to respond to the cause, often by removing the organ or by severing its connection with the brain. Thus "ultimate cures" for ulcer are vagotomy or removal of the duodenum; a response to hypertension may be blockage of the sympathetic nervous system; a response to severe mental disturbance may be psychosurgery.[97] Medicine is increasingly forced to intervene with heroic measures whose side effects are often only slightly less unpleasant than the original disease.

The irony of treating stress pathology by destroying the capacity of the organs to respond to the stress or removing them, is lost on much of the medical profession, which sees only its duty to the individual. This is not surprising since the primary thrust of medical education is to identify the immediate cause of the pathology. This becomes the "true" cause, and the search for understanding halts. The pattern of treatment follows directly, for if the cause of mental depression is a lack of brain norepinephrine, it makes sense to look for a drug that raises norepinephrine. If the cause of ulcers is excess acid secretion, it should be suppressed. And so on.

There are at least four problems with this sort of medicine. One is that it is not "cost effective". Technical solutions to rising death rates from stress pathology are far more expensive than the public health measures that reduced the death rate in the past. Coronary by-pass operations and blood dialysis are two well-known examples. Stress pathologies are the source of an increasing proportion of the deaths and will require an increasing share of the social product for their treatment. As male life expectancy has remained unchanged over the last 15 years, the proportion of the GNP in the health care sector has escalated from 4.6 percent to 8.3 percent.

A second problem is that high technology curative medicine will probably be ineffective in dealing with these problems. This is readily evident in some of the statistics we have already mentioned. Though the per capita consumption of anti-anxiety agents has risen sharply in the last decades, stress death rates have risen at an accelerating pace.[98] Though major tranquilizers are credited with emptying out the mental hospitals, they have not prevented a sharp upswing in admissions and residency rates for youth from the large cohort.[99] The highest death rates are now found in the large metropolises, which also have the highest number of doctors per capita, hospital beds per capita and medical expenditures per capita.[100] The "great medical centers" are often located right in the midst of the areas of highest chronic pathology — the slums. Rural areas with low doctors per capita and low medical expenditures have the lowest death rates. To add yet another paradox, as a result of Medicare and Medicaid, the poor now have more doctor visits per capita than the rich, and have equal access, at least on paper, to the high-quality high tech-

nology private facilities.[101] However, the death rate differential between these two groups has probably increased since the mid-sixties.[102] These data strikingly indicate the irrelevance of high cost curative medicine to overall health in society.[103]

A third problem is that the technical approach contributes additionally and powerfully to the breakdown of community responsible for the diseases in the first place. Death is no longer treated as part of the human life cycle. Life and death are no longer related to bonds between human beings but to treatment by technicians. The growth of this trend increases one's fear, passivity, and sense of helplessness — factors which have been directly implicated in the impact of stress on increased sickness.[104] Doctors increasingly lose their capacity to reduce stress, and in the process, lose their roles as healers.[105]

Finally, it seems just plain inappropriate to view these diseases as mere technical defects in the body's machinery rather than as dramatic evidence of the fear and pain pervading people's lives. Even if technical advances can be developed cheaply, they are not an appropriate response. For example, there are claims that cingulotomy (a psychosurgical operation) is "effective" in treating alcoholism in the sense that destruction of the cingulum may relieve feelings that lead to drinking. The cost of a cingulotomy is low, roughly that of an abortion. What sort of society, however, deals with the problems of 9 million people by destroying their capacity to *feel* tension and anxiety? It seems equally inappropriate to view atherosclerosis and lung cancer primarily as technical challenges.

New Directions

The most human solution, and in the long run the only real one, is to halt the social disruption and recreate relaxed community. Work should no longer be a high pressure activity kept going by the threat of a variety of social punishments. People should not be socialized to put themselves under chronic stress in order to produce. The ideals of competitive material achievement must be replaced by ideals of cooperative mutual development of social relationships. The barriers separating work from home and children should be broken down, and both men and women should be free to develop themselves and create in a relaxed atmosphere. Material aspirations should be stabilized, and industry automated and put on a maintenance basis. Capital accumulation should give way to living.

That this prescription is not just a list of leftist slogans, the applicability of which to modern life is dubious, is demonstrated by the social attempts to deal with stress pathology that have already been made. Behavior modification techniques, for instance, have been used to help people reduce blood pressure, stop smoking, or lose weight. That these methods are successful shows that sociopsychological factors are important in these diseases, in contrast to irreversible, possibly genetic, physiological alterations. However, outside the reinforcement situation, they start smoking again, and blood pressure increases, since the rewards and punishments of the surrounding society have not been changed.[106] Various techniques of relaxation have been widely propagated — self-hypnosis, progressive relaxation, Yoga, Transcendental Meditation. As with behavior modification, these methods have large impacts on physiological stress indicators during relaxation sessions. People who become consistent practitioners of these methods show a decided reduction of chronic stress indicators.[107] The problem is that the great majority of people who try these techniques cannot become consistent practitioners due to the pressure of their own socialization and their immediate environment.

People have tried to create new forms of intimate community — encounter groups, sensitivity training, organizational development — but the impact at best has been limited. People are opening up to new possibilities but their social relationships are not transformed.[108] Intimate group meetings have been used to deal specifically with stress-related problems, as in the cases of Alcoholics Anonymous, Synanon, or Weight Watchers. These groups have only limited success also, which may be due to a number of things. Many of these groups share the practice of mutual denunciation and negative reinforcement to get people to shape up to the Protestant Ethic

and perform. As Berne[109] has pointed out, this simply is a repeating phase in the total problem for an alcoholic or addict, a step in the circle of the game, not a move outside it. Others, like Weight Watchers, do not use such methods, but also fail to alter the relevant social relations which are the source of stress; they only create a community supportive of a very particular change. All of these groups work, not with the natural network of people involved with a person suffering from stress pathology, but with relative strangers. The dynamics of stranger groups in our society typically involve setting up antagonistic hierarchies, stigmatization, and other processes which focus and magnify stress rather than relieving it. These comments apply also to group therapy, which has been used largely to deal with neuroses.

The impact of altering the whole environment of social reinforcers is dramatically illustrated in the experiments with a token economy in mental hospitals.[110] Mental hospitals usually reinforce pathological behavior.[111] The token economy is an attempt to reinforce "normal" behavior. By this method, chronic back ward schizophrenics are transformed from helpless asocial beings into people who can feed, clothe and take care of themselves, engage in work and play, and go through halfway houses back into the world of society as it is. Of course, many of them return to the hospital, since the reinforcers *in society*, particularly in their intimate networks, have not changed. Their "sickness" is necessary to the relationships they have with people on the outside.

