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THE ECONOMICS OF POPULATION AND FOOD SUPPLIES

I. ECONOMIC PROBLEMS OF POPULATION CHANGE

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FOR practical purposes, too much of the work done on the economic problems of population is dominated by points of view that lie at opposite poles. At one extreme the optimum population theorists treat the subject as if the major problem were that of deciding on the number of people needed to maximize *per capita* income, or some other goal of their choice. This work is done, or proposed, almost as if the essential questions would be solved once such a number were ascertained. Problems of transition are neglected as if they did not exist—as if numbers could be changed at will and without repercussions on the economy and society. The abstraction is a dangerous one. It neglects the fact that the nature of the social-economic changes selected to achieve the desired population size partly determines the population size that is desirable. Processes of population change are neither completely flexible nor frictionless.

The opposite extreme is equally unfortunate. It tends to treat population growth as following an established and predictable course. In this view, which is usually implicit rather than explicit, all that is necessary is to extract a prediction from some authority, and then set about the problems of meeting the economic needs of the predicted population—set about it, that is, on paper, not in fact. This procedure also suffers from a fatal defect. There is no immutable course of population growth that can be forecast. Future trends will depend on many things, important among which will be the nature of the steps taken to meet the economic problems of population growth. The nature of the economic changes ahead will be quite as important in determining the size of the population as will the nature of the population growth in determining the magnitude of the economic problems.

One extreme overlooks the processes of population change, and the other treats them as independent of the situation in which they arise. Both fail, therefore, to focus attention on the major questions

which are those of the interrelated processes of social, economic, and demographic evolution. The result has been a good deal of rather idle speculation. There is not very much point, for example, in finding the extent to which India or China is 'overpopulated' when the avoidance of continuing population increase would apparently involve a catastrophic loss of life.

Those who treat population change as independent of its social-economic setting have contributed even more to the confusion in matters of food and population. Will mankind's numbers eventually outrun the possibility of obtaining a minimum adequate supply of food, minerals, and energy? This question of ultimate carrying capacity is meaningful only in a very restricted way. Any reasonable consideration of the subject will show that the highest conceivable limit would be reached if growth, even at current rates, were to continue for any span of time that could be considered significantly long in the history of the human race. The point is important because it establishes a principle. Growth must stop sometime, and it must do so either by a reduction of the birth-rate or by an increase of the death-rate. If man covets low death-rates in the future, as he always has in the past, he must eventually reduce birth-rates. The principle established, however, the question becomes one of means and timing, and the real problems are those of process.

Difficulties also arise when the analysis relates to the needs of a predicted population in the near future. By disregarding the social and economic processes involved we can think almost exclusively in engineering and scientific terms. We can talk about the marvels of science and technology as if there were no intervening terms. In a word, we can forget that we are social scientists who should know that both the application of new knowledge and the processes of new discovery depend on social settings that have been infrequently present in the world. We forget that we already know much more than we apply, and that we shall not see science and technology smoothly applied in some never-never land of economic, social, and political vacuum. There is great danger that social, economic, and political difficulties will intervene to bring drastic checks to population increase long before the theoretical possibilities of advanced technology are exhausted. It is in this sense that the problems of social-economic organization and change, rather than those of technology, seem the important ones.

This is the thesis, and a warning of the bias with which my paper proceeds. To make the case it will be necessary to see what we know of the processes of change, to find the major gaps in our knowledge,

and to ask the meaning of our knowledge and ignorance for research and action.

The European Setting

Europe and the industrial countries of the New World furnish us with the most important information. They provide the longest statistical record, and they have gone furthest in the transition toward a balance of low birth- and death-rates. An understanding of their experience gives us considerable information about the kinds of processes likely to be found in other parts of the world as technological development gets under way.

First of all it must be recognized that Europe's population growth during the past three centuries was unique in the world's history. Her population multiplied fivefold, and the population of European extraction increased probably more than sevenfold throughout the world.[1] The major source of this increase was a reduction of mortality. The decline of the death-rate was gradual for a long time, as public order and the agricultural, commercial, and industrial revolutions lifted incomes, and as sanitary and medical knowledge advanced. In the late nineteenth century a precipitous decline in mortality got under way and has continued to the present with the virtual elimination of deaths from contagious and infectious diseases. The expectation of life at birth probably was below 35 years in the mid-sixteenth century. Today in advanced countries it is seldom below 65 years and it exceeds 70 years in the best modern experience.[2]

Meanwhile birth-rates remained generally unchanged until the last quarter of the nineteenth century.[3] Although they were lower than in Colonial America, or in the Orient today, they were high by present standards. Indeed, they had to be high. We may take it for granted that all populations surviving to the modern period in the face of inevitably high mortality had both the physiological capacity and the social organizations necessary to produce high birth-rates.

