

World Population

SOME PROBLEMS AND A DILEMMA

By SIR E. JOHN RUSSELL

One of the greatest differences between the world of today and that of my early youth lies in the outlook on the future. We young people were optimists; full of admiration for the progress mankind had achieved during the lifetime of our parents, and confident that it would continue onward and upward for ever. It is impossible to convey any adequate idea of our all pervading sense of complete security. We had an Empire "on which the sun never set," an incomparable navy that would keep our shores inviolate and enable our merchant fleet to deliver everything we needed to import. No war in our recollection had ever disturbed the smooth course of our lives; occasional outbreaks necessitated military action, but they were far away in regions of which we knew little or nothing, and our chief interest in them was usually the firework display that marked their inevitably successful conclusion. The present was happy enough but the future promised to be even more so: Edward Bellamy's glowing forecast in his *Looking Backward* was like a fairy story on Golden City lines and had a wide appeal: Sydney Webb had advised me to read it when I asked him what the world would be like when we had the socialism he was then advocating. We knew that the world population was increasing, but we shared Isaiah's optimism: "Thou hast multiplied the peoples and increased the joy thereof."

But that has now all gone: in his interesting articles in the first two issues of this journal Sir Charles Darwin draws only "depressing conclusions" from the increase, in particular the probability that the world may relapse into the hard conditions of Natural Selection. This, after all, is Nature's way, and it has prevailed over large parts of the world all through the ages until recently. The Second World War was the chief factor in bringing about a change. It drastically curtailed food production and supplies in many countries, and reduced a large part of the world population to a deplorable state. After it ended the advanced western countries recovered more rapidly than some of the others and began to operate the charter of human rights drawn up during the war by President Roosevelt and Mr Winston Churchill, including freedom from want and disease. The high child mortality

shocked the consciences of the advanced nations and "Save the children" activities made an irresistible appeal. Medical services and food production were both stepped up and many more children survived, also adult life lengthened; an explosive increase in population set in such as the world had never seen before.

In itself the consequent crowding would probably not have created serious trouble: man's gregariousness makes him very tolerant in this respect. But the question of food supply is more serious: the saving of a life may take only a few hours of medical care, but the husbandman has to provide the survivor with somewhere about his own weight of food every five weeks of his life. This requires even more effort than at first sight appears, for most of the food is harvested only once a year and has to be stored: it is then liable to attack by many pests and even in good conditions the losses are estimated to be of an order of ten per cent, and often indeed are considerably higher. In the race between food production and population increase the husbandman is handicapped by the circumstance that success in any one year increases his task in succeeding years by saving more lives which later on generate still more lives and so on indefinitely. It is as if he were running a race in which a new competitor continually springs up a lap ahead.

The advanced western peoples solved the problem by lowering their birth rates and devising systems of agriculture that are capable of expansion. Food production has thus kept pace with population increases and in some cases has done more, so that surpluses have been produced which the world markets could not take, the disposal of which has at times caused considerable difficulties. At present most of the undeveloped countries still have high birthrates but not an expanding system of food production; each has developed its own native methods which its husbandmen understand and can operate. During the colonial regime the British, Belgian, Dutch and French Governments set up agricultural research stations in the countries associated with them to discover practicable ways of improving the systems, and instructors were trained to show how they should be operated. In general the improvements followed the classical western lines: better cultivations, use of fertilizers, improved varieties of crops and breeds of animals, irrigation, control of pests and diseases, and where practicable introduction of new and more rewarding crops. These have had considerable success and the result has been that up to the present the husbandman has caught up with the wartime deficiencies and has been just about keeping pace with the increase in world population: during recent years this has averaged about 1.6 per cent per annum while increases in food

production have ranged from about 5 per cent in the very good season of 1958-59 to about 1 per cent in the poor season of 1960-61. But already there are indications of falling off; about one-tenth of the earth's surface is cultivated, and while this is steadily increasing it is not keeping pace with the rate of population increase: it went up by 8 per cent during the period 1951 to 1959, but the world population rose by 20 per cent.

There are special difficulties in the way of increasing food production. For the great majority of mankind this is carried out by peasants, mostly uneducated though often very shrewd, operating in a small way and with limited resources traditional systems which they know will produce food, and which moreover are self contained in that the appliances needed can all be made and maintained by the local craftsmen; little if any capital is needed. On the other hand, some of the products required by world markets and industry such as rubber, cotton, tea, certain vegetable oils, often fare better: they must conform to definite standards if they are to be readily accepted, and they are commonly grown in large plantations under skilled supervision and scientific control. Only in communist countries is anything similar attempted for food production, and so far as can be gathered no great success is attained. The only independent Communist country, Yugoslavia, abandoned collectivisation early and reverted to peasant production. The reasons for this lie deep in primitive human nature: they include attachment to a mode of life and a particular plot of land which we have long since lost, reluctance to abandon a system that has served the tribe for as far back as tribal memory extends, and unwillingness to embark on practices of which the witch doctor and the village elders disapprove.