Family therapy and Network therapy have been developed to deal with these problems, and are correspondingly more successful than the other methods. Family and network therapy start from the assumption that modern society fragments, divides and privatizes natural forms of community, such as family, neighborhood, or workplace groups. This process both creates stress and causes it to reverberate chronically within the impaired network; from time to time, stress is focused on individuals who experience the contradictions of such life most acutely, who also are frequently stigmatized for this experience.[112]

The fundamental process of therapy is one of recreating open and vital community, which dramatically increases the network's resources for dealing with social crises and reducing the chronic stress level. In the process, the concentration of stress on particular individuals, and the accompanying stigmatized roles, are broken up, with the result that the presenting problem (drug addiction, anorexia) is abolished. Many of these revitalized networks continue to be effective for years. Unlike other therapeutic techniques, family and network therapy are effective outside the therapy sessions, because they stimulate the self-activity of the community network and explicitly aim at the network becoming very quickly independent of the therapists.[113]

By relying on community resources, these methods have also been developed for individual therapy.[114] Fundamental to all forms of this kind of therapy is a belief in the availability in people of natural forms of community, and a natural sequence of successive growth stages for the individual in a social life cycle. It is these community resources and the attractions of progression to the next life cycle stage which provide the dynamic power of transformation.

In a field which is notorious for follow-up studies that are either so imprecise as to be meaningless, or where good evaluations of therapy have shown that most therapies do no better than the spontaneous rate of improvement in a sample of people treated, and some do worse,[115] the work of family and network therapists has been demonstrated to be highly effective for such widely different conditions as schizophrenia, asthma, anorexia, brittle juvenile diabetes, and drug addiction.[116] That these methods are highly effective supports our contention that the creation of communities capable of dealing with the sources of stress and reducing it is immediately effective in reducing stress pathology. This is also perhaps the best demonstration that these conditions are indeed primarily the outcome of social stress.

However, even these successes have their limits. Family therapy methods depend on finding that "space" between the objectively necessary relationships of modern society, and the actual social situations of people with extreme problems, which are in many cases unnecessarily oppressive and contradictory from the point of view of function within this society. The rigid adherence of immigrant ethnics to customs and rituals which have become irrelevant to city life, combined with the defensive forms of private family-community often found in the first

generation or second generation, create unnecessary contradictions for their children, which can be exacerbated to such an extent as to produce schizophrenia, for instance.[117] Simply by encouraging the adolescent children to leave the family and become independent, hard-working, and interested in their own success (the third-generation pattern[118]), it is possible to reverse a drastic stress pathology. However, this only *creates* the problem which we have seen appearing as other kinds of stress pathology — not as the suicide when young, but as the premature heart attack from overwork and family tension.

Another limit to these methods will come when an attempt is made to find this open space for large numbers of people. While it may be possible to transform a depressed, demoralized migrant agricultural laborer into a college graduate with high income prospects, it is clearly impossible to do this for all, or even the majority, of lower class people. In a pyramid of social power which always has the same dimensions the rise of one individual is matched by the relative fall of another.[119] The difficulties of "preventive psychiatry" in the 1960s surround this very problem.[120]

We have already pointed out how essential social disruption is to the process of "free" labor migration following in the path of capital's pursuit of higher profit rates. Since constantly rising productivity requires such disruption, stopping the disruption and rebuilding community will greatly limit productivity advance. Similarly, mass relaxation by the *majority* of men who share the coronary prone behavior pattern would undermine productivity, the profits of capitalist firms, and thence the growth process itself. As cross-cultural studies have demonstrated, no achievement syndrome, no rapid growth.[121] Thus the real problem clearly emerges: to initiate a successful community forming process which abolishes social hierarchy in the whole society and stops the capital accumulation process, with its attendant disruption and family structures aimed at socialization for high-pressure productivity.

The kind of community-forming process that is needed is indicated by the experience of the Berkeley student psychiatric facility during the Free Speech Movement.[122] This facility originally treated between 8 and 10% of the student population, a proportion that had been steadily rising for a decade before the rebellion. As the movement grew, use of this facility fell drastically; as the movement was defeated, the usage rate rose back to "normal" levels. This is in direct contrast to a major attempt at "preventive psychiatry" in Manhattan, which experienced great increases in facility use, combined with a "cure" rate not above the spontaneous rate of improvement.[123] Here the genuine community-forming and incremental approaches stand in stark contrast as they actually work.

In the historical statistics of developed countries, the effective kind of community forming process occurs also during mass strikes and popular uprisings, which are accompanied by sharp declines in the suicide rate.[124] The rate rises back to, or above, previous levels as these movements are defeated as well. The defeat of these movements is also associated, of course, with a great increase of official homicide, and in some cases which required prolonged military seige to overcome the insurgents, the diseases associated with starvation and the breakdown of public health systems.

These data make it crystal clear that although this method of community formation is very effective in reducing stress, it too has limits imposed directly by the power of the ruling class in this society. While it solves the problems unresolved by therapy of small groups or by mass formation of pseudocommunity as in Suburbia, it is impossible so long as the ruling class retains its military power and cultural hegemony. Successful revolutions, however, overcome both of these problems, through fraternization with the military forces, and through an Enlightenment, begun many years previous, which creates a new worldview, causes a loss of confidence in the ruling ethic among the rulers themselves, and facilitates political division among the rulers at the point of revolutionary crisis, so that the ruling hegemony is then at best contradictory and usually nonexistent.

Since the genuine community forming processes that occur in mass uprisings may be the most effective therapy for chronic stress pathology, we believe that medical science should devote primary energies toward investigating this effect and furthering its practical application. In this paper we have made some contributions toward one aspect of this task, the formation of a new worldview.

Looking back over the facts we have discussed, it is easy to understand why Virchow, reflecting on the revolutions of 1848 in Europe, said: "Medicine is nothing but a social science. Politics is nothing but medicine on a large scale."[125]

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NOTES

1. For example, in North Philadelphia, the section with the lowest income, the infant mortality rate in 1972 was 35.5 per 1000 live births; in the richest section, Northeast Philadelphia, the rate was 9.2 per 1000 live births. South Philadelphia was chosen for the federally-funded prenatal care programs in 1964. Simply by making regular prenatal visits available to the poor population in these areas, the maternal mortality rate dropped from the highest in the city to zero over two years. These districts used to have infant mortality rates as high as North Philadelphia, but the 1972 rates are now moderate: 19.4 and 20.0. Data cited from *Annual Statistical Report of the Philadelphia Department of Public Health, 1957-1972.*

2. Waldron, I., and Eyer, J. "Socioeconomic causes of the recent rise in death rates for 15-24 year olds." *Soc. Sci. Med. 9*: 383-396 (1975).

3. Many of our arguments are based on the mortality patterns in capitalist countries. Similar patterns exist in the "socialist" countries of Eastern Europe. We do not find this surprising since the dominant thrust in both cases is toward the efficient accumulation of capital. We would expect a decline of adult death rates only where a society has consciously shifted its emphasis from accumulation toward a reorganization of human relationships. In fact, such a fall in the death rate might be useful as an objective measure of the extent to which a social revolution has approximated the visions of revolutionaries from Marx to Guevara.

4. Mason, J.W.: "Organization of endocrine mechanisms." *Psychosom. Med. 30*:565-808 (1968).

5. Selye, H.: *Stress of Life*. McGraw-Hill Publications (1956).

6. Mason, J.W.: "A re-evaluation of the concept of 'non-specificity' in stress theory." *J. Psychiat. Res. 8*: 323-333 (1971).