Peasant societies in Europe, and almost universally throughout the world, are organized in ways that bring strong pressures on their members to reproduce. The economic organization of relatively self-sufficient agrarian communities turns almost wholly about the family, and the perpetuation of the family is the main guarantee of support

[1] Dudley Kirk, *Europe's Population in the Interwar Years*, Geneva, League of Nations, 1946, p. 17.

[2] Louis I. Dublin, Alfred J. Lotka, and Mortimer Spiegelman, *Length of Life*, New York, The Ronald Press, 1949.

[3] A. M. Carr-Saunders, *World Population*, Oxford, The Clarendon Press, 1936, pp. 84–105.

and elemental security. When death-rates are high the individual's life is relatively insecure and unimportant. The individual's status in life tends to be that to which he is born. There is, therefore, rather little striving for advancement. Education is brief, and children begin their economic contributions early in life. In such societies, moreover, there is scant opportunity for women to achieve either economic support or personal prestige outside the roles of wife and mother, and women's economic functions are organized in ways that are compatible with continuous childbearing.

These arrangements, which stood the test of experience throughout the centuries of high mortality, are strongly supported by popular beliefs, formalized in religious doctrine, and enforced by community sanctions. They are deeply woven into the social fabric and are slow to change. Mortality dropped rather promptly in response to external changes because mankind has always coveted health. The decline of fertility, however, awaited the gradual obsolescence of age-old social and economic institutions and the emergence of a new ideal in matters of family size.

The new ideal of the small family arose typically in the urban industrial society. It is impossible to be precise about the various causal factors, but apparently many were important. Urban life stripped the family of many functions in production, consumption, recreation, and education. In factory employment the individual stood on his own accomplishments. The new mobility of young people and the anonymity of city life reduced the pressures toward traditional behaviour exerted by the family and community. In a period of rapidly developing technology new skills were needed, and new opportunities for individual advancement arose. Education and a rational point of view became increasingly important. As a consequence the cost of child-rearing grew and the possibilities for economic contributions by children declined. Falling death-rates at once increased the size of the family to be supported and lowered the inducements to have many births. Women, moreover, found new independence from household obligations and new economic roles less compatible with child-rearing.

Under these multiple pressures old ideals and beliefs began to weaken, and the new ideal of a small number of children gained strength. A trend toward birth restriction started in the urban upper classes and gradually moved down the social scale and out to the countryside. For the most part this restriction of childbearing was accomplished by the use of folk methods of contraception that have been widely known for centuries throughout the world. However,

they were not widely used until the incentive for birth restriction became strong. Later, presumably in response to the new demands, the modern and more efficient methods of contraception were developed and gained widespread acceptance.[1] By the middle nineteen-thirties birth-rates throughout the modern West had reached very low levels. The transition to an efficient recruitment of life on the basis of low birth-rates and low death-rates was virtually completed. Because the decline of the birth-rate lagged behind that of the death-rate, pending the reorientation of attitudes and beliefs about child-bearing, the transition produced an unparalleled period of population growth.

In brief, this is the standard interpretation of the demographic transition. There are other views but they will not stand close scrutiny. One of them is that modern technology has reduced reproductive capacity by producing better diets. This theory fails, among other things, to account for the finding that when the urban women of today do not practice contraception they conceive about as readily as their predecessors did two centuries ago.[2] Neither can the invention of modern contraceptive methods be thought of as the fundamental cause. The trend toward decline was well under way before modern methods had any appreciable importance.

The cases that do not fit easily into the standard interpretation are also important to an understanding of the decline in fertility. Birth-rates have declined outside the urban-industrial setting and, on occasion, have failed to decline in it. American birth-rates were dropping early in the nineteenth century, but the drop was from extremely high levels to those more nearly characterizing Europe. In France, however, rural birth-rates apparently were dropping in the eighteenth century. An early rise of rationalism and a secular point of view may have been involved, but this explanation raises more questions than it answers. Similarly, birth-rates were falling rapidly between the world wars in the Balkans, and notably in Bulgaria which is almost wholly agricultural. Here we may note the presence of popular education, an awareness of the outside world, rapidly improving health, and an extreme shortage of land newly intensified by international restrictions on migration.

