
WHAT EFFECT HAS POPULATION GROWTH ON PEOPLE?

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When I was a child, there stood in the corner of our living room a small rack of shelves that held most of our books. Among these was a dingy, dark-bound volume of sermons of the vintage of the middle 1800's. One discussion that interested me especially was a discourse upon whether on the day of judgment there would be a resurrection of the physical bodies of all mankind that had lived and died until that time. The opponents claimed that there wasn't room on the earth for all these people to stand on the day of judgment, but the parson who was giving the sermon calculated that, during the lapse of time since Adam and Eve were driven from Eden and their offspring cursed because Eve had misappropriated an apple, only enough human beings had existed to allow three square yards of land space per person and that, therefore, it was completely possible to have physical resurrection. This was about 100 years ago. Since then the world population has increased one and one-half times. At this rate, only about one square yard per person is left (and if this old preacher's calculations were correct, I suspect the Lord will have to hasten His return or there will not be enough land for all to stand on.)

Now of course, such discussion is as pointless as the medieval arguments about how many angels could stand on the point of a needle. Therefore, we might better turn our attention from what will happen to the dead to what will happen to the billions that are yet unborn.

We have had presented in preceding papers, and you can readily find elsewhere, many statistics upon the past, present, and probable future rates of reproduction and population growth among mankind in various areas of the earth. There is a great deal of speculation as to what will happen in the next 50 years. Much of this speculation will be changed slowly, but inexorably, from speculation to reality. As long as it is speculation we will have those who see only hopeless disaster and also those who naively believe that man can surely rise to every emergency and always win. Has man's past demonstrated the acceptability of this belief? Does his present condition throughout the world warrant it?

It is only natural in a country such as ours that the flush of youth, success, and plenty should dominate much of the thinking on social problems. When we believe that we can't lose, we fear nothing. When we believe that we have an endless supply of anything, we usually waste it. My father once told me of a trip which he took by horse and buggy when he was a young man. Riding across Indiana he passed through areas where natural gas had recently been discovered. Almost every barnyard had an iron pipe protruding into the air with no shut-off. Gas escaped in great jets. It was lighted and burned 24 hours per day, inexhaustible light and fuel that cost nothing. Have you paid your gas bill recently? He also told me that when he was a boy he could go out after dark armed with a club and knock off of a rail fence in a short time enough passenger pigeons for the next several day's food. Countless millions of these pigeons blackened the skies for miles. The last living specimen died in the Cincinnati Zoo in 1914.

I would like to call your attention to a few examples of experimental work which are rather basic and perhaps not too widely applicable but which have some meaning with regard to populations. If you have made cultures of microorganisms in the fashion that you know as the "hay infusion," you have collected dead grass, leaves and sticks from low spots on the ground, put the material in a battery jar, and covered it with water (fig. 1, A). If you examine this material daily, for the first few days you find almost nothing in the way of microorganisms, but by the end of a week you find that nearly every drop of water has a number of organisms in it. By the end of two weeks it is swarming with organisms and they seem to have been developed out of a few types because they are nearly all of the class we call Ciliates, very largely *Paramecia* of several species. The population is unbelievably crowded. If you continue examining it for three weeks, you find that the water has cleared considerably, a great many of the kinds of organisms have disappeared, and those that remain seem to have adjusted to what appears to be a reasonable sort of population pressure (fig. 1, a).

Similarly, the well-known fruit fly, *Drosophila*, that is cultured for experimental work is grown in half-pint milk bottles (fig. 1, B) and there is a culture medium placed in the bottom. If you add to such a jar a pair of friendly *Drosophila*, they will proceed to populate the bottle. The population follows a typical sigmoid curve of population growth (fig. 1, b).

