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WHY CONTROL POPULATION?

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Because of continuing acceleration in number of births, in resource use and in many aspects of environmental rundown, the planet's carrying capacity has long been exceeded, and with it any immediate prospect of sustainability. Nearly half the population of the world is below breeding age and, although growth rates are falling in some regions, they are stable in others. Family planning has been effective in limited areas of the world, but any prospect of demographic transition to lower fertility for most is far from realization. Future scenarios depend on how quickly family planning, including contraception, education of women and health support programs can be introduced. The costs of such activities would be a small proportion of current military expenditures.
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The Academies' Declaration

Last year, before the United Nations Conference on the Environment and Development (UNCED) took place in early June in Rio, the Royal Society of London and the US National Academy of Sciences issued a joint declaration on "Population Growth, Resource Consumption, and a Sustainable World". The Statement warned that the population was growing at almost 100 million a year and that if present trends continue, science and technology may not be able to prevent either irreversible degradation of the environment or growing poverty for much of the world. They suggested that with continued growth, the population, which at that time was about 5.4 billion (5,400 million) might reach 10 billion by 2050, and would continue to grow if global fertility rates do not stabilize very soon at replacement level (2.1 children per woman). The Declaration gave some facts on environmental changes in this century, and deplored unrestrained resource consumption in the developed world that might produce irreversible damage and already threatens the living standards of those who live in developing countries. The two Academies recognize the huge economic disparity between North and South, and the growth of poverty and starvation, and advocate family planning on a global scale. They call for international action and propose to invite Academies from others countries to a scientific conference in 1993 to examine issues in detail.

Different Futures, Some Opinions

The Declaration makes a good starting point for discussion on population growth, and resultant changes already apparent. Although a somewhat restrained statement, the two Academies nevertheless call for

action and recognize certain important issues currently being debated. They accept explicitly that population growth and unrestrained use of resources are the prime movers in increasing human poverty and environmental degradation, although there is a substantial body of opinion that questions these assumptions.

This paper will review some of the controversies and possible priorities for action. Although we live at a unique moment of history and are faced with an uncertain future, there is a disparity of opinion regarding the causes of our present situation and the measures that might be taken to slow and, if need be, reverse current trends. One may summarize briefly the extremes of three opinions on what is going on: (1) humankind must question the accelerating use of resources and technology and return to a life in balance with the ecosphere and therefore presumably with far fewer people; (2) this is opposed by the economic optimists who consider that people are our greatest asset and that technology is capable of sustaining and improving the lot of humankind indefinitely, as well as "managing" the ecosystem; (3) the third opinion holds that all life on the planet has been in balance with its physical surroundings since it began and adjusts to the ever-changing environment; the rapid human induced changes we observe today may soon be balanced by equally rapid adjustments within the ecosystem, with results that might be highly unfavourable to our species. Such an opinion would recognize the physical reality of the situation, based upon empirical observation, and act accordingly.

Whereas opinions (1) and (2) are firmly opposed, each, nevertheless, represents a reductionist approach to problems which leads to piecemeal solutions. Opinion (3) on the other hand demands a more holistic approach and would integrate solutions into a general theory that allowed prediction and modelling, of which Lovelock's Gaia theory (1976) might be an example, although not necessarily the only one.

"Ecosphere" is used in this paper whenever relevant in preference to the much misunderstood concept "environment". The former term ascribes equal importance to the atmosphere, hydrosphere and lithosphere, together with all forms of life (biota) that exist within them, and can be divided into regional and local ecosystems, each a three-dimensional sector including air, water and/or land and the organisms that populate them. The ecosphere is literally our home that we affect through our activities and our numbers.

The terms North and South are used interchangeably in this paper for developed and developing regions or countries

At this point I must confess that I am not an unbiased reporter, although I believe that the facts presented here are true. It seems to me that the accelerations currently observable, and referred to in this paper, including population, resource use, waste production, extinctions, deforestation, and many others, effectively prevent the spread of utopian economic systems by which all humankind might live in a sustainable environment indefinitely into the future. In fact, I believe that the problems we currently face must be solved in a very short time - a few tens of years at the most - if our present system is to continue.

