Balancing population and food supplies is a problem as old as man, but the population problem today has three new facets. Supplies of food are spread unevenly over the globe without relation to population; medical science brings difficulties with its success in prolonging life and reducing infant mortality but also provides the means of controlling conception. Replacing the conventional picture of a dual world based on the level of development, the author presents here a four-celled matrix according to the ratio of resources to population. The envisaged population stabilising policies extend far beyond the field of family planning and may include radical changes in population mobility and food rationing in the next decade.

A problem both old and new

The population problem is the oldest human problem—even older, perhaps, than the problem of human governance. In our day it is transformed by three new factors to which I will return; but it is nonetheless conditioned by all those features which shaped it in Cro-Magnon days.

Any human group must maintain a certain minimum size if it is to survive. There will always be more mouths to feed than there are pairs of hands to hunt and gather food. And the active pairs of hands must be numerous enough to survive accidents to any one of them. But equally such a group cannot exceed a maximum size, originally set by the food potential of the area over which it can range in a day. And this in turn will vary with the natural richness of the area and with the group’s skills in using it.

So three critical ratios emerge when we analyse even the simplest human societies. One is the composition of the group, notably the relation of consuming mouths to producing hands. A second is the relation of the group’s demands to the resources of the area on which it is effectively free to draw. A third is the extent to which the group can enlarge its use of these resources or extend its access to them. This third element, the relation of its actual to its potential

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command of available resources, has proved to be the most elastic of all. It includes both the dimension of technology and the dimension of physical expansion, whether by colonisation, rapine or trade.

A very few communities exist today which have maintained a stable relation with a limited environment for many millennia. One such is the group of tribes in the highlands of New Guinea with whom contact was first made, by air, in the 1950s. Confined to a fertile area by jungles which equally protected them from invasion, endowed with a cultivable grain and domesticable animal, these people have subsisted with no remembered change of technology for countless centuries, any potential surplus population being controlled only by unnoticed and unidentified variations in the birth and death rate. Inter-tribal war, though not unknown, seems to have played no significant part in population control.

Such examples are rare. A few others are to be found which supplement natural controls by infanticide or by the ritual killing of the old, but infanticide has usually been designed to eliminate the potentially unproductive, rather than to maintain a stable population. And even this, though known in Rome and Sparta in classical times, has been rare. Some Cro-Magnon bones in an Anatolian cave tell us that the man they supported some 30 000 years ago had from birth a withered right arm as well as other infirmities; and that he died, probably from an accident, at what was then the advanced age of over 40. Human family solidarity is nothing new.

The general pattern of societies which have survived has been one not of stability but of expansion of numbers, accommodated either by getting more food from the same area or by expanding into other areas. The first is the story of man's progress through husbandry to agriculture and industry. The second is the story of emigration and conquest and colonisation. Linking the two is the story of specialisation, division of labour and trade, internal and international.

One significant feature of this last link was the slave trade. From the time when societies became sufficiently large and efficient to generate surplus wealth, and consequently inequalities of wealth, to the time when mechanical and electrical energy became widely available, slaves were perhaps the most precious form of productive wealth. The wealth of Solomon testifies to this, no less than to the wealth flowing along the trade routes which he dominated by conquering the Edomites. Most of recorded history is the history of slave-based cultures or of cultures based on the labour of those who were not enfranchised citizens. This distinction distorted the equation between populations and their ground of subsistence by establishing a class of human beings who were equated with their masters' flocks and herds, whether they were formally slaves or not. It is a distinction not easily eliminated or easily forgotten. Moreover, the substitution of mechanical for human slaves has not removed all the effects which a slave-based culture has on the masters.

That in brief summary is the uneasy story of the process by which the human race has spread over the planet, and the key to its present dilemma. All the traditional avenues of escape from population pressure are being closed in one way or another. These closures are of such varying kinds that they need to be distinguished.
First, there is nowhere to go. There are indeed still areas of the earth's surface which would support larger populations than they support now. But all these are under the sovereign control of governments and in nearly all of them all the cultivable land is already in public or private ownership, individual or collective, and most of it is under some kind of development unless it is of a kind (desert, mountain, jungle) which we do not know how to develop. Immigrants admitted now can no longer be given an area of land to cultivate as they were in North America even a century ago. They can only be assimilated into a more or less integrated economy in which they can be productive only in so far as they can be employed. And this qualification increasingly restricts both the numbers and the character of the immigrants whom such countries are willing to admit.

This is not the only restriction. Even those countries which still admit immigrants are increasingly aware of the difficulties of assimilating people of an alien culture and in consequence are increasingly selective. Since those whom they admit are likely to be those who can least easily be spared by their countries of origin, immigration policies are usually inconsistent with emigration policies.

