The Seating on the Globe —The Crisis We Human Beings are Confronted—

Gen-ichi WATANABE*

Hunger

Our globe has a history of 4,600 million years since its beginning. Some 1.5 million years ago *Australopithecus boisei*, who was supposedly living in Africa and whose number was surmised to be about 125 thousand, evolved into *Homo sapiens*, represented by us as we are now. The weight of the brain of mankind today is 1.4 to 1.5 kilograms, while that of *Australopithecus boisei* was one third of it.

Since the agricultural revolution occurred about 10 thousand years ago, the human race spread widely over the earth. By producing food with our own efforts, our population began to increase.

When Augustus reigned over Rome as the first Emperor around the 1st year A.D., there were 250 million. The increase of population did not always go favorably. Drought and famine, the spread of epidemics, and wars killed a lot of people. Surprisingly enough, the black plague which spread throughout all the world in the 14th century slew one-third of the world population.

Famine also took away a tremendous amount of lives. Chapter 12, verse 10 of *the Genesis* reads: "And there was a famine in the land; and Abraham went down into Egypt to sojourn there". This same kind of famine is still there. The continent of Africa nowadays is suffering from endless droughts and civil

wars. It is not enough to say that the shortage of food is in a critical condition; it is really in a desperate one. In Africa one person out of three, that is, 150 million people are just waiting for their death from starvation. Food and Agriculture Organization (FAO) predicts that before the 21st century comes, 300 million people will die of hunger in the continent of Africa.

From 1918 to 1922, and then from 1932 to 1934, the USSR lost 10 million people due to death from starvation. Even now the USSR is still suffering from chronic drought, and every year she is importing 30 to 40 million tons of grain from the West. In 1984, the USSR urgently imported additional 10 million tons of grain from the USA. The amount of agricultural products which the USSR imports is the highest in the world. Incidentally, Japan is the second highest in the world as far as her import of agricultural product is concerned.

Population Explosion

In spite of the above-mentioned circumstances, the world population has intently been increasing. When we think of the period of time in which the population of the world doubled until 1975 when the world population was expected to be 4,000 million, we cannot but think that there had really been a geometrical increase in tempo, as shown in Table 1.

* 新潟大学名誉教授 (衛生学)

* *Emeritus Professor of Hygiene and Preventive Medicine, Niigata University School of Medicine*

Table 1 Rate of Population Increase

Year	World Population	Duration of Time in which Population doubles
(8000 B.C.)	(5 million)	
1 A.D.	2.5 hundred million	1630 years
1630 A.D.	5 hundred million	
1830 A.D.	10 hundred million	200 years
1930 A.D.	20 hundred million	100 years
1975 A.D.	40 hundred million	45 years
2023 A.D.	80 hundred million	48 years

Particularly since the start of this century, the world population has been explosively increasing. The world population is considered to have amounted up to 5,000 million in 1987. The recent estimate by the United Nations tells us that the world population will be more than 6,127 million by the year 2000, and will be 8,177 million by the year 2025. Anyway, the fact cannot be avoided that in the beginning of the 21st century the world population will be over 6,000 million.

It is necessary that we should be expected to have a corresponding supply and demand of food for the population increase. Though the famine began with the outset of the history of mankind, it is only in these last ten years or so that food anxiety has been discussed as a serious international problem. As the world population increases to the extent that it surpasses our food producing capability, we are now beginning to feel afraid that this globe of ours might be unable to support the whole of mankind on itself, and, to tell more frankly, even now a world famine has been predicted.

When we talk about the relationship between population and food, we cannot but

refer to "an Essay on the Principles of Population" published in 1798 by Thomas Robert Malthus (1766-1834). He predicted that unless any factor worked to restrict the increase of population, the population growth would advance in geometrical progression while food production on the limited expanse of land available increased in arithmetical one. Thus there would be an unbalanced state between the two factors, causing poverty and vice.

However, while the Industrial Revolution, which occurred in England at the end of the 18th century, enlarged the productive power and heightened the standard of living, the development of medical science and public health also helped to make the mortality rate diminish and to prolong the life span of man. This caused a decline in the birth rate and made poverty less remarkable in advanced countries. As far as these aspects are concerned, we find that Malthus' prediction was not necessarily true.

So, the rapid increase in population in the developing countries after the Second World War leads to poverty and famine, and even though a few developed countries have a

surplus of food, from a global point of view this indicates that the world situation assumes an aspect of Malthus' hypothesis. The rapid increase in population not merely causes the food problem but also exhausts natural resources.

The declaration in Mexico which was adopted at the 4th meeting of the World Population Conference sponsored by the United Nations three years ago, was as follows: In these ten years after the Third Conference held in Bucharest in 1974, many countries have suffered from unemployment, economic insecurity, and foreign obligations, and the number of those people who have suffered from absolute poverty has increased remarkably. Natural resources and economical difficulties are then becoming serious, especially in the developing countries.

Capacity of the Earth

Eighteen years ago, George Borgstrom, a scholar of agricultural economics, pointed out in his article that the number of human beings had already become more than the population size which was supported by the limited resources of the earth, and that the upper limit of population which the earth could embrace on it was 2,000 million. And fifteen years ago, English ecologists said that the population that our earth could support was 3,500 million at the most. On the other hand, J.C. Saigal, a political economist in the Republic of Senegal, pointed out that it was mere nonsense to calculate the number of people who could live on the earth.