7. McGrath, J.E., (ed.), *Social and Psychological Factors in Stress*, Holt, Rinehart and Winston, Inc. (1970).

8. Age adjusted death rates from coronary heart disease have increased by several fold in the U.S. since 1902 (Stamler, J.: *Lectures on Preventive Cardiology*, Grune and Stratton, New York, (1968)) and substantially in the male population between 1940-1960, Moriyama, I.M., Krueger, D.E., and Stamler, J.: *Cardiovascular Disease in the United States*. Harvard University Press, Cambridge (1971). See also: Dodge, S. and Martin, W.: *Social Stress and Chronic Illness: Mortality Patterns in Industrial Society*, University of Notre Dame Press, London (1970).

9. Dintenfass, L.: *Blood microrheology: viscosity factors in blood flow, ischaemia, and thrombosis*. Appleton-Century Crofts, N.Y. (1971).

10. Ventricular premature beats, which can be viewed as the result of *intermittent* hyperirritability in the heart muscle, may be stimulated by a similar mechanism. In any case, it is clear that their onset is highly related to stress. Psychological stress greatly decreases the threshold for ventricular fibrillation and premature beats while increasing sympathetic activation (Lown, B., Verrier, R., Corbalan, R.: "Psychologic Stress and Threshold for Repetitive Ventricular Response," in *Science 182*: 834-36 (1973)). We are aware that the exact mechanism of coronary attacks has not yet been clarified; there may even be several different types of ischemic heart disease. What we have presented is a sketch acceptable to many investigators in the field.

11. Friedman, M.: *Pathogenesis of Coronary Artery Disease*. McGraw Hill, N.Y. (1969). Stamler, op. cit.

12. Louis, W.J., Doyle, A.E. and Anavekar, S.: "Plasma norepinephrine levels in essential hypertension." *N. Engl. J. Med. 288*:599-601 (1973). Shanberg, S.M., Stone, R.A., Kirshner, N., Gunnells, J.C., Robinson R.R.: "Plasma dopamine B-hydroxylase: a possible aid in the study and evolution of hypertension." *Science 183*:523-523 (1974).

13. Epstein, F.H. and Eckoff, R.D. "The epidemiology of high blood pressure — geographical distribution and etiological factors." in Stamler, J., Stamler, R. and T. Pullman (eds.): *The Epidemiology of Hypertension*. Grune and Stratton, N.Y. (1967). See also Harburg *et al* cited in note 31.

14. Abrahams, D.G., Alele, C.A., and Barnard, B.G.: "The systemic blood pressure in a rural West African community." *W. Afr. Med. J. 9*:45 (1960). Moser, M., Harris, M. Pugatch, O., Ferber, A., and Gordon, D.: "Epidemiology of hypertension. II. Studies of blood pressure in Liberia." *Am. J. Cardio. 10*:424-431 (1962).

15. Epstein and Eckoff, op. cit. Elizabeth Marshall Thomas (*The Harmless People*), Random House, New York (1959) notes that the Kung Bushmen of the African Kalahari Desert salt their food heavily. Yet, these people have among the lowest blood pressure in the world: Kaminer, B. and Lutz, W.P.W.: "Blood pressure in Bushmen of the Kalahari Desert." *Circulation, 22*:289-295 (1960). Stamler (op. cit.) also notes a lack of correlation between dietary sodium and blood pressure.

16. Friedman, M., Rosenman, R.H. and Carrol, V.:

"Changes in the serum cholesterol and blood clotting time in men subjected to cyclic variation of occupational stress." *Circulation, 17*:825-861 (1958).

17. Jenkins, C.D.: "Psychologic and Social Precursors of Coronary Disease." *New England Journal of Medicine*, 284: 244-255 and 307-317 (1971). For a popular account, see *Type A Behavior and Your Heart* by Meyer Friedman and Ray H. Rosenman published by Alfred A. Knopf, New York (1974).

18. Jenkins, ibid. The other major factors pursued in the literature to account for the rise of coronary heart disease death rates are the rise of saturated fat consumption in the twentieth century, increased pollution, and the massive increase in cigarette smoking. The relation between dietary saturated fat and cholesterol and blood cholesterol levels is not consistent in different reports; preventive campaigns operating largely through reducing dietary intake of these two substances have had to drastically reduce them in order to obtain rather small improvements in heart attack risks. See, for instance, the studies reviewed in Stamler, *Preventive Cardiology*. Pollution might presumably operate through the effect of carbon monoxide on the oxygen-carrying capacity of the blood, though some workers have implicated sulfur dioxide as well. As we point out in our section on historical epidemiology, general environmental pollution cannot account for the actual pattern of movement of the age-specific death rates; therefore, this is also likely to be a minor factor. The physiological mechanism by which smoking influences heart disease may either be direct — via carbon monoxide, which occurs at high concentrations in cigarette smoke — or indirect — via the effects of nicotine as a source of sympathetic arousal. The studies which have favored smoking as the prime risk factor for heart attacks attribute at most one-half of the elevation (for instance, the urban-rural difference) to smoking. Unlike general pollution, smoking practices *can* account for the movement of age-specific death rates, particularly the marked elevation of death risks beginning at labor market entry ages, when comparing males and females, urban and rural, or a country over time. This is due to the fact that most people start smoking as teenagers and become addicted at that point. Smoking may well not be an independent variable, however. The studies of smoking point out that it overlaps mighly with other stress responses — for instance, almost all heavy drinkers are also smokers. Smoking is more prevalent in the cities, especially historically; and a person with the coronary prone behavior style is much more likely to be a smoker as well. See the references cited in footnote 27.

19. Friedman, M., op. cit.

20. Moriyama, et al., op. cit.

21. For a review of the pathogenesis and epidemiology of ulcers see: *Harrison's Principles of Internal Medicine*. Wintrobe, M.M., Lorn, G.W., Adams, R.D., Bennett, I.L., Jr., Braunwald, E., Isselbacher, K.J., and Petersdorf, R.G. (eds.) McGraw-Hill, N.Y. (1970); *Advances in Psychosomatic Medicine & Duodenal Ulcer* (1971). For the role of psychological factors in the experimental production of ulcers in animals, see Weiss, J.M.: "Psychological factors in Stress and Disease." *Sci. Am.* June (1972) pp. 104-113. Weiss produces ulcers in rats by giving them unavoidable tail shocks. When the rats can control the situation by pressing a bar to prevent the shock, ulcers are reduced. Ulcers are further reduced if a light goes on telling the rat that it has prevented the shock. However, if the rate at which the rats must respond is set very high, then neither the ability to respond, nor the feedback will prevent the ulcers.

