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THE WORLD'S ACCELERATION

A Paper for the Kit Kat Club

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January 20, 1948

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Our world began with a mass of matter, thrown off by our sun perhaps, some millions or billions of years ago as we measure time.

It went through a long period of cooling, of taking form. There was earth, and water. Continents formed, and oceans. As it cooled and contracted, it wrinkled into folds that were mountain ranges. And then the gradual process of erosion formed valleys and plains.

Somehow, from the ooze of primeval swamps, life emerged and started on that long unbroken road that leads to us. It divided itself endlessly into plants and animals. The seas were filled with fishes and the land with wonderful plants and animals. The mammoth and the mastodon had their day. So did the dinosaur and the saber-tooth tiger.

In the long drama of evolution, species came and went, leaving their records in the fossil rocks and endowing us with their organic remains in coal and petroleum and natural gas.

At some time, perhaps a million years ago, certain forms of this slowly developing life took the shape of man. Since then man has had his own evolution within the evolution of his world. He, like other forms of life, has changed

with his environment. He has always responded to the great forces of nature. While man has developed intellect and civilization and a sense of morality and ethics, he has had only limited success in conquering his environment. He still must reproduce himself as other animals do. He has stabilized his body temperature, but in doing so he has subjected himself to endless trouble with heat and cold. He must eat the organic products of the world, or die.

He has learned to think, but he has yet much to understand about his world and his environment.

But man has advanced wonderfully, in comparison with other forms of animal life. The road of his destiny is marked by many accomplishments.

He learned to use fire, and stone, then bronze and iron. He invented the wheel. He learned to make paper, and then invented movable type, so that by eccentric arrangements of carbon particles on sheets of cellulose, he can record his thoughts for his contemporaries and for his descendants.

He succeeded in inventing gunpowder and the internal combustion engine. He discovered and learned to use electricity, and then radio waves. Lately---and shall we say finally?---he has learned how to cause atomic fission.

It was a long time between his first crude, primitive inventions and his later, more complicated ones. His progress was spotty. Some men were more efficient in their environments than others.

Scattered over the earth in islands of culture that did not touch one another, some groups of mankind were exceedingly advanced in some things, surprisingly slow in finding others.

The peoples of the western hemisphere, for example, had invented amazingly accurate calendars, and had built good roads, but they never thought of the wheel. Pre-Columbian American surgeons had successfully trepanned the human skull, but knew nothing of explosives.

The rate of man's inventions, and the rate of his increase on the earth, are the subject we consider here. Whether one caused the other, no one can say with certainty, but they are coincidental, and they add up to an acceleration whose force and possible results are of great interest to all thinking men.

Man's increase on the earth has been slow. Only recently have we been able to make even estimates of past population with much accuracy. But evidence is abundant that, for long millennia, the population of the world was small. Even when the Mediterranean civilizations flourished, population dwindled quickly a few score miles away from Rome or Greece or Carthage.

The orient perhaps had the largest populations of past epochs, even as it has today.

When the New World was discovered by Europeans, it was a vast wilderness, except for the cultural centers of the Aztecs, the Mayas and the Incas. The forests and

plains were sparsely peopled by nomadic barbarians whose numbers were few.

It is estimated that the territory that is now Ohio, although it was a center of Indian life, was inhabited by only a few thousand. Ohio today has seven million people.

There is little upon which to base accurate estimates of world population in ages past. Certainly for very long periods it must have been fairly stable, increasing very slowly.

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Only within the past century has serious notice been taken of population as a basic factor of world-wide significance. And only in the past few decades has the world become one world. Before that it was a far-flung group of islands of humanity, either unaware of one another or in only tenuous communication.

The first scholarly estimate of world population put the figure at a little over one billion in 1845, just over a century ago. Today it is approximately two and a quarter billions. So we see that world population has more than doubled in the past century.

Considering the great antiquity of man on earth, this is indeed acceleration at a very rapid rate.

It is interesting to note that, in the past century, two nations have outstripped all others in RATE of population. They are the United States and Russia. It is they who are the great power factors in the world's geopolitics today.

One of the most interesting modern studies of world population and its significance is contained in the book, "Human Breeding and Survival," written by Guy Irving Burch, director of the Population Reference Bureau, and Dr. Elmer Pendell of Baldwin-Wallace College.

Pearl Buck's book, "The New Generation," says: "In all those countries where population is too abundant, the cause of the individual is lost." The authors of "Human Breeding and Survival" point out that at least two out of every three of the world's people today live in want of the barest necessities of life.

"Though man has struggled long and hard to increase production of agriculture and industry, to improve the distribution of goods, and to make government a more effective instrument, the problems of humanity remain unsolved," they say.