Ireland is the most outstanding and difficult case. It is the only country that reduced its population during the last century. The

[1] Regine K. Stix and Frank W. Notestein, *Controlled Fertility*, Baltimore, The Williams & Wilkins Company, 1940, pp. 144–58.

[2] Biological and Medical Committee of the Royal Commission on Population of Great Britain. 'Reproductive Capacity and the Birth Rate' (*Papers of the Royal Commission on Population*, vol. iv), London, His Majesty's Stationery Office, 1950.

main factor was wholesale emigration beginning after the potato famine. Its birth-rate, however, also fell sharply. The decline came in an essentially rural culture and almost exclusively by means of rising age at marriage and increasing spinsterhood. There has been very little control of fertility within marriage. Here, then, is a rural society in which the motives for reducing fertility became so strong that reproduction was controlled by a measure of self-restraint that other populations have been unwilling to accept. The situation seems so unusual as to make its repetition in other parts of the world unlikely.

On the other side of the matter, birth-rates have failed to decline in a number of urban settings, notably in Egypt and the Far East.[1] In these instances, however, the city dwellers do not represent major proportions of the total population. We may note, moreover, that health conditions are poor, there is little popular education, the middle classes are weak, and often much of the labour force is transient, retaining its familial roots in the countryside. It is also true that the higher economic groups are controlling their reproduction to some extent.

It is evident that urbanization provides no mystical means for the reduction of fertility. The small family ideal and strong motivation for the reduction of births have arisen in a variety of conditions. At present we cannot either list all of the factors involved or attach precise weights to the factors we can list. There is, however, good reason to believe that among the important factors are: the growing importance of the individual rather than the family, and particularly the extended family group; the development of a rational and secular point of view; the growing awareness of the world and modern techniques through popular education; improved health; and the appearance of alternatives to early marriage and childbearing as a means of livelihood and prestige for women.

Some of these factors have been present in most of the situations in which fertility has declined in rural areas. Many have been absent where urban fertility has failed to decline. But it is in the urban-industrial society that all have been present in greatest force. Looking at the scene as a whole, it is difficult to escape the conclusion that the development of modern technology lies at the root of the matter. The societies that developed the technology which produced the

[1] Clyde V. Kiser, 'The Demographic Position of Egypt', *Demographic Studies of Selected Areas of Rapid Growth*, New York, Milbank Memorial Fund, 1944, pp. 97–121; Kingsley Davis, *The Population of India and Pakistan*, Princeton, Princeton University Press, 1951, pp. 67–82.

declines in mortality were ultimately transformed by the very requirements of that technology in ways that brought forward the small family ideal and the practice of birth restriction.

The population of the modern West may or may not increase considerably in the future. When death-rates are low, rather small changes in the proportions married and in the number of children born to married women can make the difference between growth and decline. But the almost automatic increase of the transitional period seems to be over. From the point of view of problems of food, one important fact should be noted: these populations can check their growth by a further restriction of births any time the wisdom of such a course becomes generally obvious.

Evidence from Non-European Experience

One of the crucial questions in demographic analysis is whether that part of the world's population whose fertility remains very high would react as Europeans did if submitted to similar circumstances. There can be no certain answer. On the evidence thus far considered we may note only that the principles drawn upon in our account are very general ones—hence probably widely transferable under appropriate circumstances.

This view is strengthened by Japan's experience, which does not differ in essentials from that of Europe. Here, too, the death-rate led the birth-rate in the decline. Moreover, the urban-rural and regional differences in fertility are reminiscent of those in the West. Perhaps the greatest difference lies in the fact that a relatively large part of the decline in fertility was due to rising age at marriage. However, contraception is practised extensively in the urban centres, and currently abortion is rife throughout the nation.[1] During its period of modernization the population has grown from about 30 to more than 84 millions. Moreover, although birth-rates have declined sharply since 1920, the transition is by no means complete. By the time it is complete the period of modernization may have lasted from a century to a century and a half and have resulted in a three- to fourfold multiplication of numbers.[2]

The hypothesis that the principles of the European analysis are transferable to other peoples receives indirect support of another sort. Where, as in Formosa and Ceylon, economic development has

[1] Irene B. Taeuber and Marshall C. Balfour, 'The Control of Fertility in Japan', *Approaches to Problems of High Fertility in Japan*, New York, Milbank Memorial Fund, 1952, pp. 102–28.