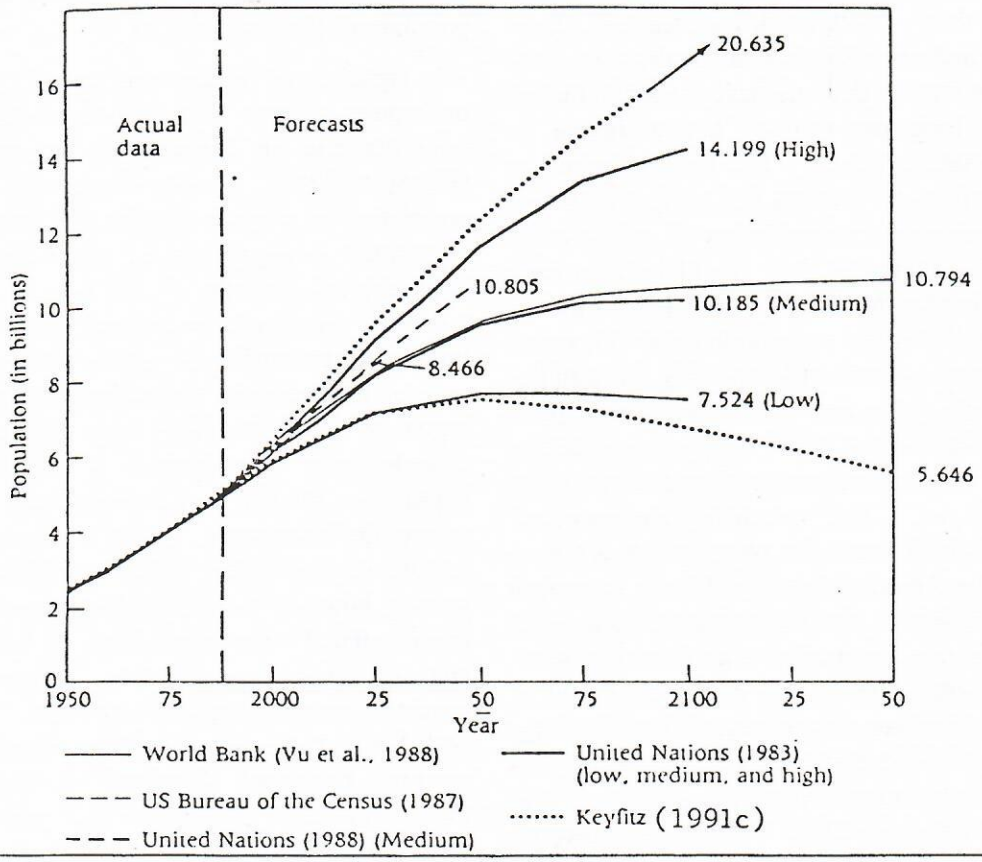
Dynamics of Growth

We know how fast the population of the world is growing today and it is possible to project the effects of current trends forward in time, not necessarily to predict the future but to point out what a population would be if present trends continue under varying future conditions. Plainly there is a fall-off in accuracy over time in any such predictions, and many scenarios have been suggested. Currently the numbers are growing relentlessly and there is little uncertainty in the figures for the next 20 or 30 years. The age effect, as the result of past growth, will ensure the expected acceleration (Arizpe et al., 1991). This may be summed up by the remark that "half the people in the world haven't started having children - they <u>are</u> children" (Gillespie, 1992).

What happens next? If growth continues indefinitely, various unpleasant futures may be predicted. Even if the demographic transition (discussed below) eventually lowers growth rates due to falling fertility in balance with increasing education and prosperity, nevertheless, projections for the next 20 or 30 years are relatively reliable and indicate 8 or more billion. Subsequent projections will depend on assumptions of fertility change although the momentum of growth within young populations will continue a long time. The growth of population is, indeed, a fact, and demographers agree on the reality of the figures cited by the two Academies. Opinions differ, however, on possible futures and how uncertainties will increase. Forecasting the behaviour of population over a longer term becomes increasingly uncertain, and the possibilities of disruption in the patterns of growth projections become increasingly probable. Current

projections of possible futures remain approximately the same to about 2010-20 and then diverge increasingly according to a variety of assumptions (Lee, 1991, and figure 1).