If India's ~~birth~~ death rate could be suddenly lowered to that of the United States, and if she continued her present birth rate, India would populate the entire world five times in one century. China could do the same, and it would not take Russia much longer.

Faced with the fact of two and a quarter billions of people on earth, some of the wishful thinking of idealists becomes absurd. The authors I have mentioned quote a statement issued during the recent war by the Office of War Information:

"...beyond any doubt, men now possess the technical ability to produce in great abundance the necessities of daily life---enough for everyone. This is a revolutionary and quite unprecedented condition on earth, which stimulates

the imagination and quickens the blood."

The authors admit that man has the technical ability to produce in great abundance, but that men can produce enough for everyone, they say, is certainly NOT beyond any doubt.

Everyone today certainly is not being supplied with the necessities of good living. And "everyone" a few years from now will be vastly more people than the word means now.

The Population Reference Bureau, of which Mr. Burch is director, reported in December that Europe's population has increased 14 millions during the past 10 years. This despite---or is it because of?-- World War II which took millions of lives.

Furthermore, although millions of Europeans are living in misery, on the verge of starvation, Europe's population is NOW increasing faster than before World War II, and is expected to increase 22 millions more in the next 10 years.

The 16 countries which will receive aid under the Marshall Plan have a total population of about 219 millions. All of them have sharply increased their birth rates. Many are giving bonuses in one form or another for larger families.

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The United States is keeping pace with the general rise in world population.

The U.S. birth rate in 1947 was 26.2 per 1000 population. The pre-war rate was 18, an increase in our own birth rate of almost 50 per cent.

Before the war, population experts had estimated that our population would level off, with deaths balancing births, about 1965. The trend has changed.

The new rate of population increase will recede some time no doubt, but it will add an estimated 10 million people to our old calculations. They make our current United States population about 145,000,000. By the year 2000, some 50 years hence, our population will be 175,000,000.

So, our population is not static, but expanding, even as it is in other countries. That will mean an expansion of our economy---and in our use of the world's resources.

Project our thinking six years, and we see this added wave of young Americans entering first grade school. Will there be places for them to sit?

In 14 years they will be entering high school, in 18 years, college.

They will marry in twenty years or so, and will start another wave of population.

They will be using, meanwhile, the goods required by their ages---

That means heavier demands now for kid stuff, school houses, recreation, then for clothing and other needs of teen agers, finally, of homes, furnishings, public services--- all the things young home makers need.

Population does not disappear after it is brought into being, but keeps on having an effect on later populations. Burch and Pendell estimate that world population will reach three billion three hundred million by the end of this century.

Our own population is only about six per cent of world population. Considering our small ratio to the rest of the world, and the exceedingly low standards of living of most of the people in other parts of the world as compared with our high standards, we need some sober calculation before attempting to furnish food and succor to all who need it in the world.

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Many people have two illusions about the world food crisis, Burch and Pendell point out. They imagine that there is less food than before the war, and that, because of the war, there are fewer people to eat it.

The U.S. Department of Agriculture reports that, in 1945 and 1946, the caloric value of world food production was only 5 per cent less than before the war. But, considering the seven per cent INCREASE in world population during the war, the food production on a per capita basis is about 12 per cent lower.

There is a direct connection between population and the ability to get enough to eat, and the fear, dread and hate that lead to war.

Men have tried many schemes to avoid war in Europe and Asia, and all have failed. But we and Canada are proud of the peace that has existed along our unarmed frontier for a century. Both of us have had enough resources to feed and maintain our populations without fear and without aggression. The result---no war.

The Germans, Burch and Pendell point out, have been among the world's most intelligent and industrious people. Yet their level of living was only half as high as ours and Canada's before the recent war.

The Japanese also were industrious and highly resourceful, yet their scale of living was less than one third as high as ours.

Industrialization did not free either the Germans or the Japanese from want nor prevent them from starting wars for expansion. The Chinese produce more food per acre than do Americans, yet they live on the edge of starvation.

Economists and statesmen are beginning to realize, more and more, the relationship that exists between population and the problems of security, freedom and contentment, all factors which, in their absence, lead to war.

But to pursue our study of world acceleration, we can only glance briefly at each facet of this many-sided problem.

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As he multiplied on the earth, man learned to use the materials that it offered him. From crude stone, he progressed through bronze and iron and wood, using the forests, the other animals, the soil, coal, petroleum, gas and the other minerals.

During the many centuries when man multiplied slowly, he used the world's resources slowly. As he accelerated his rate of reproduction, he increased his RATE OF USE of earth's resources.