[2] Marshall C. Balfour, *et al.*, *Public Health and Demography in the Far East*, NewYork, The Rockefeller Foundation, 1950, pp. 13–50.

taken a different course, the population trends have also been different. In both cases colonial Governments have facilitated a rapid expansion of production in agriculture and rather little has been done about non-agricultural production. In both cases efficient government, rising production, and effective public health programmes have reduced death-rates sharply.

Between 1905 and the early years of the last war, the Japanese transformed Formosa from one of the most unhealthy regions in the Far East to one of the healthiest. Without benefit of sulfa drugs, antibiotics, or modern insecticides, the death-rate was reduced to 20 per 1,000 by 1940.[1] Since the war, and with the assistance of funds, medical supplies, and technicians from the United States, the death-rate has been further reduced. In Ceylon the essentials of the story are not too much different for our purposes.[2] The early reductions in death-rates were somewhat less impressive, but the recent ones even more spectacular. Under the impact of a vigorous anti-malarial programme, the death-rate dropped from 20 per 1,000 in 1946 to 13 in 1950.[3]

Meanwhile nothing much has happened to the birth-rate of either area. That of Formosa has, if anything, risen, and that of Ceylon probably has remained rather steady. The 1940 figure was 44 per 1,000 in Formosa, and the 1950 figure was 40 per 1,000 in Ceylon. Moreover, this effective stability of birth-rates is exactly what one would expect on the basis of our European analysis. In both regions agricultural development has been accomplished with a minimum of disturbance to the existing social order. Foreign technicians have provided the necessary initiative and supervision. There has been little general education and little occasion to learn new skills in an unfamiliar setting. Even in the field of public health the control of disease has meant an emphasis on doing things for people, rather than on teaching people to do things for themselves. In short, the programmes of agricultural development administered by outsiders have enhanced production and improved health, but they have also left relatively untouched the details of social organization, and the customs, attitudes, and beliefs of the population which throughout the centuries have served to maintain high birth-rates.

The results in the cases under consideration are rates of natural

[1] George W. Barclay, 'Colonial Development and Population in Taiwan.' Unpublished thesis, Princeton University, 1952.

[2] Irene B. Taeuber, 'Ceylon as a Demographic Laboratory: Preface to Analysis', *Population Index*, vol. xv, No. 4 (Oct. 1949), pp. 293–304.

[3] United Nations, *Demographic Yearbook*, 1951, New York, 1952 (Sales No. 1952. XIII.1).

increase that have exceeded 2 per cent. per year for a considerable time and that are currently running to nearly 3 per cent. Such rates, if maintained, double the stock every 23 years. The case of Puerto Rico is in principle the same. The natural increase is about 3 per cent. per year and there are already more than 650 persons per square mile.[1] Thus far rapid agricultural development under colonial and semi-colonial management appears to have delayed the demographic transition. It has speeded the decline of the death-rate, and done so with almost startling efficiency in the past decade. But it appears to have delayed the sorts of social change from which the restriction of childbearing might be expected to emerge.

Both the Japanese experience and the different course of events produced by a different sort of economic development in such areas as Ceylon, Formosa, and Puerto Rico tend to confirm the hypothesis that the principles drawn from the European demographic transition are widely applicable throughout the world.

The Problems of Densely Settled Areas of High Fertility

To say that the principles drawn from the European analysis apply to the world's present areas of high fertility is, of course, a far cry from saying that we may expect events to take a similar course. Possibly they will in the parts of the world that, like Europe at the beginning of its transition, are relatively lightly populated in relation to the resources potentially available. But in the densely settled regions of Asia the initial conditions are strikingly different from those of Europe a century ago. It is to these regions, containing more than half of the world's population, that we shall devote our attention because they present the major problems both of food supply and of population change.

It would, of course, be advantageous if the transition to low birth- and death-rates could come as an automatic by-product of economic development. Difficult social, political, and moral questions could then be avoided. Economic development is generally wanted, at least in principle, and is urgently needed to meet the immediate problems of poverty and disease. With an automatic demographic transition, changes that are immediately wanted could become the unrecognized carriers for the changes that are ultimately necessary. However, many factors suggest that the regions under discussion face no such easy prospect.