Figure 1: World Population Projection (from R.D. Lee, 1991)



A major difficulty in demographic modelling is the effectiveness of the much discussed demographic transition. This proves to be a difficult concept to pin down. Rate of population growth or decline depends on the balance between mortality and fertility. High mortality and high fertility lead to a low rate of increase - the norm in the more distant past. More recently, decrease in mortality and increase in fertility have led to rapid population increase, the current condition in much of the world. The third balance, found today in most developed countries, is low mortality and low fertility leading to reduction in birth rate down to or below replacement level. This last development is brought about by the demographic transition, and there is discussion and doubt as to whether this represents a universal law and how quickly it might take place.

Demographers are not unanimous in accepting the transition as a law. Some require it if we are to emerge from the current crisis in runaway growth. On the other hand Abernethy (1991) has stated that recent research suggests that the fertility reduction predicted by demographic transition theory may not materialize. The demographic transition seems to have occurred when the population of a country or region becomes more highly educated, urbanized and developed economically. The ultimate cause appears to be a manifestation of the Industrial Revolution, combined with advances in hygiene leading to increased consumption of goods and services, although the timing and magnitude of the transition is highly irregular (Davis, 1991). In the developed world, the "early-transition" countries, reduction in fertility began before 1950 and sometimes happened very quickly. A Canadian example may be cited from Quebec where the immediate post-World War II liberalization of the Church, led to a rapid emancipation of women and a change from having the highest birth-rate in the Western World to the lowest in less then one generation.

In the developing world there is a great variety of population growth rates. Horiuchi (1992) has given a

summary of the post-War years of global changes. Rates, expressed as a percentage of annual growth, rose from 1.79% to 2.06% in the 1950s and 60s. In 1975-80 they decreased to 1.73% and have remained constant since then - with no further decrease. Sub-Sahara Africa and some South Asia countries are "pre-transition", but fertility declines have started, although they have a long way to go before falling to replacement level or below. The built-in inertia to change is illustrated by the fact that currently 48% of Sub-Saharan Africans are aged below 15, and in order to stabilize the population they would have to have one-child families for the next 30 years. Latin America and Asia, with 37% of the population below 15, would require 25 years of one-child families to stabilize (Gillespie, 1992). No one is suggesting that these scenarios are feasible but it shows why it will take a long time for the present developing population surge to work itself out. The so-called "late-transition" countries - East and Southeast Asia, including China, India, and Latin America, began reduction in growth rate after World War II, but the decline stalled some 12 years ago. No one can predict when it may resume. Whether the global growth rate continues to fall or remains constant makes a very large difference to the future. If growth had continued to fall at the 1970s rate, the world population would reach stability or zero growth at 6.7 billion in 2030. If growth, however, continues at its present rate, the population will increase to 10.7 billion in 2030. This represents a huge discrepancy, and, because the transition is not understood, the degree of future uncertainty is also unknown and possibly menacing (Horiuchi, 1992).

The Stand-off

The major controversy between two schools of thought regarding cause and effect between population and resource availability, also extends into the idea of carrying capacity of the planet and possible limits to growth of all kinds - physical and economic. The protagonists of the two opposing views might be characterized as technological optimists, who believe that new technology will allow continued economic growth indefinitely (Ausuble, 1992), versus the technological sceptics who consider that growth in population and resource use will reduce possibilities of sustainability and that we should plan accordingly (Arizpe et. al., 1991). Their opinions are astonishingly far apart and range from statements such as: there is no correlation between people and environmental change (Whitmore, 1990), to Keyfitz's listing of many manifestations of further environmental degradation and extinction of plants and animals to be expected within the next 30 years and the remark "every one of the unmeasured negative elements ..... is related to population" (Keyfitz, 1991c).