Now, if in such a culture you start with twice as much food, (fig. 1, C) we find a similar curve of population growth and not a very different one in numbers (fig. 1, c). If, on the other hand we start the culture in a different kind of a jar which has several times as much exposed area, we find a curve which rises more rapidly because it produces many more flies although the total amount of food is no greater than in the first bottle. This seems to indicate that things of this kind bear a very definite relationship to the availability of necessities; that is, the growth of population is certainly directly related thereto.

Frogs and fish and flies and birds and microorganisms are quite different from

man. But are a protozoan and a dog more alike than a dog and a man? It is an undeniable fact that man's chief distinguishing asset is his vastly superior intellect. While man has developed this intellect during the past one-to-two million years, we can scarcely overlook the fact that many kinds of organisms have survived for hundreds of millions of years with almost nothing comparable to intellect. During the past half million years many kinds of human or near-human organisms are known to have existed. Some say they were different species, some say not. If they were anything but human, I'm sure they would be called different species. Whether human or not, they have become extinct. Why? Is only *Homo sapiens* smart enough to survive? Will he not destroy himself? What guarantee have we that intellect will offset the responses of protoplasm to the inexorable natural laws?

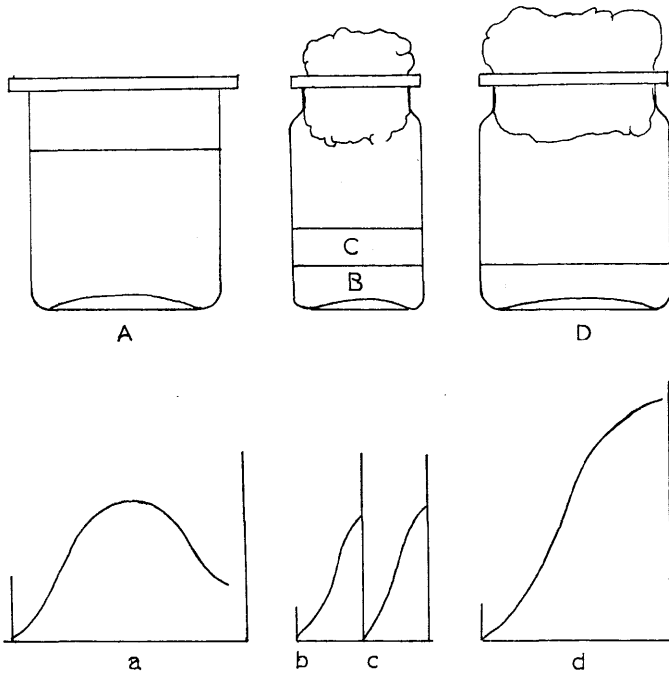


FIGURE 1. A, culture jar for protozoa; B, C, D, culture jars for *Drosophila*; a, population curve in protozoan culture; b, c, population curves in drosophila cultures with same surface areas; d, population curve for a drosophila culture with larger surface area.

Wherever we look at living things we find that their problems of existence are different from each other's in detail but alike in principle. The clam and the starfish live side by side in the sand at the bottom of the sea. The clam will not harm the starfish but the starfish will eat the clam. If enough starfish are present, they will nearly destroy the clam population. Then they will begin to starve and their numbers will be decimated. Because of the fewer starfishes more clams will survive and the clam population will rise again.

Those pioneers who moved away from the Atlantic seaboard, struggled over the Appalachian highlands and floated down the streams into the great wilderness faced great hardships. Only the mentally alert and the physically rugged survived. There were strong selective forces. From these stalwarts descended the people who were to lay the foundations of the great Middle West. The same

selective forces do not operate in the same manner today, or at least, not to the same extent.

Let us look for a moment at a graphic representation of the history of human culture and the growth of world population. This graph is not based on any particular set of statistics. It is only a crude diagram of some of the chief phases of man's history. I have used two lines, one to show human population growth, the other to show the development of man's culture. We might present these as a succession of eras:

1. If we go back into pre-history, about which we know very little, we might assume that in the early days with relatively few human beings and a great many hazards the population went up and down, that it probably came close to extinction at times and flourished at others, varying according to availability of food. This is Period 1 on the chart (fig. 2), an era of primitive struggle for survival.