Much remains unknown about the actual demographic situation, and still less is known about the details of the economy and of the

[1] Ibid.

resources available. Moreover, the situation is by no means uniform from region to region. For our purposes, however, the general picture is clear. The populations are heavily agrarian; probably more than three-quarters of the people are dependent on agriculture. The amount of cultivated land per person is extremely small, and significant extensions would be expensive. The vital rates are not known precisely, but there is good reason to believe that birth-rates are generally above 40 per 1,000.[1] This figure is higher than any ever recorded in western Europe. In spite of universally high birth-rates, population growth is by no means universally rapid. Indeed, by Western standards it has been rather slow, because death-rates are in general extremely high. Again, exact figures are not available for the major populations. However, the expectation of life at birth is probably not as much as thirty-five years in India, and may be even lower in China.

Starting from this position, what is the magnitude of the economic task if the transition to low birth- and death-rates is to come as the by-product of a successful programme of economic development? Since no special effort would be made to induce declining birth-rates, our previous analysis would lead us to expect no immediate or substantial change. Birth-rates would remain for several decades at about their present level—say 40 per 1,000 population. Moreover, efforts to reduce death-rates would be fostered. Few people would hold that a demographic situation was at once sufficiently relaxed to make unnecessary any effort to reduce the birth-rate, and so desperate that reasonably available techniques for preventing death should be withheld. What, then, would happen to population increase?

A death-rate of more than 20 per 1,000 would be most unlikely under the assumed conditions of economic development which would provide progressively rising *per capita* incomes and reasonable health protection. A birth-rate of 40 and a death-rate of 20 yield an increase of 20 per 1,000, or 2 per cent. per year. This rate doubles a population in 35 years and trebles it in 52 years. Formosa experienced such a rate of increase during the period of Japanese control and, as we have seen, in several regions the current increase is even more rapid. Under our assumption of a programme of economic development, which is to be continuously successful in improving living conditions, birth-rates would eventually begin to fall. In the early stages, however, the reduction would be offset by the continued decline of the death-rate. It seems likely that, under these imaginary

[1] United Nations, *Demographic Yearbook*, 1949–50, New York, 1950 (Sales No. 1951. XIII.1), p. 14.

conditions, the rate of population growth would be between 2 and 3 per cent. per year for several decades—perhaps for two generations.

A programme of economic development sufficiently successful to yield progressively increasing *per capita* income would therefore need to be a programme that improved living conditions for populations growing at between 2 and 3 per cent. per year. At least this would be the case under our assumption that no special efforts were required to reduce birth-rates or to check the decline of the death-rate. Such an expansion of the economy is no mean undertaking even when land and other resources are relatively abundant, populations are literate, and the incomes are high enough to facilitate capital accumulation. But it is a staggering task in the absence of such conditions.

Let us consider some of the problems that would be faced in the Orient. It may be taken for granted that the labour force in agriculture ought not to expand. If *per capita* incomes are to increase, the need is for more, not less, land per worker. The increase should be drained off to the non-agricultural sector of the economy. Such a transition would involve an enormous effort. It would mean that a sector of the economy on which less than one-quarter of the population is dependent would have to absorb the total increase. On this reckoning a 2 per cent. rate of increase in the total population would require the non-agricultural sector of the economy to expand at an average annual rate of 5 per cent. per year for the first thirty years. Among other things, such an increase would require a rapid expansion in non-agricultural investment and in non-agricultural skills. Meanwhile, a relatively constant agricultural labour force would have to increase its production at rates well above 2 per cent. per year in order to provide an improving food supply for populations growing at 2 per cent. Heavy investment in agriculture would also be required. Under these imaginary conditions a 4 per cent. annual rate of expansion in total production would scarcely seem adequate.[1]

Moreover, there would be long-run problems of sheer size involved. It seems most unlikely that the regions concerned could expand their agricultural production rapidly enough to provide adequate diets for two billion people in thirty-five years. To do so might well require trebling agricultural production. England and Japan solved their analogous problems by selling their industrial

[1] United Nations, *Measures for the Economic Development of Under-Developed Countries.* Report by a group of experts appointed by the Secretary-General of the United Nations, New York, 1951 (Sales No. 1951.II.B.2), p. 46.

and commercial services to the world in exchange for food, but their populations constituted no substantial part of the world's total. Here, however, we are dealing with more than half of the world's population. The problems of securing the necessary resources, production, and markets for trade on this scale would seem insuperable.