Since 1900, the mineral production of the United States alone, has been greater than all mineral production in all countries of the world since the world began up to the Twentieth Century.

The United States has been called the land of plenty. But Elmer W. Pehrson, economics and statistics director of the U. S. Bureau of Mines, points out that we have as much as 100 years' supply of only nine of the 33 minerals needed to keep our factories running. Of the remaining 24, we have a 25 to 100 years' supply of only four, a five to 25-year supply of eight, and LESS than five years' supply of 12.

"To put it in harsh terms," he said, "35 years is only a little more than the usual interval between wars, and we have less than 35 years' supply of 21 of the 33 most important minerals. And this group includes petroleum, copper, lead and zinc."

In this land of plenty, what do we hear today? Plans for allotting, if not rationing, iron and steel. Shortages of gas and oil, due, it is said, to lack of production and transportation facilities, which in turn are due to lack of materials. We have already started to run short.

We cut down our forests in profligate haste, to clear the land for crops, and to get timber. Between 1909 and 1938, only 30 years, our standing saw timber was reduced 40 per cent. In 1943, timber cut or destroyed was 50 per cent more than total growth. Yet, of our 28 million homes, 23 million are built of wood.

What about soil---that few inches of surface fertility that produces everything we eat? Dr. Hugh H. Bennett, chief of the U.S. Soil Conservation Service, told a congressional committee back in 1939, that we did not have enough good land in the United States. That was before the war's demand for food, and post war high prices brought about even more intense use of crop lands.

Three dollar wheat drives marginal land under the plow. It is interesting to note that two opposite conditions encourage erosion and waste of soil. Extreme poverty among farmers prevents them from following sound soil conservation practices. On the other hand, high prices, as we have now, encourage careless land use and plowing of marginal lands that are easy prey to erosion by wind and water.

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- The annual report of the Secretary of the Interior for 1945 stated:

"It behooves us to learn the true meaning of our meager supply, which is not that we shall be weak in a hundred years, but that we are relatively weak now."

In this country it now takes about 3 acres of land to supply a minimum diet and the raw materials for clothing and shelter for one person. We have about 460 million acres of good crop land left. Of this, 80 million need clearing, irrigation, drainage or reclamation. At our present population we still have a little margin. But at our present rate of increase, we will have a deficit of crop soil within a few years.

Available productive soil in other parts of the world has been scarce for a long time. Large areas have passed from productivity to desert long since.

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It is Nature's way to provide balance wheels on portions of her realm that accelerate too rapidly. There have been many balance wheels on the world's acceleration in the past.

Man had to pit himself against the privitive hazards of fierce animals, the elements, plagues and pestilence, starvation, and the effects of wars in massacres and pogroms.

When he did overcrowd his environment, he often found escape to new areas of the earth. The discovery and colonization of America was an event that had an influence on the social and economic life of the Old World for several centuries. Europe's masses, crowded and frustrated, found hope in the prospect of new homes and better living in America. They were our ancestors.

The statesman, Edmund Burke, in his famous appeal for conciliation with America, 172 years ago, had this to say:

"For some time past, the Old World has been fed from the New. The scarcity which you have felt would have been a desolate famine, if this child of your old age...had not put the full breast of its youthful exuberance to the mouth of its exhausted parent."

Yes, the Americas offered a great safety valve to release the pressures of the Old World in times past. It is still furnishing sustenance to the world, and may be able to do so for some time.

But there are no more new worlds of territory. We have examined our planet and have found it all. There are areas still subject to further development, but their potential capacities are limited. Practically all of the earth, by now, is owned or claimed by someone.

Our new frontiers cannot be territorial. They must be frontiers of scientific research, of new technical discovery, of new engineering efficiency.

As many more human beings are born, we must find ways of feeding them by more efficient use of available land--- if they are to be fed.

While our birth rates are increasing, we are also learning now to live longer. No longer do plagues sweep away large sectors of population, as they did in the Middle Ages. Only recently, cholera broke out in Egypt, on a scale that at one time might have decimated a large population. But science brought serums by plane, and the plague was averted.

The average life expectancy of Americans should reach the Biblical three score and ten within the next 10 or 20 years, statisticians of the Metropolitan Life Insurance Co. predict. The average life span now is 65.8 years. This is

a gain of 16 years since the turn of the century.

Many interesting but isolated population problems can be found. Ireland was overcrowded a little over a century ago. Crop failure meant bitter famine. Millions of Irishmen came to America, relieving the pressure in the Emerald Isle. This wholesale emigration, and a relatively low birth rate, decreased the population of Ireland from six million in 1845 to three million in 1945.