It is not surprising then, that population increase is posing ever more acute, though different problems to all countries. Population pressure can be relieved only to a dwindling extent by that natural process by which the disadvantaged and the adventurous left their homelands to seek their fortunes elsewhere. Wars of conquest followed by settlement or colonisation, though not unknown, are less tolerated and could not again play their former part without an international cataclysm, which today would almost certainly serve to reduce rather than to redistribute populations. The frontiers of political states are hardening and must continue to harden as each assumes more consciously the responsibility for keeping its members alive. This increasingly heavy national responsibility may be muted, but it may equally be sharpened by whatever international machinery may exist for redistributing across national frontiers populations or resources or both.

**Four types of nations**

I find it convenient to consider four typical situations. There are highly developed countries which, like the UK and Japan, have populations larger than they could support if they were not able to import food in exchange for their manufactured products. There are other developed countries, like the USA and Australia, which are net exporters of food. And though they also import food and depend for their prosperity on international trade, the real resources they command in their own territories are sufficient to support their present populations. At the other end of the scale there are relatively undeveloped countries which, like India, are unable today fully to support their growing populations, whilst others, equally undeveloped, more than meet their present needs with their present resources and technologies. Between these extremes are many intermediate varieties, but the four types serve to focus the different policy issues which are dominant in these different situations.

In each of them, whether developed or undeveloped, problems of food produc-
tion or acquisition are compounded by problems of distribution, within as well as across frontiers. All highly developed societies and many others face the political difficulties of governing huge urban aggregates of high density and low social coherence. Human life cannot be lived acceptably in conditions appropriate to battery hens, even if abundant food could be provided from synthetic protein and processed algae. Food is not the only limit to acceptable human density. These limits are neither known nor knowable in advance. When they are exceeded, they used to become manifest first in plague and pestilence, or in waves of colonisation. Today these ancient regulators are likely to be preceded by the breakdown of services, law and order, and other aspects of governmental regulation.

In the Western world, urban growth is already more intense in smaller cities than in those which set the pace a century ago. This is due partly to deliberate policy as well as to deteriorating quality of life in the largest centres—for example, the combination of policies in the UK designed to limit the growth of London by channelling it to other places, including new towns designed for the purpose. It is hard to find statistics which clearly reflect this process of redistributing urban growth. London, New York, Tokyo, and Calcutta have different stories to tell, each too complex to encourage facile comparisons or contrasts with the others. But all alike emphasise that population problems are not necessarily soluble because they fall within the area of a presently viable national government.

There remains a basic difference, even within the developed countries, between those countries, like the UK and Japan, which are viable only so long as they can buy food and other resources in the international market, and those which are not so dependent. Economies of the former type are based on a 19th century assumption which may fail, which is indeed failing now. This is the assumption that market mechanisms will generate, internationally as well as nationally, whatever increase in real resources is desired sufficiently for the desire to be expressed by a rise in price. Today there is enough surplus food on offer to support all those developed populations which can afford to buy it—not all those which need it. But their ability to buy it depends on their competitive power in world markets, which itself calls in question the ability of the non-competitive to sustain themselves. And the surplus is on offer only because it is surplus and only so long as it is surplus. No country will long sell food when it is hungry.

It is therefore of the greatest significance that the huge grain reserves accumulated in the past decade have already almost melted away and that the number of countries, developed or undeveloped, which are net food exporters has dwindled to a tiny minority.

The plight of countries which are undeveloped but overpopulated may be a little less grave since their very lack of development suggests that food supplies may be more readily increased. The “green revolution” has indeed increased Indian yields over the past years to a notable extent. It depends on fertilisers which require energy and which may depend directly or indirectly on imports; it may have other self-limiting factors which have not yet disclosed themselves. It is nonetheless a notable pointer, not least because its value does not greatly depend on devising new patterns of distribution.
Such countries have also open to them a resource which the West has forgotten, though we may soon have to recall it. In a country where men are plentiful and food is short, what matters is yield per acre rather than yield per man. The Western habit of prizing increased productivity *per man*, even when it is offset by the employment of fewer men, makes sense only when the men thus freed can be otherwise usefully and acceptably employed. This assumption does not hold today for the homeless, workless crowds in Calcutta or for the unemployed of any Western country. It is giving way to the paradox of a Western world in which men are the only abundant resource, but nonetheless the only resource which is too expensive to be fully used. This in turn reflects the process which has already reduced most skilled men to machine minders and which is in process of reducing them still further to the status of consumers, supported only on condition that their rising demands keep the automata fully employed. This nonsense at all events may be expected soon to crumble before the logic of bitter experience.

I have heard of a case, though I have not yet been able to verify it, in which the agricultural yield of 100 acres of farmland was actually increased by using the land for a housing development. A thousand lovingly cultivated gardens more than offset the area lost to roads and buildings, and the supposed advantage of more mechanical power. The product made no visible addition to GNP because it was eaten without the prior formality of being sold and thus assigned a money value. But it was no less nourishing on that account.