The greatest trouble is that modern more efficient and expandible methods are likely to necessitate a complete revolution in the way of life. This happened in our own country. Our old open field system had served for something like a thousand years, but by the time of the first Queen Elizabeth it was beginning to prove inadequate to feed our population of about four millions. Had fertilizers, better varieties, pest control agents and other improvements been known the output could, no doubt, have been doubled or trebled but the possibilities were limited. Then in the 17th and 18th centuries a new system, Mixed Husbandry, was developed; it was not only more productive but proved capable of constant improvement, which is still continuing. On the open field system yields of 5 or 6 cwt. of wheat would be not uncommon; on the Mixed Husbandry system in its earlier forms they rose to about 15 or 16 cwt.; later improvements have raised the average to about 26 cwt. at the present time, but good farmers expect about 40 cwt.

and are thinking hopefully of 60 cwt. per acre. Even this is not the limit, already on one occasion a yield of 70 cwt. has been obtained.

A similar transformation is being attempted in Kenya. On the traditional system the land belonged to the tribe, but each member had the right to cultivate a certain specified area. On his death the next of kin inherited the land and parcelled it out among themselves: a daughter on marrying transferred her rights to her husband, while a son marrying acquired the rights possessed by his wife. The result is a complicated land pattern very difficult to operate satisfactorily; a man may have 20 acres in 30 or more separate plots widely scattered. The traditional tool is the hoe. The first operation, the opening up of the soil, is done by the men, the later operations, sowing, harvesting, etc., by the women. The hoe is an accommodating tool: the plots need have no definite shape; in fact they are often very irregular in outline. But the improved system is entirely different. The chief implement is the plough, and it requires the holding to be all in one place and rectangular in shape: the nearer to a square the better. Also it must be worked by a man. Much exchange of land is necessary, involving the giving up of plots that have long been held by the family, and this the peasant always dislikes. There is also a firm belief that the land received in exchange is not as good as that given up. These and other troubles normally make the process of consolidation of the holdings very difficult and slow.

The Kenya Government, however, had to take certain compulsory powers during the Mau Mau troubles and they were thus able to introduce the improved method in some of the Kikuyu villages and to direct the operations. The results were so satisfactory to the cultivators that neighbouring villages asked for consolidation of the holdings and instruction in the new methods; till recently the movement was spreading more rapidly than the Agricultural staff could operate it. The new methods include rotations of crops for home use and for market, thus supplying the womenfolk with cash to purchase some of the desirable things the Indian traders are carrying into the remotest villages. On my last visit I heard of a missionary who declared that he had often been in parts of Africa where the Gospel had never been preached, but never anywhere where you could not buy a sewing machine on the hire purchase system.

The social consequences of the new system will, however, be revolutionary. The village will be no longer a self contained, self sufficing unit: the appliances needed cannot be made by the local craftsmen but must be produced by highly organised industries located for convenience in towns. The land will no

longer be owned by the tribe but by the individual cultivator, who may sell it, but only to a fellow tribesman: fragmentation and scattering of holdings are not permitted. It is recognised that this involves the creation of a landed and landless class and as the improved systems require far fewer workers than the old many of the landless will become redundant in the village. Industries must be developed to provide them with work and new industrial cities must be established. The advanced countries will be called upon to provide much of the capital needed and also a share in the world markets.

Already Nairobi has made quite a promising start. Kenya has no gold, diamonds, metallic ores or other valuable minerals to export, but enterprising British and other firms have started secondary industries that look like solving the economic problems of the landless if left to develop in peace. But the social problems inherent in industrial life are also appearing: unemployment, crimes of various sorts, prostitution, and others. Apparently this is all part of the price that has to be paid for the extra food provided by the new agricultural methods. There had been hopes that all this might have been avoided by the development of village industries. Mahatma Ghandi tried to establish them in India with but little success.

An inevitable result is that the population becomes more and more urban minded and loses interest in food production. The necessity for conserving good farm land may be recognised as a general principle, but encroachment continues in advanced countries and erosion in those undeveloped. Other interests come first. Even in some of the hungry countries where increased food production might be regarded as the outstanding problem the native politicians show little interest in it. Indonesia is buying armaments although Java is one of the most densely populated regions in the world and is rapidly developing a Malthusian situation. Appropriate education widespread is needed; considerable efforts are being made, but the supply of teachers will long present difficulties.

These are some of the problems that have already arisen in connection with the feeding of the world population. They will almost certainly become more difficult, and their solution will require much careful study and the provision of considerable funds. If as happens now the advanced western countries are called upon to bear most of the external burden they will have a much harder task than has fallen to us. They may be less able to bear it. Increased taxation for home purposes and steady deterioration of the currency may reduce their ability to provide money for other countries, and changes in the character of their populations may

reduce their ability to find good solutions of the problems involved. The medical advances that raised the hunger problem in the undeveloped countries have aged the populations of advanced countries. Twenty-five years ago there were in England and Wales about one million persons over the age of 75; now there are about two million, and accumulation of the aged is likely to increase, intensifying among other problems the perennial one of paying for their increasing pensions. Increases are also likely in the proportions of mentally, morally and physically unfit and who years ago would have died early but are now saved by medical science without, however, being transformed into normal, healthy citizens; they become a permanent charge on the community.