The significance of carrying capacity depends upon one's point of view. The notion is congenial to natural scientists and an irritation to the social scientists (Keyfitz, 1991b). To the former it is the maximum population of a given species that can be supported indefinitely in any particular region and the term has been applied globally to the human species. The economic viewpoint, in contrast, points out that any limitations to output of goods and services merely reduces unnecessarily the capacity to produce. This argument fails, however, when the environment is brought into consideration. Economists ignore population growth and consumption because they ignore the ecosystem. They think in terms of an infinite world (Keyfitz, 1991b). Because of population growth, however, most inhabited regions appear to be overpopulated in terms of stress on local ecosystems, and far beyond sustainability. While accelerations continue sustainability is a vain hope. The authors of both *Limits to Growth* (Meadows et. al., 1972) and its recently published successor *Beyond the Limits* (Meadows et. al., 1991) have been accused of making predictions which either have not proved to be correct or are improbable. In fact, the authors make it abundantly clear that they were projecting current empirically observed trends into the future and examining the effects of varying postulated conditions on such trends. The controversy is also at the centre of the carrying capacity discussion, with assurances, from one side in the argument, that the world can support a much larger population, as opposed to warnings on the other side, of approaching catastrophe. Davis (1991) gives a full and fair account of the controversy and finally concedes that the "limits" have essentially been shown to be right.

Current classical economic theory depends on a closed system of circular flow of exchange values, to which the environment and the reservoir of resources are externalities. The future looks bright because no heed is paid to uncosted materials such as water, air, forests, animals and plants, without which the ecosystem would cease to exist and, inevitably, we too. Economics as a science must become concerned about the ecosystem because we are part of it, cannot manage it, and cannot live outside it.

Our economic model, within the ecosystem, must describe the use of energy and materials as a one-way throughput of matter-energy derived from a reservoir of diminishing finite resources and discharging waste as emissions, effluents and solids requiring disposal in a manner that does not increase environmental pollution; the costs of which must be assessed (Daly and Cobb, 1989).

The problem of costs and costing human induced environmental change has recently surfaced in examining policy options in slowing climate change. Nordhaus (1992) rightly acknowledges that costs of protective measures might be staggeringly large, but makes the familiar error of assuming that physical changes in the ecosystem and economic costs in a human value system may legitimately be included in a single model. They are in fact in entirely different dimensions of reality. Costing ecosystem values is equivalent to costing one's own blood supply - without it you don't exist, and it is, therefore, invaluable. Nordhaus's suggestions constitute a good example of the dilemma posed by Pascal's wager (Orr, 1992), in which he would advocate betting on an optimistic outcome that will, however, lead to disaster (or eternal damnation, in Pascal's terms!) if he should prove to be wrong.

Population and the Ecosphere

Sustainable development is a catch-phrase that defies accurate definition but is taken to imply that we can continue economic growth and look after the environment at the same time, - we can have our cake and eat it. Sustainability should certainly be one of our goals, but until the present accelerations, including population, that are observable all over the planet are slowed and reversed, there can be no talk of sustainability (Rees, 1990). Mention has been made of the differences of opinion concerning the effects of population and resource use on environmental rundown. Keyfitz (1991a) has recently written a paper with the title "Population Growth Can Prevent the Development that Would Slow Population Growth", - in other words, the causes prevent the cures. I have named this the Keyfitz Block effect and find that it is recognizable worldwide (McLaren, 1993a).

