

WORLD POPULATION—PROBLEMS AND SOLUTIONS*

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The most fascinating problem facing the world today is our tremendously increasing population and the battle to maintain an adequate standard of living for all, with sufficient food and a balance between birth and death rates.

General Considerations

Man has been on this earth for perhaps 2 million years. It took most of this time to produce a population of 1 billion, which was achieved in 1850. It required only 75 years to reach 2 billion, the population in 1925. In 1962, 37 years later the population was 3 billion and continuation of this trend, like compound interest, will provide a 4th billion in another 15 years and a 5th in less than another 10 years. This means that our present population of 3.3 billions will rise to 6.9 billions by the year 2000 unless something is done about it.

This spectacular acceleration has been brought about by a sharp decline in the death rate, coupled with a great increase in the average length of life.

In early Egypt, Greece and Rome, around the beginning of the Christian era, the life expectancy was about 30 years. By 1900, life expectancy in Europe and North America had reached 45 - 50 years and today, it is in excess of 70.

Three factors have contributed to the decline in the death rate. The first was the general improvement in standards of living, due to technological advances and comparatively long periods of peace, by reason of relatively powerful and stable governments. Secondly, great strides were made in the purification of water and foodstuffs and improving personal hygiene and assisting in the elimination of parasitic and infectious diseases. The third major factor is, of course, to be found in the great and growing contribution of modern medicine, en-

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hanced by the recent progress in chemotherapy, antibiotics and the insecticides.

The significant gains have been a fall in infant mortality, with a potentially greater number to mature and reproduce in the future, and an increased life span. Throughout all this time, fertility has remained at a relatively high level.

The decline in the death rate was most apparent in Europe and in countries colonized by European stock. Since World War II, its influence has made an enormous impact on others, especially through United Nations' programmes emphasizing economic development and improved health and social services.

Today, the birth rate in the less developed countries where 2/3 of the world population live, is about 40 per 1000 compared with 15 - 25 per 1000 in the industrial countries.

The United States, Europe and Japan are growing relatively slowly and will double their population in 50 to 100 years with a natural increase of about 1%. Latin America, the Far East, Asia and Africa will double in 20 - 40 years with an increase of 2 - 3% per annum. Latin America, the fastest-growing of all, will increase from 200 million to 650 million by the year 2000, closely followed by that of Africa. India's 460 million will increase in 15 years by 187 million, which is more than the total number of people at present in the United States of America!

In South Africa the total population is more than 16 million, made up of over 3 million whites, 1½ million Coloureds, ½ million Asiatics (of which 90% are South-African born) and 11 million Bantu.

According to Dean in Port Elizabeth, the neonatal death rate among the urban Bantu, mainly due to gastroenteritis and pneumonia, has decreased from 500 per 1,000 to 200 per 1,000 between 1950 and 1963, and this is the trend throughout South

Africa. The greatest salvage has been among the Coloureds, who also have the highest birth rate of 47 per 1,000.

Problems for the Future

Various kinds of concern are expressed for the future. Some are concerned about sheer physical space resulting in 'standing room only'. Others see the increase as out running the available food resources, with hunger and famine emerging as the number one problem in the years that lie ahead.

Some are convinced that the increase spells genetic disaster, with a greater likelihood of undesirable genes coming together as a result of exposure to radiation, nuclear fall-out and the effects of drugs. Still others see it as a cause of wars.

Population is a problem in the highly industrialized areas as well. In America, where an extremely high standard of living exists, the population, including that acquired by immigration, has risen by 50 millions in 20 years. 80% has gone into urban areas with a resultant strain on public facilities such as schools, hospitals, transport and water supply. It is estimated that New York's population will increase by 40% in the next 25 years, but that the automobile census would rise by 78%. Imagine the traffic tangles!

How difficult it is too, to absorb such an increase in labour force. Automation will obviously affect the unskilled worker, increasing unemployment and crime. In the undeveloped countries, underemployment is more the rule. They have a low economy, poor education and a low standard of living. UNESCO estimates that in the world today, only 1 in 8 of all ages and 2 out of 5 between the ages of 5 and 20 receive any formal education. It is most unfortunate that most of these people also enjoy a high fertility differential.

Suggested Solutions

Two courses are open to us, and the logical conclusion is a combination of these:

- (i) to do everything in our power to utilize our present resources to their maximum advantage and
- (ii) to reduce our birth rate drastically.

Foreign assistance, mainly from America, has already done a tremendous amount of good in regard to public health, industrial development, the training of teachers and the building of schools, dams and roads.

The USA and Canada are the only bread-baskets remaining in the world today. They export 39 million tons of surplus grain per annum, which amounts to 86% of the world's export. Asia is now consuming 400 million tons of grain per year, and if estimations are borne out, the requirements will increase 2½ times by the year 2000.

India has little additional land that can be brought under cultivation, and to feed her growing population her farmers must increase yields on existing farm lands by at least 50% between now and 1980. A United States Department of Agriculture expert, calculates that an additional 24 million tons of fertilizer a year must be applied to achieve this, but the entire world production of fertilizer is now only 28.6 million tons per annum!

However, man is adaptable, and shortage of materials stimulates research into alternatives. Wood and metals may be replaced by plastics suitable for housing. Solar and atomic energy will replace coal and fuel in industry, and the culture of the fresh-water algae, *Chlorella*, has undeniable promise as a source of human food.

Water and its distribution has a profound effect on both agriculture and industry. There are 330 million cubic miles of it, covering nearly ¾ of the earth's surface. Every second the sun's heat draws up 16 million tons into the atmosphere and it is returned to the earth as rain, hail or snow to replenish our fresh water supplies. 97% of the earth's water is salty in the oceans and seas. 2% is in ice, mainly in Antarctica, and only 1% is fresh water in lakes, river and underground reservoirs. However, distribution is uneven, and half the world's land surface is arid.