22. Mason, op. cit.

23. Selye, op. cit.; Mason, op. cit.

24. One piece of evidence along these lines is offered by Meyer, L.J. and Haggerty, R.J.: "Strep Infections in Families," *Pedr. 29*:539-49 (1962). They found a higher frequency of streptococcal infection in families under chronic stress than in controls, and that illness followed major stresses (divorce, death, job loss) four times as often as it preceded them. The connections between stress, physiological alterations, and reduced immunity leading to infectious illness have been sketched out. Seligman (see references below) has shown that animals and humans confronted with situations that subject them to continual frustration, from which they cannot escape, first pass through a phase of hyperactivity, then engage in compulsive, stereotyped behavior, and finally end up in a kind of withdrawn depression, called "learned helplessness". Schmale and Engel have described this final state as a "giving up-given up" complex, and show that it reliably precedes the onset of many different kinds of illness, particularly upper respiratory infections (TB, flu, colds). Jacobs describes this situation as one of role failure, and again demonstrates that it precedes upper respiratory infections. Weiss has demonstrated that a situation similar to Seligman's is optimal for the generation of ulcers; and it may be the key precipitating situation in heart attacks (see note 10). Mason has shown that the level of cortisol in the body in people confronting stressful situations is directly proportional to the degree to which they have developed a psychological state very similar to "learned helplessness". This work parallels the work with psychiatric patients demonstrating that cortisol levels are greatly elevated in depression, in some cases equalling levels reached in Cushing's syndrome. The depressive syndrome is the major psychic precursor of suicide, and suicide covaries with unemployment in the business cycle. Depressive mental illness varies strongly with unemployment as well. Given all these facts, it is not surprising that upper respiratory infectious disease, particularly influenza and pneumonia, vary regularly with the business cycle. See: Seligman, M.E.P., Maier, S.F., and Solomon, R.L.: "Unpredictable and Uncontrollable Aversive Events" in R.F. Brush ed. *Aversive Conditioning and Learning*, Academic Press, N.Y. (1971); Schmale, A.H.: "Giving Up as a Final Common Pathway to Changes in Health" *Advances in Psychosomatic Medicine* 8:20-40 (1972); Jacobs, M.A., Spilken, A., and Norman, M.: "Relationship of Life Change, Maladaptive Aggression, and Upper Respiratory Infection in Male College Students" *Psychosomatic Medicine* 31:31-43 (1969);_____. "Life Stress and Respiratory Illness" *Psychosom. Med* 32:233-242 (1970);_____: "Patterns of Maladaptive and Respiratory Illness" *J. Psychosom. Research* 66:63-72 (1971); Wolff, C.T., Friedman, S., Hofer, M., and Mason, J.: "Relationship Between Psychological Defenses and Mean Urinary 17-hydroxycorticosteroid Excretion Rates" *Psychosomatic Medicine* vol 27, no. 5, pp. 576-609 (1964); ed. Harold F. Himwich, *Biochemistry, Schizophrenias, and Affective Illnesses*, Williams and Wilkins, Baltimore (1970); Davies, B. Carroll, B., and Mowbray, R.: *Depressive Illness* Charles Thomas, Springfield Illinois (1972). Plasma adrenalin and noradrenalin levels are also elevated in depressed people (Wyatt, R.J., Portnoy, B., Kupfer, D.J., Snyder, F. and Engelman, K.: "Resting Plasma Catecholamine Concentrations in Patients with Depression and Anxiety" Arch. Gen. Psychiatry 24:65-70, (1971); Charlotte Silverman: *The*

Epidemiology of Depression (1968); M. Harvey Brenner: *Mental Illness and the Economy* Harvard University Press, Cambridge (1973) and reference 92.

25. Harris, J.E. and Sinkovics, J.G.: *The Immunology of Malignant Disease* (1970); Bernstein, I.O.: "Immunological Defenses Against Cancer" *J. Ped.* 83:906 (1973). For a recent review, see Marx, J.L.: "Tumor Immunology (1): The Host's Response to Cancer" *Science* 184:552 (1974). Bahnson, at the Eastern Pennsylvania Psychiatric Institute, has shown that tumor development is preceded by a syndrome very similar to Seligman's "learned helplessness"; see Psychophysiological Aspects of Cancer, ed. Edw. M. Weyer, *Annals of the New York Academy of Sciences*, vol. 125, Art. 3, pp. 773-1055 (1966). For more recent information on many biochemical measurements implicating stress responses in tumor proliferation, see "Second Conference on Psychophysiological Aspects of Cancer" *Annals of the New York Academy of Sciences*, vol. 164, pp. 307-634 (1969).

26. *Alcohol and Health*, a Report from the Secretary of HEW, Scribner's, New York (1972). See also the Midtown Manhattan study, cited in note 37, for a social-epidemiological sketch of the alcoholic and the social stresses acting on him.

27. Royal College of Physicians of London: *Smoking and Health Now*, Pitman, London (1971); Harold A. Kahn: "The Dorn Study of Smoking and Mortality Among U.S. Veterans: Report on 8-½ years of Observation", and E. Cuyler Hammond: "Smoking in Relation to Death Rates of One Million Men and Women", in National Cancer Institute Monograph 19, *Epidemiological Approaches to the Study of Cancer and Other Chronic Diseases* ed. William Haenszel, (1966). G.H. Hall and Cathleen F. Morrison show that nicotine addiction in rats develops proportional to the degree of stress to which the animal is exposed in an active avoidance learning paradigm ("New Evidence for a Relationship Between Tobacco Smoking, Nicotine Dependence, and Stress, *Nature* 243: 199 (1974)). Since so much work in the modern economy is performed essentially within an active avoidance framework (to avoid unemployment, demotion, migration, etc.), this provides a nice experimental link showing that addiction is a product of a stressful situation.

28. This mortality excess is probably not due to genetic factors The same divergence in death rates is found between *whites* differing in socioeconomic factors as the average black and white do. See Edward Banfield, *The Unheavenly City* (1970) on "the statistical Negro", also B.S. Dohrenwend, "Social Status and Stressful Life Events" in *Journal of Personality and Social Psychology* vol. 28, no. 2, pp. 225-235 (1973); and Harburg, E., Erfurt, J.C., Haunstein, L.S., Chape, C., Scholl, W.J., and Schork, M.A.: "Socio-ecological Stress, Suppressed Hostility, Skin Color, and Black-White Male Blood Pressure: Detroit", in *Psychosom. Med.* 35: 276-296 (1973). The last paper shows that whites having the same conditions of social stress as Negroes have similar blood pressures.

29. For a thorough review of this literature, see R.M. Factor: "Life Events and Illness: A critical review of the literature and a research proposal" Biology Department, University of Pennsylvania, mimeo. (1973). Alvin Toffler's *Future Shock* (1970) is a popular account incorporating much of this work. For insight into the personal impacts of migration, see Fried, M.: "Grieving for a Lost Home" in Duhl, L.J. (ed.) *The Urban Condition*, Basic Books, N.Y. (1963).

30. Mortality from selected causes by marital status, U.S. Parts A. and B. Series 20, numbers 8a, 8b. National Center for Health Statistics.

31. This of course is Durkheim's argument (*Suicide* (1951)) extended to all causes of death, as his plan indeed sketched but never realized. See Emile Durkheim, *Rules of the Sociological Method* (N.Y., 1938). Walter R. Gove, "Sex, Marital Status and Mortality", in the American Journal of Sociology vol. 79, no. 1, p. 45 (1973), has shown that a selection argument cannot account for the marital differential in mortality.