The Navajo Indians in the southwestern United States are another kind of case. In 1868, the tribe numbered some 9,000 people. Today there are more than 60,000 Navajos, and they are increasing at the rate of 1000 a year. Their primitive economy, in their restricted desert reservation, will no longer support them. Recently they were saved from winter starvation by a hasty grant of relief funds from Congress.

Japan's population is at an all-time high, despite the war. More than five million have been repatriated to their already overcrowded islands, from colonies in China, Korea and Formosa.

Italy's population goes right on increasing, faster than any other country of western Europe. Yet this country, with many of its farming areas worn out by centuries of over-cultivation, cannot support its 45,000,000 population.

Italy sent many of its sons and daughters to the United States before we put up barriers to immigration.

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We are not the first men who have studied and worried about the relation of population to our chances of eating. The times have seemed out of joint to some of the thinkers of every generation. Even wise men do not understand the plan and the exquisite timing with which God controls His universe.

Over a century ago in England there was a scholarly economist named Thomas Robert Malthus. He studied the world as of the end of the 18th century and reached a great conclusion. He put forward the view that population, when unchecked, increases in a geometric ratio, while subsistence only increases in arithmetical ratio, and that population always increases up to the limits of the means of subsistence. Population is prevented from increasing beyond these limits by the positive checks of war, famine and pestilence, and by the influence of misery and vice.

Later he revised his thesis, abandoning somewhat his mathematical concept, and adding as one of the checks on population an imponderable which he called "moral restraint." By this he meant the postponement of the age of marriage, accompanied by sexual continence.

The Malthus thesis aroused great controversy, and inspired further thought and study by later scholars, including Charles Darwin.

The Malthus theory was not bad in its day. But Dr. Malthus overlooked a great portent that was flickering like heat lightning on his horizon. That was the Industrial Age which was about to usher in the greatest period of material advancement in human history.

That Industrial Age has permitted a growth of world population that has far surpassed anything Dr. Malthus thought possible in the light of the facts he knew.

But we are again at a stage not too different from the situation that worried Dr. Malthus. World population again seems to have increased close to the limits of its means of subsistence.

We might recopy the Malthus thesis. But first we had better look to our own horizons, to see that we do not miss the portents there, as Malthus failed to see the signs in his times.

There are flashes on our horizon---atomic flashes. We already recognize man's ability to split the atom, as a fact of supreme significance. In the atom may lie the answer to our dilemma of accelerated population, of our accelerated use of earth's resources, of our accelerated rate of living.

The answer can come in two ways, one a profound tragedy, the other a benign means to further human welfare.

Used destructively, the atom could quickly resolve the subsistence worries of great segments of earth's heavy populations by simply disintegrating them.

Used constructively, the atom may open undreamed-of new sources of subsistence and better living that would permit added billions of people to live on our world.

The world may be compared to a great wheel slowly turning on its axis. For many long epochs, too long for us

to tell, it has been turning slowly, controlled by the great power that manages the universe. But suddenly and still driven by the same force, it speeds up, faster and faster. Compared with the deliberate rate it has traveled before, its new speed seems breath-taking.

In acceleration, a body responding to a force that accelerates it moves faster and faster until some counter force begins to govern it and it remains at a constant speed or else slows down. If no control comes to govern acceleration, the results are destructive.

In this brief text, we have taken only a superficial glance at some of the facts that indicate that our world has indeed gone into a very rapid acceleration. Considering the great age of the world, it is extremely sudden.

Thinking on this interesting but dismaying subject brings to mind many other things which we may ponder.

Such as:

The question of ethics and morality faced by fortunate peoples like ourselves in a world crowded with teeming populations of hungry and distressed peoples.

The problem of whether birth rates that increase populations beyond the possibility of subsistence can be controlled.

The little understood factors that cause natural birth rates to change.

The question of whether wars cause populations to increase, or whether population pressures cause wars.

The possibilities of more intense production of the materials of subsistence.

The problem of conservation of food-producing soil, and of restoration of forests and crop lands that have been dissipated in the past.

It is easy to get into a blue funk when pondering the trends in our perplexing world. The facts of the world today are alarming. The prospects for the future, for much of the world at least, look dark.

But we can temper our fears with the knowledge that every age has had them. The philosophy of hope and faith can sustain us as it has sustained those who have lived before us.

In the words of Emerson:

The rounded world is fair to see,
Nine times folded in mystery;
Though baffled seers cannot impart
The secret of its laboring heart,
Throb thine with Nature's throbbing breast,
And all is clear, from East to West,
Spirit that lurks, each form within,
Beckons to spirit of its kin;
Self-kindled, every Atom glows,
And hints the future which it owes.