We are the recipients of brave talk of how we may "manage" the environment and how humankind must assume the "stewardship" of the threatened areas of the world and its life. Reality is very different. In North and South we find that the Keyfitz Block is inexorably writing the rules. A few examples are offered: (1) If present trends continue Brazilian forests will be cleared within the next 30 years. The importance of forests in the ecosystem can scarcely be exaggerated because of their role in photosynthesis, acting as a CO_2 sink, and in climate modulation. In addition, the tropical forests support a huge diversity of plant and animal species in many specialized habitats (Myers, 1984, Ehrlich & Wilson, 1991). The pressures forcing deforestation are formidable. Today there are about one and a half billion people with no feasible energy alternative who are cutting firewood faster than it can grow, and, through no fault of their own, constitute a major block to ending deforestation. (2) The disparity in economic well-being, and quality of life between North and the South continues to accelerate. Over 1.2 billion people now live below the poverty line, and most of these, although not all, are in the South. Atmospheric pollution and climate warming are inevitably linked to energy use, which is, currently, largely from fossil fuels in the North. Disparity and pollution are also linked to social and political problems, particularly the contrast in rate of resource use between the North and South. Governments in, for example, the United States and Canada, while recognizing that emission reduction is necessary, are, nevertheless, reluctant to incur major economic costs. (Abelson, 1991, and Canadian Council of Ministers of the Environment, 1990). (3) Pereira (1991), in discussing population and starvation in the world remarks "there is no economic or logistic prospect of feeding the increasing millions in the tropics and sub-tropics from the costly and energy-intensive food production of the higher latitudes". Instead we must expect increasing numbers to leave the family farms that will only offer subsistence while the family plots remain large enough to yield a surplus for sale to pay for essential inputs. He points out that this window of opportunity is closing rapidly, again, owing to population growth.

Many other effects flow from population growth and impact on the ecosphere. Some effects may be reversible, such as increasing greenhouse gas release or the continued production of CFCs and related compounds that reduce the stratospheric ozone shield. Some are not reversible, for example, the extinction of animals and plants is now proceeding at 1000 times the normal rate. Others in the non reversible category include: global lowering of water tables that will not recover in a human lifetime, and soil degradation,

poisoning and loss owing to detrimental agricultural practices. In addition, many social and economic problems that affect the environment are caused directly or indirectly by population growth: increase in pollution by transport systems; mass migration ; mass tourism; mass urbanization - half the global population by 2000; increasing resource overuse and waste production in the developed world and in the developing world, as a result of poverty and starvation; world security gravely threatened by increasing social and military instability; threat of nuclear instability arising from availability of existing bombs and weapons grade materials as well as vulnerability of power stations and waste disposal sites.

Finally it should be emphasized that problems arising from population growth are not limited to the developing countries of the South, but the North also is grossly overpopulated because of its current consumption of 85% of world resources and production of an equivalent proportion of pollution and waste of all kinds. A baby born in the North will use up to 30 times the resources of all kinds and produce an equivalent amount of waste as an inhabitant of Bangladesh. At a conservative estimate, population figures for countries in the North should be increased by a factor of 10 when considering their impact on the ecosphere, relative to countries in the South.

What to do About Growth?

It will be extremely difficult to bring about the necessary global acceptance of the reality of our concerns over population growth and to define and take the necessary measures to alleviate the problem. Yet, because accelerations are involved, every day that passes increases the difficulty of initiating effective action and the cost of doing so. It must be emphasized, however, that no effective measures can be taken to slow other accelerations, identified earlier, until the growth in population and the related North-South discrepancy have begun to slow and reverse. The immediate results of such actions would be entirely beneficial, socially, economically and morally.

Immediate actions that do not require justification by further data gathering, research or discussion must be taken now to begin lowering the birth rate globally. Although the statistics are alarming and the acceleration seems insurmountable, reduction in fertility without increasing the mortality rate is probably one of the easier problems to solve that currently face humankind. We know enough to act now, and although the costs may appear high, the effects will be immediately apparent and the resulting pay-back much larger. Suggested actions should include: (1) an immediate encouragement globally of family planning and an assault against those who would deny humane and effective measures to assist women to gain control of their own reproductive capacity. (2) Simultaneously, social development must improve the status and education of women, as well as pre- and post-natal health care for mother and child. (3) A third condition would call for improved economic development - which would quickly be aided by reduction in birth rate (discussed below). (Much of the above discussion is from Shenstone, 1993, in press).

Family planning demands improved social and economic measures as noted above, but central to their success is contraception. Many methods are in use and there is great need for broad-based research and for educational materials and information on all aspects of family health. The goal of family planning may be summarized: reduce the need for fertility control; improve maternal and child health care through birth spacing; and eliminate the need for illegal abortion. These goals must be linked to an integrated development strategy combining family planning with income generation, small scale agriculture, water and sanitation improvements, leading to better quality of life while reducing births (See discussions in Jacobson, 1988, and Djerassi, 1992).