Unfortunately this is not the end of the difficulty. Much might be accomplished if there were ideal conditions of social-economic organization, appropriate skills, and populations well oriented to the factory and market economy. The actual situation is the vastly different one in which new Governments are endeavouring to rule huge numbers of uneducated peasants who are increasingly aware of their difficult position. Great unrest, great uncertainty, and great yearning for a better life are present, and complicate the attainment of the discipline needed to build a strong economic machine.

It may be argued that the picture is overdrawn. We have dealt with an annual increase of 2 per cent., whereas in most of the regions under consideration the rate of population growth has been less than 1 per cent. But recall the problem. We are not discussing what will occur. Instead we are considering what would be required if reliance were to be placed on the automatic processes of social-economic change to bring the transition to low birth- and death-rates.

With existing high birth-rates and modern methods of controlling disease, a smaller rate of increase—say 1 per cent.—would mean either: (*a*) that gains in production were too small to permit the attainment of reasonable health in spite of efforts in that direction or (*b*) that mortality was intentionally held high to relieve the pressure of population increase. The latter could scarcely be envisioned except as a temporary means of avoiding the perpetuation of the former. In reality, therefore, both alternatives come to the same thing. They amount to holding death-rates up, as a substitute for reducing birth-rates. That amounts, in turn, to admitting that rates of economic development that permit increases of only 1 per cent. are inadequate to yield sustained improvements in living conditions if birth-rates stay high.

The conclusion is one that an examination of the past records of India, Java, and Egypt amply justifies. Indeed, as their records show, the dangers are greater than we have indicated. Programmes of economic development that just manage to meet the needs of gradually expanding numbers run the risk of being worse than useless. Being insufficient to change the conditions of life, they run the

risk of expanding the base populations without reducing their capacity for still further growth.

To me it seems evident that almost insuperable difficulties are involved in achieving the sort of economic development required to permit reliance upon the automatic processes of social-economic change for the transition to low birth- and death-rates. The difficult initial conditions, and the new efficiency with which disease can be controlled, require measures that will speed the reduction of birth-rates, if programmes of economic development are to achieve their objectives. But this conclusion has an embarrassing consequence. If it is valid, the already difficult task of economic development becomes more complicated than ever. The objective is no longer restricted to the increase of production. It now also becomes that of speeding the processes of social change in directions that yield falling birth-rates, which in turn will permit more rapid increases in *per capita* income. In effect, we must move from economics to sociology and back again, travelling always in a political world.

Moreover, the problem is that of stimulating social change without inducing a measure of social disorganization that leads to catastrophe. By definition, the stimulation of social change involves weakening loyalties to the institutions and beliefs that have served to give stability and continuity. When these bonds are weakened, internal pressures may well become explosive. The very efficiency of modern medical techniques enhances this risk. It is now quite possible to keep people alive in spite of appalling living conditions. There is much less danger than there used to be that the failure to enhance production will lead to the curtailment of population growth by epidemic and starvation. Now the danger is that even the best efforts will fail to improve living conditions among populations newly aware of their disadvantaged positions.

Rising internal pressure and the weakening of traditional social bonds can easily result in political explosions; indeed, they are doing so. It is not at all unlikely that political explosion, and the economic disorganization which accompanies it, will provide the major check to population increase in the future. Populations living close to the level of subsistence, yet dependent on increasingly complex economic organizations, are vulnerable to the failures that complexity entails in times of disorganization. Today, the risks appear to be those of political upheaval, its attendant economic disorganization, and the resulting catastrophic loss of life. To be sure, times of upheaval can also be times of rapid social change that could assist in the resolution of long-run problems. Before the fact, however, the

direction of the change is difficult to predict. Moreover, the loss of life could be great. In view of this risk, the advocate of social upheaval must be completely convinced of the futility of a humanitarian policy of social evolution.

It is in this tense situation that the resolution of long-run problems requires the stimulation of social change. The difficulties are insidious. No Government and no international organization can afford to take the long view when pressed by immediate emergencies. The situation two decades from now attracts little attention when a major catastrophe looms this year. Hand-to-mouth action is literally essential; yet it may intensify future problems.