It is not easy to presume the capacity limit of the earth. It is very hard to figure it out from the acreage under cultivation and deposits of natural resources, and we can hardly

predict the progress of science and technology in the future. And also, views of value as to the standard level of living are never even among people on the globe.

On the other hand, we know that some people may be optimistic for food supply and demand in the future. However, the opinion of FAO and World Bank is very severe. The USA is not only the greatest food exporting country in the world, but is also a top-ranked food helping country. The whole world nowadays has to depend upon the USA for 15% of the supply of agricultural products. In order to satisfy this demand, the USA has annually to increase the export of her agricultural products by 6 to 8%, even though the annual rate of increase of agricultural production in the USA is only less than 2%.

On the other hand in the so-called "Third World" such as some 40 countries in Africa and in other areas, even an absolute crop production has been decreasing these ten years in contrast to the remarkable increase in population. To make the matter worse, their grain imported from developed countries has even changed their own eating customs as well as tastes. There are a lot of problems as seen in intense changes in the price of agricultural products influenced by the backwash of the world economy, petroleum difficulties and trade protectionism. Furthermore the result of the Help Agreement for the next ten years made by the UN Food Conference held in Rome in 1974 are even now unsatisfactorily lower than expected. Despite this, they rely solely upon this agreement and are lacking in energy and will to promote their own productivity. The FAO report tells us that 22 countries in the continent of Africa will be unable to self-supply food henceforth.

The Japanese as the Reasonable Earth People

As for the average calories taken in by a person a day, an American takes 3,300 kcal., a Japanese 2,500, an Indian 2,000, and the world average is 2,400. But as far as an American is concerned, he gets 1,125 kcal. out of 3,300 from livestock, a Japanese 250, and an Indian no more than 100. A Japanese takes animal protein from sea food that is nutritionally necessary and enough to him.

In the developed countries, in order to produce livestock which will give us the heat capacity equivalent to one kcal., we have to give them sevenfold kcal. as food and others. What is called "Original Calory" is the amount of calories necessary to create this total heat capacity. Any examination of "Original Calory" tells us that an American takes 10,050 kcal., a Japanese 4,000, an Indian 2,570, and the average in the world is 4,680.

Needless to say, the fundamental resource necessary to supply this "Original Calory" is land. Putting a surmise from the computer model carried out by the Massachusetts Institute of Technology and a White Paper issued

by the Department of Agriculture of the USA together, about a half of potentially tillable land (3,200 million hectares) has been made use of as farming areas at present. It might be said that we could manage to multiply the agricultural land. However, as urbanization advances day by day, good cultivable land is quickly commercially developed, and viewed globally, agricultural areas are rather rapidly changed into deserts. In order to materialize the green revolution in the desert and waste land, we need an enormous amount of public investment accompanied by a tremendous amount of energy.

Now let us imagine a condition in which mutual understanding, co-operation and solidarity among all nations will become realized while the development of science and technology increase the food supply twice of what it is now. In the middle of this year, 23,400,000 million kcal. are used by the world population each day, and under the above-mentioned hypothetical condition 46,800,000 million kcal. a day would be used by us as hard as possible (Table 2).

Table 2 Original Calories and the Earth's Capacity to support the World Population

	(kcal.)			
	USA	Japan	India	Average
Calories Needed by a Person a Day	3,300	2,500	2,000	2,400
Vegetable	2,150	2,150	1,900	2,000
Animal Meat	1,125	250	95	380
Seafood	25	100	5	20
Original Calories Needed a Person a Day	10,050	4,000	2,570	4,680
Total Original Calories Supplied to the World Population a Day				
Present				23,400,000 million
Hypothesized Upper Limit				46,800,000 million
Earth's Capacity to feed the World Population				
Present	2,330 million	5,850 million	9,100 million	5,000 million
Hypothesized Upper Limit	4,660 million	11,700 million	18,200 million	10,000 million

So if all the people in the world want to enjoy their diet as Americans do now, the limited feeding capacity for us on the earth would be 2,330 million people. It would be at the most 4,660 million people. The present population on the earth has already exceeded this particular figure. Therefore, we do not have to admit that the American way of living fits in with the reality.

On the other hand, if we decide to adopt the Indian way of living, the population size is surmised under present conditions to be 9,100 million and the upper limit would be at the most 18,200 million. However even if we want to adopt the Indian way of living, it would be meaningless, because even now a large number of people in India are suffering from undernourishment.

If we are allowed to estimate the number of people who could be sustained under the Japanese way of living based on "Original Calory", the population around 1997 namely 10 years later, would be 5,850 million. At that time, people on the earth will be filled up. For the present time, we cannot find any concrete sign at all that the world food circumstances would be improved.

According to my own estimation, at least at present, the Japanese way of consuming food

is what the world has to adopt as their model. Besides, in regard to the community health indications, we have the fact that we Japanese indeed have the longest average life span and also the lowest infant mortality rate in the world. In this respect, we can see that the Japanese life style is the most reasonable one on the earth.

Conclusion

The International Peace Research Institute in Stockholm indicates that it is senseless to discuss peace and armament reduction without thinking at all of famine problems. The population explosion in this century, especially in the latter part of that, clarified the contrast between the famine in the developing countries and the fill-eating in the developed countries.

Today we are facing a serious situation and we must do anything we can remedy the difficult circumstances, such as control armament, equitably distribute wealth and welfare, and furthermore take measures to develop science and technology which search for an energy replacement of natural resources---resources which could soon be exhausted on this planet of ours.