On the other hand, Karen Renne ("Health and Marital Experience in an Urban Population", *Journal of Marriage and the Family*, May 1971, p. 338) has shown that the unhappily married suffer more illness than the happily remarried after divorce. These statistics should not be taken to imply that the nuclear family is the lowest stress condition, especially since it results from the *breakup* of wider communal and kin institutions, which are statistically associated, in cross-cultural comparisons, with even lower morbidity and mortality from stress related causes (see our section on hunter-gatherers). Marriage is simply the most widespread form of stable community in our society.

32. Rees, W.D. and Lutkins, S.G. Mortality of bereavement. *Brit. J. Med.*, 4: 13-16 (1967).

33. Parkes, C.M., Benjamin, B. and Fitzgerald, R.G., Broken heart: a statistical study of increased mortality among widowers. *Brit. Med. J.* 1: 740-743 (1969).

34. Jenkins, op. cit.

35. Goldsmith, F.R., Effects of air pollution on human health. In: A.C. Stern (ed.) *Air Pollution*, Vol. 1 (1968). Academic Press, N.Y. Haenszel, W., Loveland, D.B., and Sirken, M.G.: "Lung Cancer Mortality as Related to Residence and Smoking Histories", *J. Nat. Cancer Inst.* 28: 447-1001 (1962).

36. Cassel: *J. Occup. Med.* 5: 185-190 (1963).

37. This point has been extensively developed in the social epidemiology of mental illness. See Hollingshead, A.B., and Redlich, F.C. *Social Class and Mental Illness*: A Community Study (1958); Srole, L. and Langner, T.S. *Mental Health in the Metropolis — The Midtown Manhattan Study* (Free Press, 1962); and Langner, T.S. and Michael, S.T. *Life Stress and Mental Health: The Midtown Manhattan Study* (Free Press, 1963). More recent work demonstrating that social stresses and their mental illness effects are higher for the lower social classes is summarized in Bruce P. and Barbara S. Dohrenwend: *Social Status and Psychological Disorder* (Wiley, 1969), and Barbara S. Dohrenwend "Social Status and Stressful Life Events", in the *Journal of Personality and Social Psychology* (1973) vol. 28, no. 2, pages 225-235. For analysis of mortality differences by social class, see Antonovsky, A.: "Social Class, Life Expectancy and Overall Mortality", in *Patients, Physicians and Illness*, ed. E. Gartly Jaco, Free Press, New York (1972); Kosa, J., Antonovsky, A. and Zola, I.K. (eds.): *Poverty and Health, A Sociological Analysis*, Harvard University Press, Cambridge (1969); Kitagawa, E.M. and Hauser, P.M.: *Differential Mortality in the United States*, APHA, Harvard University Press, Cambridge (1973).

38. Lee, R.B. and Devore, I. *Man the Hunter*. Aldine Publ. Co., Chicago (1968). Sahlins, M. *Stone Age Economics*. (1972). For a classic critique of Hobbes' view, see Ferdinand Toennies, *On Sociology: Pure, Applied and Empirical* (Chicago, 1971) esp. p. 48.

39. Lee, R.B. Chapter 4 in: Lee and DeVore, op. cit. Thomas, E.M. *The Harmless People*, Knopf, New York, 1959.

40. Woodburn, J. Chapters 5, 11 in: Lee and Devore, op. cit.

41. Draper, P. Crowding among hunter-gatherers: the Kung Bushmen. *Science 182*: 301-303 (1973). Draper observed that children spend 50 percent of their play time in actual physical contact with each other.

42. Salvador Minuchin, in *Families and Family Therapy*, Harvard University Press, Cambridge (1973), shows how the burden of stresses on the kin network increases as the extended family is destroyed and the nuclear family becomes the major form of community. Ross Speck and Carolyn Attneave (*Family Networks*, Pantheon, New York (1973)) provide a sociological perspective on this transformation, as well as means of recreating vital community forms within modern society.

43. Kaminer and Lutz, op. cit.

44. See for instance Elman R. Service: *Primitive Social Organization*, Random House, New York (1971). See also the summary of this transition in I. Waldron and R. Ricklefs, *Environment and Population*, Holt, Rinehart and Winston, New York (1973), pages 155-60, and Ester Boserup: *Conditions of Agricultural Growth*, Aldine, Chicago (1965), which describe the sizeable increase in manpower inputs required to increase yield per acre. The hierarchical, militarized nature of class societies based on agriculture may well be related to the force required to extract this additional labor per person. Toynbee (*Study of History*) follows Gordon Childe in hypothesizing that intensive agriculture was only undertaken because major climatic changes made it a condition of survival.

45. For detailed discussion contrasting traditional peasant society with modern capitalist society, see Ferdinand Toennies: *Community and Society*, tr. Charles P. Loomis, Harper, New York (1957); Anton C. Zijderveld: *The Abstract Society*, New York (1971); Robert Redfield: *The Primitive World and its Transformations*, Cornell Press, New York (1953); Emile Durkheim: *The Division of Labor in Society*, tr. Simpson, Glencoe, Illinois (1933). For an account of this transformation in England, see Peter Laslett: *The World We Have Lost. England Before the Industrial Age*, Scribner's New York (1965).

46. Waldron, I. and Ricklefs, R.L., *Environment and Population*. Holt, Rinehart, and Winston (1973).

47. Mandel, E. *Marxist Economic Theory*. Vol. I. Monthly Review Press, New York, 1968, p. 135, 148.

48. Pirenne, H.: *Economic History of Europe*, Harcourt, Brace, New York (1937); Weber, M.: *General Economic History*, Collier, New York (1961); Bloch, M.:, *Feudal Society*, Chicago Univ. Press, Chicago (1964); Blum, J.: *Lord and Peasant in Russia*, New York (1964); Bennett, H.S.: *Life on the English Manor*, Cambridge (1962).

49. Wittfogel, K.A.: *Oriental Despotism*, Yale University Press, New Haven (1957).

50. Joseph A. Schumpeter (*Capitalism, Socialism and Democracy*, Harper and Row, New York (1950)) describes the "gales of creative destruction" that sweep through capitalist society at an ever-accelerating pace, negating older techniques and human relations in all spheres of life. Alvin Toffler's *Future Shock* (op. cit.) describes the same phenomena; but where Schumpeter saw in this process an immense, burgeoning creativity, Toffler emphasizes the difficulty people have coping with it. Neither author imagines going beyond this kind of social process.

51. The classic description of this transformation is in vol. I of Marx's *Capital*, chapters 26-33. Also see J. Kuczynski: *The Rise of the Working Class*, World Universal Library, McGraw Hill, New York (1967), for a modern summary.

One byproduct of this molding of a flexible labor force that accompanies the destruction of the extended family is a breakup and decline of the nuclear family as well. This process reaches a peak from the 1890s to the 1930s in most developed countries, and is associated with a large decline in the birth rate, proportions of the population married, and large increases in marital breakup and divorce. These social changes can be seen both as a consequence of social stress and as contributing further to it. See Emile Durkheim: *Suicide*, tr. Simpson, Free Press of Glencoe, Glencoe, Illinois (1951), especially the sections on the protective effect (against suicide) of larger numbers of children in the family.