The problems are by no means limited to demographic matters. It seems likely, for example, that immediate increases in the production of food can best be obtained by steps that involve minimum disturbance of the existing social-economic organization, interference with vested interests, and difficulty in obtaining community co-operation. In short, immediate gains in production can probably be maximized by minimizing the changes in the institutional organization of the economy. Yet, in the long run, fundamental changes in the institutions, attitudes, and beliefs are probably as essential to the attainment of high economic productivity as they are to stimulating the decline of the birth-rate. The social organization of a peasant society is ill-adapted to the achievement of high technological proficiency.[1] There is much easy talk about the necessity for each society to follow a line of development consonant with its own values, but those who seek to reap either the productive possibilities of modern technology or the lasting benefits of good health will, in all probability, have to undergo a reorientation of their value structures. At least such a reorientation has occurred in all populations that have made substantial progress toward these goals.

The difficulty is that the need for immediate efficiency requires a minimum of disturbance, whereas long-run success requires rapid social-economic evolution. In the West and in Japan the possibility of a severalfold multiplication of population permitted the necessary compromises between immediate and eventual needs. The apparent impossibility of such multiplication in the regions under discussion is the major source of the difficulty. Hence the need for attaining new efficiency in the processes of social change.

It is this line of reasoning that led to our initial proposition that

[1] Wilbert E. Moore, *Industrialization and Labor: Social Aspects of Economic Development*. Published for the Institute of World Affairs, New School for Social Research, Ithaca, Cornell University Press, 1951.

the important economic problem of population is not either that of locating some ideal goal in terms of size, or that of finding the means of attaining adequate living conditions for some inevitable rate of increase. The real problem is that of population change. Within the limits of the possible, what course of events will minimize human suffering?

Implications for Research

To answer such a question our knowledge is at present wholly inadequate in the fields of economics, sociology, and demography. In demography our theory of the broad processes of population change seems to have been sufficiently tested to prove its general validity. It is adequate to delineate the nature of the problem at hand. But it does not answer the concrete questions on which information is needed either for purposes of prediction or for the formulation of policy. It does not do so because it tells us almost nothing precise about costs, magnitudes, and rates of change; and it gives us a minimum of information about the effects of particular courses of action. Yet the formulation of wise policy will require as detailed knowledge as it is possible to secure. Whatever the situation may be in economics, in demography it seems to me that there is less need for work on the over-arching theory of change than for knowledge at lower levels of generality.

We may illustrate the needs in the case of fertility. We have argued that reduction of the risk that economic development may fail to achieve its goal requires an early decline in fertility. In effect this means endeavouring to reduce the birth-rates within the peasant society. Both theory and experience indicate that such a reduction is difficult to bring about, but also that it is not necessarily impossible. What do we need to know to permit an intelligent effort to be made? There are two broad lines of approach. In the first place, direct measures may be taken. In the second place, background factors of the economy and society can be manipulated to some extent.

One direct measure is to lift the age at marriage. What would be the best measures of community education, legislation, and incentive taxation to take in this direction? The problems are suitable ones for experiment, but we know almost nothing about them.

Direct efforts can also be made to reduce childbearing by spreading the practice of birth control in its various forms. We know that resistance is great but that, under suitable conditions, something might be accomplished. Athough people in most peasant societies

want large families, the truly huge family is not always considered desirable, particularly by the mothers. Some interest in the possibility of limiting childbearing is always present. The extent of such interest does not make itself evident currently, because the majority of the population takes it for granted that the restriction of childbearing is not really a practical matter. An intensive programme of public education, coupled with competent technical advice, might accomplish a good deal. But here again the questions are what precise programmes, with what results, and at what costs. The questions are readily amenable to investigation and experiment. It is within the bounds of possibility that the wise use of modern methods of communication and training to promote higher marriage age and the practice of birth control would bring a considerable reduction of the birth-rate even in peasant societies.

The problems will not be easily solved because local willingness to attack them energetically presupposes an understanding of their importance. Dominant beliefs and attitudes often are not congenial to the spread of such an understanding. Little enthusiasm can be expected for activities designed to reduce the birth-rate if, as is often the case, the community thinks it needs more children instead of fewer, and views action taken to limit childbearing as immoral. In this situation the second type of approach, which endeavours to stimulate interest in family limitation by manipulating the background factors, may prove to be even more important. We may give only a few examples of the sorts of questions needing examination.

If, as our analysis suggests, the dominance of the extended family is an important element in supporting high birth-rates, what can be done to weaken that institution? An obvious approach is to provide more effective means of fulfilling the functions now served by the extended family. Many of these fall in the field of elementary economic security. What are the alternative possibilities and what are their costs? At present it is often economically advantageous to have many children. How could the lines of interest be changed in the most acceptable form by means, for example, of taxation and of changes in property institutions? These questions have not been seriously examined.