More and more water is being utilized. Expanding populations require greater amounts for household use and the industrial consumption is soaring. The production of one ton of steel requires 65,000 gallons and a ton of synthetic rubber almost ten times that. Furthermore, most industrial water is rendered unfit for further use and pollution of rivers is a

serious problem. Irrigation projects are draining off vast quantities and more and more schemes will have to be put into use to feed the growing population.

The desalination of sea water is a practical proposition and installations already exist in the Persian Gulf, Curacao and Kuwait, producing fresh water at a cost of 7-10 shillings per 1,000 gallons, which is below the cost of importing fresh supplies.

We were informed two weeks ago that our South African Atomic Energy Board is investigating the possibility of establishing a nuclear power station on the South African coast to produce fresh water from sea water for industrial use. Such a power station would cost as much as 1,000 million Rand but in view of the serious effect of drought on industry and farming, would amply justify its erection.

To consider the growing shortage of protein food, many countries are turning to the experimental industry of fish-farming. It is at present in the same stage of development as stock-farming was, when man first decided to fence in his cow instead of chasing it for miles.

Not only have schemes been started in shore pools as in Korea and China, but plaice are reared in the sea at Ardtoe, in Scotland.

Conditions can be made as ideal as possible and predators discouraged. Marine biologists estimate a 66% survival rate of young fish, probably 2,000 times higher than that in nature. Naturally, difficulties arise with variations in salinity and temperature of the water and as some popular fish are carnivorous, their own diet constitutes a problem.

However, in Orissa in India, a good fish farmer can raise a ton of fish per acre per year. Such a scheme at lake Kariba could supply more than sufficient for the needs of Africa. This effort, however, is still not sufficient to solve the problem of the growing population.

Family planning is not new and has many examples in nature. A colony of bacteria multiplying in a jar becomes self-limiting, as not only does it outgrow its food supply but it produces toxins that kill the bacteria and keep the growth stationary.

In a personal communication Dr. Skaife, our eminent biologist, pointed out that all social insects exercise population control in the same way--by restricting the right of parenthood to only a few of their number, the so-called 'queens'. All the rest are sterile. Furthermore, should the population become out of hand she is starved and no longer lays eggs. If still too many are produced the eggs are eaten and finally the pupae as well. This policy is ruthless, but highly effective.

While whole-hearted support has been given to diminishing the death rate, a great deal of prejudice and suspicion has made the task of lowering the birth rate a very difficult one.

Governments are slowly recognizing that family planning is a major public health problem.

In his budget for 1966/67, President Johnson has allocated 714 million rand for foreign aid, and of this, 280 million rand will be earmarked for birth control.

Contrary to the beliefs of most people, Catholic doctrine has never been against birth control although it does not condone any unnatural method. A Papal commission of inquiry has been concerned with this aspect for some considerable time and may quite possibly conclude with a change of attitude in their recommendations.

The Asian countries are very much aware of their problem. Government-sponsored schemes to further birth control are on the increase in a determined attempt to lower the birth rate from 40 per 1,000 to a reasonable 20 per 1,000 in the next 15 years.

Such schemes are easier to organize in urban areas where the public are better educated and better facilities exist, such as hospitals and municipal clinics. In the country the population is more spread out, communications are difficult and the people are both more ignorant and prejudiced.

In Madras, in India, males are compensated to the tune of R2 for being sterilized. Even in America requests for sterilization from women who have had more than six pregnancies are sympathetically handled.

The experiment of legalized abortion on economic and social grounds has largely contributed to the reduction of

Japan's birth rate from 34 per 1,000 to 17 per 1,000 in a matter of 12 years. We have heard recently that Korea and Egypt are considering something similar. This is no simple task as even under ideal conditions in hospitals, a great deal of chronic ill health can result, mainly from haemorrhage and sepsis and there is also the occasional death.

Today a marked swing has occurred in Japan towards contraceptive measures, as it is being realized that they are cheaper, easier to apply and safer. Regarding illegal abortions, it is estimated that one million are carried out in America per annum, resulting in 5,000 deaths.

Family planning, however, is not a simple matter at all. First of all, people have to be made aware of the necessity of family planning and trained personnel are required to undertake this.

Fertility control may be running counter to deepseated motivations. Children provide prestige, religious blessing and pleasure, and where infant mortality is high, the society must encourage fertility in order to guarantee perpetuation.

Among our Africans, where childless old age can mean starvation, children are the only form of social security. Boys are a symbol of wealth and girls are not only a source of domestic labour, but provide 'lobola' for their parents.

Medical and social workers must be trained in the many facets of family planning, and Governments must provide for

the availability and distribution of contraceptives to *all* members of the community.

I don't think this is the place, nor have we the time, to discuss the various methods of contraception. Suffice it to say, that the method for the masses must be acceptable, safe, reasonably effective, cheap, easily distributed and requiring a minimum amount of intelligence and reliability to use with a minimum of patient contact.

All methods have certain disadvantages, but the more knowledge that can be gained about reproductive physiology the more likely is it that we shall arrive at the ideal contraceptive.

Conclusion

The time has come for us to evaluate our position in South Africa. We here, are at the gateway to a vast hinterland peopled by a nation of comparatively low socioeconomic status and education. Illegitimacy is rife but it is beginning to recognize that family limitation has advantages and must eventually lead to a higher standard of living.

Perhaps Professor de Villiers of Cape Town has the answer—he is now inserting the loop on the 4th day postpartum and suturing it into the cervix and his results are distinctly encouraging.

It has taken me approximately 20 minutes to read this paper to you and during that time 2,000 babies have been born.