52. Toffler, A.: *Future Shock*. Random House, N.Y. (1970).

53. Lansing, J.B. and Mueller, E.B.: *The Geographic Mobility of Labor*. Survey Research Center, Institute for Social Research, Univ. of Michigan, Ann Arbor (1967).

54. Blauner, R.: *Alienation and Freedom: The factory worker and his industry*. U. Chicago Press, Chicago, (1964). *Work in America*. Report of a special task force to the Secretary of Health, Education and Welfare. M.I.T. Press, Cambridge (1973).

55. Easterlin, R.A.: *Population, Labor Force and Long Swings in Economic Growth*. Columbia University Press, New York (1968).

56. This is spelled out particularly clearly in Sennett, R. and Cobb, J.: *Hidden Injuries of Class*, Random House, New York (1972).

57. Max Weber: *The Protestant Ethic and the Rise of Capitalism*, Scribner's, New York (1957); David Riesman: *The Lonely Crowd*, Yale University Press, New Haven (1971); D. McClelland: *The Achieving Society*, New York (1961); Michel Foucault: *Madness and Civilization*, Random House, New York (1965); Herbert Marcuse: *One Dimensional Man*, Beacon Press, Boston (1964).

58. Chinoy, E.: *Automobile Workers and the American Dream*. Doubleday and Co. N.Y. (1955). See also: Cobb and Sennett, op. cit.

59. Gurr reviews studies which show that the seemingly limitless material commodity aspirations of modern man do not occur in other peoples until the traditional communal institutions are shattered. Just as the breakup of community is the source of wage workers, it is also the source of commodity consumers. Gurr, T.R.: *Why Men Rebel*, Princeton University Press, Princeton (1970).

60. Slater, P.: *The Pursuit of Loneliness*. Beacon Press, Boston (1970).

61. See for example: Castelnuovo — Tedesco, P.: "Emotional antecedents of perforation of ulcers of the stomach and duodenum." *Psychosomatic Medicine*, 24: 398-416 (1962).

62. Langner and Michael, op. cit., Dohrenwend, B.P. and Dohrenwend, B.S.: *Social Status and Psychological Disorder*. New York (1969).

63. Hendin, H.: *Suicide and Scandinavia*, Grune and Stratton, New York (1964).

64. For a more detailed analysis of these regional and urban-rural death rate patterns in the United States, see Dodge and Martin, op. cit. Essentially they demonstrate that higher stress death rates are correlated, regionally, with greater family breakup, greater migration, increased female labor force participation and greater occupational differentiation.

65. Goldsmith, op. cit.; Lave, P. and Seskin, E.P.: "Air pollution and human health," *Science*, 169: 723-733 (1970).

66. Meriyama, I.M. and Guralnick, L.: "Occupational and social class differences in mortality." In: *Trends and Differ-*

entials in Mortality: Papers Presented at the 1955 Annual Conference of the Millbank Memorial Fund. Millbank Memorial Fund, New York (1956), pp. 61-73. Tuckman, J., Youngman, W.F., and Kreizman, G.B.: "Occupational level and mortality." *Social Forces*, 43: 575-577 (1965).

67. Factor, R.M. and Waldron, I.: "Contemporary population densities and human health." *Nature*, 243: 381-384 (1973).

68. The rise of suicide with development has been extensively documented by Durkheim (*Suicide*) The relation between homicide and social disruption, such as occurs with development, has been documented by Gurr (*Why Men Rebel*). F. Henry and J.F. Short: *Suicide and Homicide*, Free Press of Glencoe, London (1954) show that in contemporary regional comparisons within developed countries, metropolitan areas have high suicide rates and low homicide rates, while disrupted rural areas have high homicide rates and low suicide rates.

69. France and Sweden are the two modern countries for which accurate death rate statistics exist for the whole transition from stable agriculture to urbanized, industrialized society. Both sets of data show the features outlined here: see Keyfitz, N. and Flieger, W.: *World Population: An analysis of vital data*, University of Chicago Press, Chicago (1968), and Bourgeois-Pichat, J.: "The General Development of the Population of France Since the Eighteenth Century", in Glass, D.V. and Eversley, D.E.C. (eds.): *Population in History*, Arnold, London (1965).

70. The labor market entry hump is typically largest at the point in a country's development when the breakdown of marriage is most extensive (largest proportion never married, separated), the proportion of the population affected by unemployment is the largest, and migration rates highest. This point came between 1890 and 1940 for many developed countries. These countries may now be entering a new phase of increased stress: see our section on rising death rates for young people over the last two decades.

71. See *Demographic Yearbooks*, data for Thailand, Taiwan, Rumania and Costa Rica.

72. See footnote 24. Also Rene Dubos: *Man Adapting*, Yale University Press, New Haven (1965).

73. Enterline, P.E.: "Causes of Death Responsible for Recent Increases in Sex Mortality Differentials in the United States." *Milbank Memorial Fund Quarterly* 39: 312 (1961); Leading Components of Upturn of Mortality for Men, United States 1952-67, op. cit.; Johnston, S. and Waldron, I.: "Why Women Live Longer Than Men" *Social Science and Medicine*, *10*: 349-362 (1976). It is frequently suggested when a sex differential is found for a particular disease that women are favored by the protective effects of estrogens. The suggestion is hard to sustain when one sees that the differential exists for such a wide variety of causes. Furthermore, there are examples of historical reversals in the ratio: ulcers were more common for women during the Victorian era but are now more common for men (*Adv. in Psychsomatic Medicine* Vol. 6, op. cit.).

74. Glazier, W.H., "The Task of Medicine." *Sci. Am.* 228, number 4, pp. 13-17 (1973).

75. Morbidity statistics parallel this pattern: the prevalence of ulcers has increased dramatically in the young age groups while changing hardly at all at older ages. See the data from the Health Examination Survey summarized in Mendeloff, A.I. and Dunn, J.P.: *Digestive Diseases*, APHA, Harvard University Press, Cambridge, Mass. (1971), p. 15.

76. For a thorough analysis of changes in male-female mortality differentials in the 20th century, see Johnston and Waldron, op. cit. The brief treatment in our text concentrates on male death rate changes, and ignores the important effects of changing marriage and rising labor force participation and unemployment on female death rates.

77. This data is in Kramer, M.S., Pollack, E.S., Redick, R.W. and Locke, B.Z.: *Mental Disorders-Suicide*, APHA, Harvard University Press, Cambridge, (1972).

78. National Center for Health Statistics: Natality Statistics Analysis; United States 1965-67. *Vital and Health Statistics*, Series 21, no. 19 (1970).

79. Brown, W.J., Donohue, J.F., Axnick, N.W., Blount, J.H., Jones, O.G., and Ewen, N.H.: *Syphilis and Other Venereal Diseases*, APHA, Harvard University Press, Cambridge (1971); American Social Health Association: *Today's VD Control Problem, 1971* (1971).