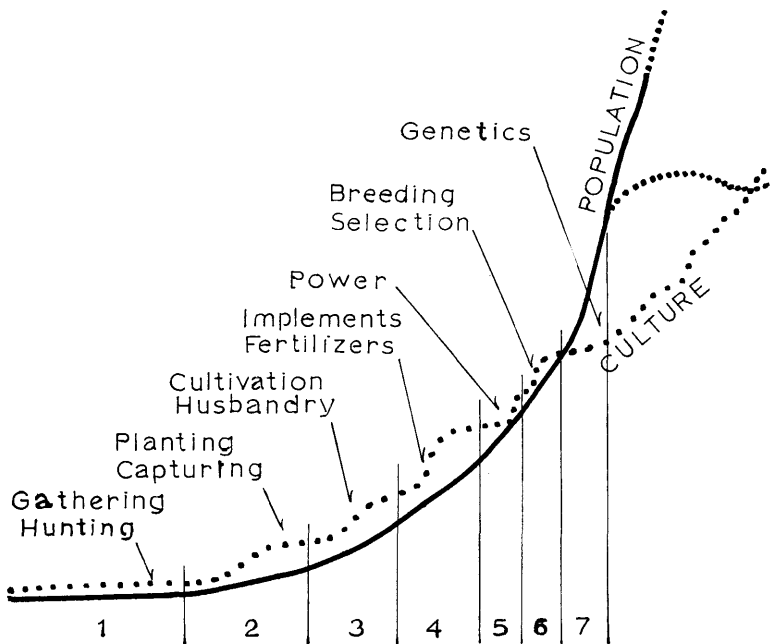


FIGURE 2. Human culture and population growth.

2. The second era, where planting and capturing came in, must have developed because some persons observed that seeds gathered for food and later thrown away, grew. They then found it was possible to have close at hand, foods for which they once had to forage. Also it must have been discovered that some kinds of animals could be confined and thus be available for food over longer periods of time than if they depended solely on hunting. These developments led to the concepts of planning ahead and of cooperation. This is Period 2.

3. The third era, labelled cultivation and husbandry, is one resulting from the discovery that it was possible to do a little tilling, to get rid of weeds, to prepare soil, and thus to plant and grow food. Also it was discovered that some animals could be kept in captivity, could reproduce in captivity and then assure a greater supply of food for a still longer period of time. Period 3 is thus an era of the first true agriculture, and the basis of civilization.

4. Period 4 is where implements and fertilizer became rather widely used. Sometimes this is referred to as the birth of civilization; education, culture, social stratification with division of labor, and consequent conflicts.

5. Next there was added to man's activities the application of power; power of some kind or other, mostly from animals, power from horse, camel, dogs. This was a long period which has only recently terminated in some parts of the world. One might well wonder what man's civilization might have been like had it not been for such animals as the horse. With this period, technology began to develop, population grew though slowly. A close balance between populations and food supplies appears evident.

6. Then came the idea of breeding animals. Not just keeping animals in captivity but breeding them and selecting the better and more satisfactory for producing offspring. That period of improving the quality of food has not yet ended.

7. Now that we understand, or are about to understand, the causes of differences in quality and quantity of food we can be said to be leaving the era of culling and selecting and to be entering the seventh era, the era of science and technology.

Already the rocket ascends. We who live in relatively uncrowded abundance can have great faith in the omnipotence of our technology. We may believe that human intelligence will meet the challenge. There is little evidence to support this belief at present. While we destroy our surpluses of necessities and squander our resources, what is happening in other parts of the world?