There remain the happiest of my four classes, the countries still undeveloped, yet producing with their existing technology all they need to sustain their current rate of population growth. They have, at least in theory, wider options in policy and more time in which to bring policy to fruition. Anyone to be born in 1974, if he could choose his place of birth, would surely choose to be born in such a country.

No such choice is open to us. We have to cope with the problems which history and geography have dealt us, each in our own land, but with due regard for those of others, and for planetary limitations. These problems as I have so far reviewed them include the problems of urban regulation—the governing of huge urban aggregates of people, and the design of the urban environment and its social and political institutions. They include problems of national distribution, both of people over available areas and of resources to people who need them. Both these are problems which market machinery failed to solve acceptably even when the conditions of a free market were far less remote than they are now. Our problems also include immigration policy and for some countries, emigration policy too. They include the even more intractable problems of international distribution of resources, whether knowledge, capital, physical resources or consumer goods and whether by unrequited gift, by political bargain or through the medium of trade. And above all in urgency they include the problem of increasing food production, especially within those countries, developed or undeveloped, which by my definition are already overpopulated. In this context we have also to remember the one great resource which is at present little developed and largely unappropriated, though it is already over-exploited and more than a little polluted—the oceans which cover more than half the surface of the planet.
Medical science—a new factor

Only against this background can we assess the second and third of those three changes which, as I mentioned earlier, have given a new dimension to a problem as old as man. The first I have already discussed. It is imbalance of food and population, both globally and within many individual countries, on a planet which lacks adequate means to redistribute even what food it has and which is divided by rising barriers against the redistribution of populations. The other two are double-edged gifts of medical science. One is the knowledge needed to prolong life and especially to abate infant mortality—so long of course as food is available. The other is the knowledge needed to control conception.

The first of these poses problems which are still unacknowledged. It is a fact that in many countries today medical science is fostering a growth rate of population which the sciences of food production have no present prospect of sustaining from internal sources or perhaps from any source. Only extremists at present would allow children to die of disease in infancy, in order to save them from dying of starvation later. But a country budgeting limited resources between food production and preventive medicine may well give a larger share to the first, when faced with present famine. Except at that level, today’s greater knowledge of how to reduce the ratio of deaths to births is likely to affect policy only in so far as it adds emphasis to medicine’s other gift, the power to control conception.

To an extent greater than ever before, individuals now have the power to dissociate conception from sexual intercourse. Next to the control of death—which happily is not yet with us—this is probably the most radical change in the human condition that has ever happened. Its effects seem to me to be highly unpredictable. It is likely to reduce the birth rate; but it might also reduce the death rate. In so far as it reduces populations, it will certainly work differentially, reducing some more than others, perhaps reducing some classes more than others within a single population. It will not necessarily reduce average family size; it might instead multiply an at present unnoticed category, the non-celibate but non-breeding pairs who will leave to the philoprogenitives the task of sustaining the population. It may result in the unwilled extinction of populations. How far will it be within the control of public policy? To Westerners the decision on family size may seem an even more inalienable personal “liberty” than the right to choose one’s employment. Yet even in the West it raises questions of high policy which no makers of policy can afford to ignore.

Whenever some aspect of our lives becomes modifiable by human action, it becomes possible to argue that it ought to be other than it is. Responsibility for its results is attributed, often wrongly but nonetheless irresistibly, to some human agency. The event has passed from the category “Act of God” to the category “Act of Man”. The responsibility for having children has long occupied a middle place, an act of man indeed, but a by-product of a biological urge so natural and so powerful that it has been regarded as only marginally within control. Many welcome the fact that parenthood should become more optional and its responsibilities correspondingly more willed. Whether welcome or not, this increase in individual responsibility cannot fail to involve an increase in collective responsibility in at least three major fields.
However great or small its powers of control, every society has an intense interest in the size and composition of its population and in the rate of any changes therein. Until recently an increase, especially in competent males, was deemed to be a national asset. From time immemorial men's work has made families and nations rich and strong, whilst younger generations have been the only support of the old. Today attention focuses on stability and on the level at which stability should be sought. There are societies today where the population so far exceeds indigenous food supplies that a rational judgement may aspire to stability at a lower level, even though at present they are able to sustain a much larger population through international trade. There are countries so manifestly underpopulated that a prudent population policy might well aim at increasing numbers before external pressures force a more abrupt and less well-planned incursion. Whatever the situation, it raises two inescapable questions—"What shall we deem to be the optimum limits of our population?" and "What should we regard as the acceptable limits in its rate of change?". These questions need to be asked. For the issues affect everyone and their public discussion is the best way to reach some consensus and thus to generate standards to which individuals may in turn respond. No government can escape responsibility for taking a line in this debate.