80. Data from U.S. Bureau of the Census; *Current Population Reports*, Series P-20, 1961-73.

81. Alcohol and Health, op. cit., chapter II shows that drinking peaks at ages 15-30 in recent surveys. Severe problems with alcohol occur at the highest rates in lower class men, residents of cities, rural-urban migrants, people who come from broken homes, or who are currently separated or divorced, and in recent surveys, men under 25.

82. *Vital Statistics of the United States* 1961-68; see also Monthly Vital Statistics Report, various issues 1969-1974 for estimates of the more recent data. The problem of classification for suicide deaths has increased enormously in the 1960s and early 1970s. Many drug deaths, currently classified under "other accidents" are probably suicides; and a large proportion of the rise of "symptoms, senility, and ill defined conditions" may be suicide.

83. Contrast the small cyclic swings in Durkheim's data with the massive movements of suicide rates since 1933; also see fig. 6.

84. The elimination of the family farm will be complete by the end of the 1970s; at present, less than 5 percent of the workforce is on farms. The maximal numbers entering the labor market (at average age 19) will come 1977-81. Thereafter, numbers entering will successively decline until about 2000. A renewed "small cohort" effect can be expected in this period if there is no prolonged depression, or if foreign immigration is not allowed to rise to fill out the cohort size.

85. This is the "labor market segmentation" about which so much has been written. See, for example, Gordon, D.M.: *Theories of Poverty and Unemployment*, Lexington Books, Lexington, Mass. (1972);_____, ed.: *Problems In Political Economy*: An Urban Perspective, Heath, Lexington, Mass. (1971); and the *Monthly Labor Review*, many articles since 1965.

86. For a full description, see F. Piven and R. Cloward: *Regulating the Poor: The Functions of Public Welfare*, Vintage, New York (1971). The repeated process of neighborhood destruction in urban growth is effectively put in historical perspective in Banfield's *Unheavenly City*; this book is particularly clear in specifying the economic *necessity*, under capitalism, of the destruction process. For a picture of a settled ethnic neighborhood before disruption, see H. Gans: *The Urban Villagers*, Free Press, New York (1962); the impact of neighborhood destruction ("urban renewal") on this same community is described in Fried, "Grieving for a Lost Home".

87. See the income distribution data collected by Merriam in eds. Sheldon and Moore, *Indicators of Social Change*, Russell Sage Foundation (1968).

88. R.A. Easterlin: "Relative Economic Status and the American Fertility Swing" in *Social Structure, Family Life, and Economic Behavior*, ed. E. Sheldon, Lippincott, Phila. (1972).

89. See Jencks, C.: *Inequality: A Reassessment of the Effect of Family and Schooling in America*. Basic Books, New York (1972), especially chapter 7; and *Digest of Educational Statistics*, 1973 ed., U.S. Dept. of HEW, Office of Education, table 21. Corresponding to these shifts, students have become more pessimistic about their futures and feel greater conflict between self-realization and the pressures of performance in academic tasks. See Waldron and Eyer, op. cit. Bowles argues that, as college students become an ever larger proportion of the labor force, they are increasingly forced to accept jobs that do not allow the independence and initiative which a college graduate could previously expect in a job. A relatively low status job compared to education is a type of status inconsistency, and status inconsistency has been shown to be associated with poor health. See Graham, S. and Reeder, L: Social Factors in Chronic Diseases, in Freeman, H., Levine, S., Reeder, L., eds.: *Handbook of Medical Sociology*, 2nd ed., Prentice Hall, Englewood Cliffs, N.J. (1972) and Dodge and Martin, op. cit.

90. Goldhaber, S.: Medical School Admissions: "A Raw Deal for Applicants", *Science* 177: 332 (1972).

91. Braverman, H., *Labor and Monopoly Capital*. Monthly Review Press, NY (1974).

92. Eyer, J.: "Prosperity as a Cause of Death" *International Journal of Health Services* 7 (1) 125-150 (1977).

93. Braverman, op. cit.

94. Maugh, T.H. II: "Narcotics Antagonists: The Search Accelerates" *Science* 177: 249 (1972). Lennard, H.L., Epstein, L.J., and Rosenthal, M.S.: "The Methadone Illusion" *Science* 176: 881 (1972).

95. Katz, R.L.: "Drug Therapy. Sedatives and Tranquilizers.", *New England Journal of Medicine* 286: 757 (1972). Crane, G.E.: "Clinical Pharmacology in its 20th Year" *Science* 181: 124 (1973).

96. Sroufe, L.A., Stewart, M.A.: "Treating Children with Stimulant Drugs" *New England Journal of Medicine* 289: 407 (1973).

97. Breggin, P.: "The Return of Lobotomy and Psychosurgery" *Congressional Record* vol. 118, no. 26 (1972); Valenstein, E.: *Brain Control: A Critical Examination of Brain Stimulation and Psychosurgery*. Wiley, N.Y. (1973).

98. Waldron, I.: "Increased Prescribing of Valium, Librium, and Other Drugs — An Example of the Influence of Economic and Social Factos on the Practice of Medicine" *International Journal of Health Services* 7(1): 37-62 (1977).

99. Kramer, op. cit.

100. For regional distribution of the age-specific death rate, see the summary in Gibbs and Martin, op. cit., and the recent data in *Vital Statistics of the United States*. For the regional distribution of medical facilities, see the summary in Lewis, I.: "Government Investment in Health Care", *Scientific American*, vol. 224, no. 4, p. 17, (1971).

101. See the study described in Feldstein, Martin S. "The Medical Economy", *Scientific American*, vol. 229, no. 3, page 151 (1973). This issue of *Scientific American* contains many other useful articles on health care delivery organization.

102. For example, in Philadelphia the infant mortality rate in the worst ghetto, North Philadelphia, health district 5, has gone from 40.7 to 35.5, 1963-72, while in district 10, a middle-class area, from 15.4 to 9.2. At ages 25-34, the death rates per 100,000 population in district 5 went from 30.0 to 56.5, 1963-70, and in district 10, from around 7 to 8.2. The poor districts also had the greatest rise of reportable infectious diseases. The data for 1963 were conservatively estimated from the crude rates and age distributions given in *Philadelphia Statistical Report*, 1963. The actual divergence is probably wider than this, since the really suburban parts of Philadelphia are outside the city limits. Comparable data have proved difficult to collect in these areas. See note 1 also.

103. This is not to say that *some* high technology practices do not reduce death rates. However, with statistics such as have been cited, it is obvious that the vast majority of resources in medicine are misdirected.

104. cf. footnote 24

105. To the extent that the patient is increasingly viewed as a multifaceted machine to be manipulated by one system specialist after another, and to the extent that the high technology medical centers completely ignore the social context from which a person comes in with sickness ("that's not a medical problem"), the major role of premodern doctoring has been lost: to relax the patient and enable them to overcome the contradictions in their lives which lead to sickness (e.g. Frank, Kiev, Watts). An interesting example of this loss occurs in coronary intensive care units. The restrictions on social contact that modern medicine makes necessary routinely drive people psychotic on these wards, for which they are treated with the major tranquilizers. Mather et. al. have shown that coronary patients in the hospital have somewhat higher mortality than matched patients cared for at home, where communal contacts are maintained.