A puzzling feature associated with family planning is the evident reluctance to discuss openly the needs for research in contraception and the expressed recognition of the dangers of population growth. The failure of the Rio Conference (UNCED) to emphasize the population issue continued the process of largely ignoring the single most destructive force ever to threaten human well-being and the ecosphere. It should be said that the official position taken by Canada at the Conference also made no attempt to raise the population issue. Even when growth is recognized, however, facing the reality of what measures must be taken still engenders inanition or obfuscation in some quarters. For instance, a draft copy of UNCED's Agenda 21 (1992) talks of demographic dynamics without using the apparently proscribed terms birth control, contraception and even family planning as such, and, there is no mention of contraception research and applications in any terminology. This Byzantine and repetitious document, while on the side on the angels in recommending better conditions for women, may be

typified by one quote: "ensure that women and men have the same right to decide freely and responsibly on the number and spacing of their children, to have access to the information, education and means, as appropriate, to enable them to exercise this right in keeping with their freedom, dignity and personally held values taking into account ethical and cultural considerations". In gambling jargon this is known as "hedging your bets". Fortunately, there are regions of the world where the demographic transition is being forced by family planning programs. These are the late-transition countries, China, India, East and Southeast Asia and Latin America. Changes are taking place at varying rates but the efficacy of birth-control is established.

The Cost

The efficiency of birth-control in economic terms is well demonstrated by a Mexican example. Between 1972 and 1984 $165 million was spent to provide 800,000 women with contraceptive supplies, thereby averting 3.6 million births and 363,000 abortions, and saving $1.4 billion that would have been spent on maternal and infant care. Developing countries that encourage family planning may be the first to experience rapid and widespread social and economic advances (Jacobson, 1988).

In spite of the fact that the cost of measures to reduce fertility rates without raising mortality will be repaid many times over, there is still concern for the immediate costs that must be born in advance of the benefits. Perhaps the most serious immediate deficiency is the relatively small amount expended on reproductive research and contraceptive technologies, and forms a serious block to quick improvement. It can take 15 years or more for a new contraceptive to move from laboratory to the market. Worldwide expenditures on reproductive technologies peaked in 1973 at $280 million and have since declined in Europe and North America. Reduced funding and an inhospitable political climate are delaying the development and introduction of contraceptive technology just as demand for new methods is multiplying. Over the last two decades $10 billion has been spent on family planning in developing countries. The current budget is about $2.5 billion per year. The Population Crisis Committee, Washington, estimates that to reach population stabilization by the end of the next century, global expenditures must rise to $7 billion a year over the next decade. Developing countries need to make larger contributions to family planning. In 1986 the Third World spent more than 4 times as much on weaponry and upkeep of military forces as it did on health care - $150 billion compared to $38 billion. U.S. reduction in funding for international population assistance between 1985 and 1987 and withdrawal of funding for the UN Fund for population activities (UNFPA) meant that more then 340 million couples in 65 countries were affected (Jacobson, 1988).

Sadik (1991) of UNFPA points out that immediate adjustments to growth rate will have effect in the longer range predictions for 2025. A realistic goal is to extend family planning services to 1.5 billion people in the next 10 years. The number of couples using family planning will rise by 50% from 381 million in 1991 to 567 million in 2000. The overall cost will be about $9 billion a year by the end of the century - double today's expenditure, but far smaller than the cost of failure. For example, India has calculated that averting 106 million births since 1979 represents a saving of $742 billion. The gains to the environment and development prospects generally are far higher.

Finally Agenda 21, chapter 5, suggests "implementing integrated environment and development programs at the local level taking into account demographic trends and factors". They suggest funding from 1993-2000 at $7 billion annually, but make no attempt to suggest what effect the program will have on population growth. They outline certain areas of research, that in the guarded language of the proposal, include improving "appropriate policy instruments", but there is no indication of what this means.