Its most inescapable choice is in deciding whether and if so to whom and on what terms contraceptive advice and resources should be made available and in what circumstances abortion should be legal. Advocates of family planning have campaigned in both fields, not only on account of exploding populations. Many governments have developed national programmes or changed legislation accordingly. The effects of these vary from the apparently unsuccessful, as in India, to what appears to be the stunning success of China, two countries which between them account for more than half the population of the world. Although it is far too early to assume that India cannot do what China is doing, the present contrast provokes some fruitful reflections. In China it appears that extra-marital pregnancy is exceedingly rare and extra-marital births virtually unknown, whilst the problem of stabilising the population seems to have been solved.

These programmes are themselves contributions to the dialogue which will clarify and change public attitudes and thus help to make population policy. They may and should be backed by advocacy of whatever governments see as the national interest—and also of the international interest, where national governments dare to invoke this criterion.

**Policies for population mobility**

Governments cannot fail to contribute further to the debate by the assumptions on which they base other policies, notably those of immigration, emigration and food production. It is hard to think of any area of policy which is not affected by these assumptions. The most dramatic Western example is probably Canada. Here, the current size of the population and its birth rate, coupled with its very high ratio of resources to population makes immigration a key variable. The net increase of population by immigration, over a range between 75 000 and 500 000 per annum—a range not beyond the conceivable scope of
immigration policy—would produce results ranging from stability at the present level to escalation at a probably prohibitive rate.

The least controversial but not least relevant contribution of public authority is to monitor change and supply information. Any government today can, if it wishes, collect and analyse information about its population on a scale undreamed even a decade or so ago. Even though the blessings of the computer may be less and more mixed than its more passionate addicts proclaim, it has revolutionary and, I think, beneficient power in classifying, aggregating and presenting data. Population trends, including the projected effects of changes which have already occurred, are among the more reliable of the materials on which it can work. And the wider the services which governments provide, the more they need such information. Changes in the work force, in numbers of schoolchildren and old age pensioners need to be foreseen, even a decade ahead, if the services which deal with them are to be adapted to meet them. It seems, for example, an absurd anachronism that governments so placed should still depend on a decennial census.

It seems to me therefore to be a pathological, if natural, sign of the times, that the so-called free world should be so reluctant to allow its governments to collect the information with which to guide its freedom. Our freedom in the last analysis is only freedom to choose our commitments. And our commitments are becoming increasingly collective, none more so than our commitment to stabilised populations.

Urgent actions for the long term

Finally one sombre thought should I think be stressed. Although population changes may be sudden and dramatic, the effect of population policy can only be gradual and long term. It is concerned with the unborn. During the rest of this century the problems of the living—and the dying—will I believe be more revolutionary and worldwide than ever before in human history. It seems probable to me that within ten years food rationing will be needed in most, or even all of the countries, however developed, which are not self-sufficient in food and that it would be needed in every country, if starvation in the least self-sufficient is to be abated even to the extent that policy permits. I can also envisage a vast switch from fodder grains to food grains to avoid the huge waste of biosynthesis involved by the luxury of being so carnivorous as Western men today. All such changes imply a revolution in expectations, in institutions and in methods of distribution. But these affect us, in the context of population policy, only in one respect. We can be sure, as I believe, that within a decade it will no longer be necessary to argue the case for stable populations. The age-old stabilisers of pestilence and famine, if not also war, will be too manifest for anyone to ignore. It is the more important that those who are dedicated to solving the problem of population control should be neither dismayed nor diverted from their task but should on the contrary exploit to the full the more favourable climate in which to pursue it.

Whatever happens to those alive today, our goal is that the unborn shall inherit an earth in which they have at least the possibility of continuing the great adventure of human social and individual life. One of the conditions of
such an earth is that its human populations shall have such stability of size and composition as makes it possible for them to live in balance with each other and with their physical home and to look forward to progress along the dimension of a redefined humanity.

Such stability is only one of the conditions which would make that adventure possible. Even if achieved, it does not guarantee that the adventure will succeed. It is nonetheless a noble aspiration and a difficult task—noble and difficult enough to claim the allegiance of dedicated men and women not only in the Population Year of 1974, but for many years to come.

But its implications extend far beyond the field of family planning and they fall with wholly different emphases on countries in different sectors of the four-celled matrix in which, earlier in this article, I arranged the nations of the world. The relative importance of these divisions is itself changing; differences between high and low "development" are already, in my view, far less important than differences between a high and a low ratio of resources (especially food) to population. And over all these broods the problem of distribution and its enigmatic relation to politics. The mind reflecting on this huge problem should not ignore the singular fact that, as it ranges over the enormous spectrum of threat and of distress conjured up by "the population problem", its few foci of comfort should include both Canada and the People's Republic of China.