The role of healer has been partly taken over by the rise of psychiatry as a medical specialty (Rieff), but this is a small and expensive compensation for the massive loss of healers in the community in the 19th century, with the establishment of doctoring (e.g. Ehrenreich and English). A significant component of the rise of stress death rates is probably due to this net loss of healing power in communities. See Frank, J.: *Persuasion and Healing*, Schocken Books, New York (1961); Watts, A.: *Psychotherapy East and West*, Ballantine, New York (1961); Kiev, A.: *Curanderismo*, Free Press, New York (1968); Ehrenreich, B. and English, D.: *Witches, Midwives and Nurses:* A History of Woman Healers, Glass Mountain Pamphlets, Oyster Bay, N.Y. (n.d.); Mather, H. et. al.: "Acute Myocardial Infarction: Home and Hospital Treatment", *British Medical Journal* 7 August 1971, p. 334; Rieff, P.: *Triumph of the Therapeutic*, Harper and Row, New York (1966).

106. See for instance, Dollard, J. and Miller, N.: *Personality and Psychotherapy*, McGraw-Hill, New York (1950); Miller, N.: "Learning of Visceral and Glandular Responses", *Science 163*: 434 (1969). Shapiro, D., Tursky, B., Gershon, E. and Stern, M.: "Effects of Feedback and Reinforcement on the Control of Human Systolic Blood Pressure" *Science 163*: 588 (1969); Benson, H. Shapiro, D., Tursky, B. and Schwartz, G.: "Decreased Systolic Blood Pressure Through Operant Conditioning Techniques In Patients with Essential Hypertension" *Science 127*: 740 (1972); Weiss, T. and Engel, B.: "Operant Conditioning of Heart Rate in Patients with Premature Ventricular Contractions" *Psychosomatic Medicine*, 33: 361 (1971). Stunkard, A. and McLaren-Hume, M.: "The Results of Treatment of Obesity: A review of the literature and a report of a series. *Arch. Int. Med.* 103: 79-85 (1959); Stunkard, A.: "From Explanation to Action in Psychosomatic Medicine: The Case of Obesity." *Psychosomatic Medicine 37* (3): 195-236

(1975); Keutzer, C., Lichtenstein, E., Mees, H.: "Modification of Smoking Behavior: A Review." *Psychol Bulletin, 70*: 520-533, 1968; Bernstein, D. "Modification of Smoking Behavior: An Evaluative Review." *Psychol. Bulletin, 71*: 418-440 (1969).

107. Wallace, R.: "Physiological Effects of Transcendental Meditation", *Science 167*: 1751 (1970): Forem, J.: *Transcendental Meditation*. Dutton, New York (1974); Wallace, R.: *The Physiological Effects of Transcendental Meditation*. A Proposed Fourth Major State of Consciousness, Students' International Meditation Society, Los Angeles (1970); Wallace, R. (ed.): *Scientific Research on Transcendental Meditation*, MIU Press, Los Angeles (1972).

108. Lieberman, M., Yalom, I., and Miles, M.: *Encounter Groups: First Facts*. Basic Books, New York (1973); Rogers, C.: *Encounter Groups*. Harper and Row, New York (1970).

109. Berne, E.: *Games People Play*. Grove Press, New York (1964); _____: *What Do You Say After You Say Hello?* Grove Press, New York (1972). Steiner, Claude: *Games Alcoholics Play*, Grove Press, NY. (1971).

110. Azrin, N. and Ayllon, T.: *The Token Economy: A Motivational System for Therapy and Rehabilitation*. New York (1970).

111. Goffman, E.: *Asylums*. New York (1961).

112. Speck, R., and Attneave, C.: *Family Networks*. Pantheon, New York (1973).

113. Speck and Attneave, op. cit.; Minuchin, S.: *Families and Family Therapy*. Harvard University Press, Cambridge (1974); Haley, J.: *Changing Families, A Family Therapy Reader*. Grune and Stratton, New York (1971).

114. Haley, J.: *Uncommon Therapy*. Ballantine, New York (1973); _____: (ed.): *Advanced Techniques of Hypnosis and Therapy: Selected Papers of Milton H. Erickson, M.D.* Grune and Stratton, New York (1967).

115. cf. Lieberman, et. al., op. cit.

116. Minuchin, S., Baker, L., Rosman, B., Liebanán, R., Milman, L., and Todd, T.: "A Conceptual Model of Psychosomatic Illness in Children: Family Organization and Family Therapy." *Archives of General Psychiatry 32*: 1031-8 (1975).

117. A beautifully painstaking description of this process is in Esterson, A.: *The Leaves of Spring*. Tavistock Publications, London (1970).

118. For a description of these three stages of acculturation among Italian immigrants, see Lopreato, J.: *Italian Americans*. Random House, New York (1970); among other immigrants, Glazer, N. and Moynihan, D.: *Beyond the Melting Pot*. MIT Press, Cambridge (1963).

119. Gabriel Kolko: *Wealth and Power in America*. Praeger, New York (1962), has demonstrated that the pyramidal dimensions of income and power distribution have remained the same in America since 1913. This theme is a commonplace among students of poverty and social power, such as Domhoff, Parker, Mills, Baltzell, Gordon. The classic is Sorokin's *Social and Cultural Mobility* (The Free Press, New York (1959)), which collects the evidence that in all class societies the pyramidal distribution of social power has been of similar dimensions. Preclass societies (hunter-gatherers) lack such pyramidal organization: see for instance Elman Service, op. cit. or Lee and Devore, op. cit. The latter volume reviews the evidence on all hunter-gatherers alive today. Therefore it is difficult to conclude that class hierarchy is an *innate* characteristic of man; after all, over 99 percent of humanity's history has been as hunter-gatherers, and our genetic traits are still hunter-gatherer traits. For discussion of the stability of the pyramid and associated social effects, see Banfield, op. cit., and Young and Wilmott, op. cit.

120. See Dumont, M.: *The Absurd Healer, Perspectives of a Community Psychiatrist*. Viking Press, New York (1968); Kolb, L., Bernard, V., and Dohrenwend, B. (eds.): *Urban Challenges to Psychiatry*. Little Brown, Boston (1969).

121. McClelland, op. cit.

122. For a brief description, see the report by Calvin Trillin, p. 74 in the *New Yorker*, Mar. 13, 1965.

123. Kolb, *et. al.*, op. cit.

124. For example, the data for Germany show a long rise of the suicide rate up to the peak just before the first world war, followed by a large decrease as the war gets under way, and a massive decline in the postwar period of popular uprisings and ruling class division, 1918-1923. Subsequently, during the recovery of German capitalism in the late 1920s, the suicide rate rises above its previous historical peak and remains at that level through the Nazi period. Source: *Statistical Abstracts for Germany, 1900-1942*.

125. *Disease, Life and Man, Selected Essays by Rudolf Virchow*, tr. H. Rather, Stanford University Press, Stanford (1958).