For the purpose of inculcating an innovative point of view and a rationalistic approach to life, could not something be done about the ways in which agricultural innovations are introduced to the community? Could not the community organizations for the improvement of agriculture be utilized in ways that would give added

prestige to families with educated children? In short could not existing interest in better crops be used to extend interest in other forms of economic and social change?

There would seem to be even more direct possibilities connected with public health activity. Could health programmes be used to transform the existing ideal of many children into the ideal of a few healthy children? In general, would it not be possible to construct programmes of agricultural development and public health in ways that would stimulate many of the social changes that came as a by-product of urban-industrial development in Europe? Very little work has been done on this problem.

There are any number of such questions. How can programmes of land development be managed to increase the mobility of young people, thereby weakening the pressures toward traditional behaviour exerted by the elders of the family and community? It is the women who best understand the difficulties of bearing and rearing large numbers of children. What measures can be taken to enhance their status? What economic and social alternatives to early marriage and abundant childbearing could be provided for them? Are cottage industries so important to the economy as to be worth the dangers of adding new economic functions that are fully compatible with high reproductive performance?

Although we have argued that urban-industrial development will not be sufficient to bring the demographic transition, it is also clear that it will be necessary in economic terms and useful in relation to population trends. How can such development be guided in ways that speed the rise of marriage age and the restriction of childbearing?

What are the possibilities in the field of popular education? How can its scope and content be arranged to stimulate an innovative and rational view of life, to enhance the importance of the individual as opposed to the extended family group, to improve the status of women, and to substitute the ideal of a healthy prosperous family for that of a large family? What are the possibilities, and what are the costs?

Perhaps the most fundamental of all questions are those of the allocation of scarce resources to meet unlimited needs. How much of the product of economic development can be allowed to go into immediate consumption, and how much must be deflected to capital equipment, education, health, and the provision of elemental security? The answers may well be essentially political, and the decisions are inevitably hard. They are being taken every day, implicitly. Nevertheless, there are differences of opinion as to what

existing programmes may be expected to accomplish in the near future, and whether, if they succeed in their immediate aims, they may not do more harm than good in the long run. Such differences of opinion are eloquent testimony to the complexity of the problems and to the paucity of our knowledge.

We have confined our suggestions about the scope of needed research to questions of human fertility because that is the fundamental variable. In many situations, however, migration also offers a possibility of relief during the period of transitional growth. Here, too, our information on the economic, social, and demographic aspects of specific plans is grossly and needlessly defective.

Little in the way of concrete action may be expected until the political leadership of the regions concerned becomes aware of the need for curtailing population growth. In a number of regions such an awareness shows signs of developing at the highest levels, but it is not as yet broadly based.[1] Widespread studies by local scholars of the processes of population change under a variety of conditions of economic development could do much to stimulate interest. The subject is charged with emotion, and citizens of prosperous nations are inevitably open to suspicion as to their disinterestedness. It seems likely that local political leaders can be brought to an understanding of the relation of population growth to health and prosperity most effectively through the work of their own scholars studying the practical problems of population, social, and economic development.

Given an understanding of the problems by local leaders, and a large store of detailed information about the costs and potential results of a wide range of possibilities, the problems may yet find their resolution. It is quite possible that we can learn to speed the reduction of fertility with something of the efficiency with which we already reduce mortality. If so, we shall greatly enhance the chance that economic development can mean sustained improvements in health and living conditions for the world's poorest peoples.

If there is a moral to this analysis for the economist, it lies in the fact that he should stray from the well-worn and familiar paths if he is to be truly useful. His problems are not simply those of production, distribution, and consumption within the framework of well-established institutions. In view of the demographic situation, his

[1] Frank W. Notestein, 'Policy of the Indian Government on Family Limitation', *Population Index*, vol. xvii, No. 4 (Oct. 1951), pp. 254–63 (see also vol. xviii, No. 1 (Jan. 1952), p. 20).

hopes for long-run success in ameliorating living conditions must lie in speeding the change of institutions. In short, to be useful the economist must also be a general social scientist, for, in view of the demographic situation, the key problems are the interrelated ones of social, economic, and political change.

(*The discussion of Dr. Notestein's paper, together with that of Dr. Black's which follows, will be found on page 46.*)