There is also a very real danger of genetic deterioration as a result of the higher rate of increase of the XYZ end of the population compared with that of the ABC end, favoured by present domestic policies. Already there are warning signs in the increase of juvenile crime and sexual laxity in spite of the best efforts of our increasingly expensive educational system.

It would be easy to draw a very gloomy picture of the future prospects of the human race. But it would not necessarily be a true one. Dean Inge who was by no means a rosy optimist used to say that things rarely turned out as badly as had been feared, and agricultural history provides numerous examples of threatened catastrophes being averted by unexpected discoveries. In the early 19th century there were well grounded fears that Britain's population of about 16 millions was dangerously high: the "hungry forties" seemed an ominous portent. But unexpected developments of steam engineering made possible the remarkable growth of industry in this country and of transport of food from the American prairies, and by the 1880's and 1890's so much food was available that many of our farmers were driven into bankruptcy. By 1896 however the position had changed so much that Sir William Crookes made his celebrated forecast of desperate shortage of wheat by 1930, bringing hunger to millions of people who had never known it. Like a good scientist he propounded a remedy: the application of nitrogenous fertilizers which he showed how to synthesise in indefinitely large quantities from the nitrogen of the air. The forecast was one of the soundest in the whole history of agriculture though the nitrogenous fertilizers would not, in fact, have solved the wheat problem. But in the meantime an entirely new science was developing: plant genetics started off by an entirely unexpected discovery of a scientific paper published forty years earlier by an unknown monk in an obscure journal; also agricultural engineers produced entirely new types of machinery; and when 1930 came

there was such a glut of wheat on the world market that again many farmers became bankrupt and a new problem was raised: what to do with the surplus. In the Argentine wheat became so much cheaper than coal that on some of the railways it was used to fire the engines. As another example, fears were till recently justifiably felt that the exhaustion of coal and oil when it comes would gravely hamper all production. But a new source, atomic energy, will have overcome the difficulty long before it arises. This finding an unexpected way out of threatened disaster is no new thing in the world's history; nearly 25 centuries ago it was a recurrent theme with Euripides:

“The things that we looked for the gods deign not to fulfil.

And the paths undiscerned of our eyes the gods unseal.”

In this sceptical age many would argue that because solutions of vital problems have turned up hitherto it by no means follows that this will happen again.

In the meantime the advanced Western peoples are confronted with a terrible dilemma. Nature's solution of the problem of an expanding population is the law of Natural Selection. The Western peoples urged by feelings of humanity and sustained by the Christian ethic, are deliberately flouting this law thereby asking for trouble—and getting it. The efforts to save the children succeeded, but raised the new problem of world hunger. In so far as this is solved it raises the still newer problem of unemployment, which is being met by setting up industries in the undeveloped countries. Meanwhile as a temporary expedient unemployed persons from Commonwealth countries are admitted to our country, but this already causes health and housing troubles and will raise others including problems of mixed marriages. For the undeveloped countries the permanent solution would be gifts of manufacturing equipment and places in the world markets that we at present hold. The productive sector of the advanced countries would have to find a large part of the money needed for these and other industrial developments with no certainty of a full refund. As their efforts succeed their overseas markets may slip away from them because of the low wage costs of their new competitors, and as Lord Boyd Orr pointed out some years ago they would be in the awkward dilemma of either losing their present manufacturing supremacy, which enables them to help, or of violating one of the clearest injunctions in our present code of conduct. The position may well be worse than that, for as the advanced populations progressively weaken owing to the increasing numbers of mentally, morally and physically unfit that they foster, and the increasing burden of helping the undeveloped countries, it may happen that those which have been most assiduous in these good

works find themselves unable to survive in what may be an increasingly severe struggle for existence.

Personally I cannot believe that events will turn out like that. We still cannot see what the future holds; we do not know whether there is a Plan in the Universe or whether events outside our control come about merely by blind Chance. This second alternative is depressing, the first is happier and for many people a better guide to life. Whichever view we take our task is clear: it is to study closely and dispassionately the problems presented by this difficult situation which now threatens us in the hope of finding workable solutions for them as they arise.

BIOGRAPHICAL NOTE



Sir Edward John Russell. Born at Frampton-on-Severn, Gloucestershire, 31st October 1872. Son of Edward Thomas Russell, school-teacher who later entered the Unitarian Ministry. Educated at University College of Wales, Aberystwyth, and Manchester University where he became demonstrator and lecturer in Chemistry. Head of Chemical Department, Wye Agricultural College, 1901-7. Goldsmith's Soil Chemist, Rothamsted Experimental Station, 1907-12. Director of the Station 1912-43, during which time he built up a distinguished staff and took an active part in the development of modern agricultural science. Has travelled extensively in Europe, Africa, North America, Australasia and India, studying the agricultural and food-production problems at the request of the Government Departments and Universities, advising especially on the scientific problems concerned. He is a Fellow and Past Vice-President of the Royal Society, the Royal Geographical Society, the Royal Society of Arts and Royal Agricultural Society, and has been awarded university and other distinctions in a number of countries.