The general consensus appears to be that we must double the amount currently spent from all sources on family planning in the broadest sense of that term, and that this will mean a global expenditure of something in the order of $7 to $10 billion a year. Matched against current expenditure on armaments and armies this is a small amount indeed, especially when it is realized that expenditures on fertility reduction are repaid many times over in cash terms as well as reducing environmental stress and increasing quality of life.

The Moral Dilemma

We live at a crisis point in history and we are largely unaware of it. If an unseen intelligent being from somewhere else in our galaxy were to visit the planet, perhaps the most incomprehensible phenomenon it

would observe would be that the planet's apparently wise and competent dominant beings are totally ignorant of the life support system they are condemned to live within. They are, furthermore, blissfully unaware that their uncontrolled reproductive capacity is growing to the extent that it is rapidly destroying this system, while fighting among themselves to preserve their freedom to do so. The problem of having too many babies born is evidently mixed up in some people's minds with morality. Some would say that it is immoral to interfere with a women's child-bearing capacity; on the other hand others might suggest that it is immoral to bring unwanted babies into the world to die in infancy or at best to live short and desperate lives in poverty and hunger. Morality is a relative concept that has varied throughout history and varies today from place to place or between adherents of differing beliefs. Commonly, however, a moral act however defined is concerned with humanity alone. Is this always desirable or right?

Today we are becoming conscious that we are damaging our physical and biological surroundings, our home or ecosphere, and that such damage may be looked upon as an evil act. Awareness of this might lead to a new morality that encompasses both humanity and the wellbeing of all life within the ecosphere. We also find that there is a harsh reality lying behind this apparently simple suggestion. A code of ethics that is seen to be humane and just in a human framework may result in increased stress on the ecosystem; only humane actions that also benefit the ecosphere may be considered ethically acceptable. Such a principle bears on our population problems. Undoubtedly continued increase in world population, as this paper has shown, will produce more and more environmental degradation and will further reduce the planetary carrying capacity. This must, therefore, be looked on as an immoral act on the part of our race (McLaren, 1993b).

The most urgent actions we can take, therefore, are those that reduce the number of human beings. This is not a cut and dried matter of simple choice, however. Consider the horror of bringing children into the world only to die or live a life in misery. To such children, the cause of death is being born. So that in some cases at least, not having children may be looked on as humane from a human as well as an ecosystem point of view, and we might consider such actions as enlightened self interest. Is birth control moral? Is family planning humane? Sometimes we are faced with problems to which there are no right answers - the old question of doing good that evil may come, against doing evil that good may come.

China reduced its birth rate from 34 per thousand in 1970 to 18 in 1979. This was achieved by a birth control program whose implementation arouses serious reservations. The Chinese experiment is discussed by V. and B. Bullough (1983), who express deep regret that coercion was used in the program. Nevertheless the horrors of children dying of starvation in the overpopulated and poorer parts of China over many years far outweigh the drastic powers of persuasion used to reduce births. They comment that they can offer no viable alternatives. Such a comment from brave and concerned people has summarized for us our future - in which most problems we shall face will require a choice between the lesser of two evils.

In conclusion, we must return to the three opinions that were discussed at the beginning of this paper. Restoring balance with the ecosphere (Opinion 1), although desirable, assumes a relatively passive relationship within which reactive measures may be taken as problems are perceived, but with little attempt to synthesize or examine cause and effect. The speed at which changes are currently happening would appear to deny the possibility of a suggested technological economic Utopia (Opinion 2), which is essentially a declaration of ignorance of the fact that we live within a life-support system over which we have little or no control. A holistic approach (Opinion 3) differs from Opinion one in that there can be no we/they relationship within the ecosystem of which we are a coherent component. We must recognize the enormity of the offence we are committing in our blind misuse of power to achieve a temporary dominance that is directed to exploitation and killing within the framework of the system. We must redirect our group intellect towards changing current behaviour patterns to patterns based on a holistic general theory of cause and effect derived from empirical evidence furnished by the physical, biological and social sciences. And we must recognize that the subject of this paper, population, is unconsciously the overall driving force for humankind's attack on the ecosphere and, by the impetus of its growth, is preventing an immediate and urgently needed end to destruction of our own life-support system.

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