Within the memories of all of us, our geography books used to tell us of the tremendous populations that attempted to survive in the valleys of the Nile, the Ganges, the Yellow River, and elsewhere. The teeming millions were held in check by crop failure, pests, epidemics, floods, and sometimes by wars. Such natural controls seem brutal to our Western minds (unless we are at war); so, we feel it our sacred duty to do everything possible to prevent its happening. We send physicians and nurses to train them to prevent infant and mother mortality. We supply drugs and antibiotics to prevent loss from diseases. We send as much food and other essentials as can be transported to prevent starvation. We teach them how to care for the invalid, the insane, the aged, in order to prolong their lives. We like to do these things because it gives us a feeling of personal goodness.

If you came home from work one evening and found that the drain to the kitchen sink was partially clogged and that your wife had turned on the faucet till the water ran over onto the floor and that she was frantically trying to mop it up with a towel which she wrung out into the sink, you would probably want to stick her head in the sink. Of course, you might seize a bucket and cup and start bailing out the sink. This could help for a while but your bucket would soon fill and you'd be worse off than before.

In this little sink that we call our world the flood is on. Today it is our neighbor's sink in the apartment upstairs. Tomorrow it will run through on our heads. So far we have tried everything except to turn off the faucet. If we do try, we find that there are many other hands turning it on: tradition, taboos, religious tenants, ignorance and illiteracy. Under I.C.A. five Colleges of Agriculture in State Universities are each assigned about one-fifth of the area of India where projects are carried on in an effort to help improve the agriculture of that area. Hundreds of millions of dollars are spent by I.C.A. annually to make it possible for more people to survive. This might be a noble effort if it didn't eventually increase the problem.

Forty-four million people per year are added to the world's population; one more every time your heart beats. In ten years the increase will be something like 50 million, for the *rate of increase* itself increases.

I know that there are some who believe that God endowed Man with the

power of procreation and that interfering with it is opposing His will. He also endowed Man with intelligence enough to recognize his problems and provide against them, and if he does not use this intelligence he is equally guilty of flouting God's will. It is our custom on special occasions to wish each other health, happiness, and prosperity, yet we are also made to feel that to enjoy these blessings is some kind of sin so long as there are people in other parts of the world who lack them.

One of our solutions is to open our doors and arms to peoples everywhere. If not carefully done, this might soon spell disaster. We have been doing a lot of it recently. There are certain social and religious groups that have organizations, raise money, and use every political pressure to secure the entry of their adherents into this country. It is these same minorities who, from press, pulpit, classroom, and television, cry "prejudice" against any who think that it isn't right. Regulations regarding immigration need to be looked at carefully, and not set aside every time we feel a little sorry for somebody.

A number of years ago I walked out onto a cement walk in my back yard. I looked down and saw two dark lines across the concrete. They seemed to be moving. I stooped down and looked at them more closely and found that they were two columns of ants, one going from north to south and the other from south to north. The two columns were not more than eight to ten inches apart. I noted they were large red ants rather common to this locality, but for some reason one of the columns did not look quite like the other. On closer inspection I discovered that each of the ants going from south to north was carrying something in its jaws whereas the column going from north to south was not. I tapped one of the ants with my finger. It dropped its burden which turned out to be a black ant. Then I realized that these red ants were raiders that often capture other species of ants. Sometimes they will capture a queen ant if their own colony has lost its queen.

I followed the column which carried no load and found that it went all the way around the house to a bare spot on the corner of the terrace where I had previously observed a black ant colony. Sure enough the red ants were carrying away black ants.

Now this showed lack of intelligence on the part of the ants. Requeening their nest with a black ant queen and getting most of their work done by black workers did not solve their problem at all. In three months the red ants had mostly disappeared. The queen laid only black ant eggs and all the offspring were black; so, they took over.

What effect has population growth on people?—Have you been asked recently for a contribution to support indigent Eskimos? Have you heard a lecture upon the plight of the happy little Pygmies who live a naturally adjusted life in the jungle? Do your dollars send CARE packages to the Indian tribes of the Amazon? Not likely.

Where are the "underdeveloped" countries? Who are the "underprivileged" peoples? Wherever the populations exist out of all proportion to their abilities to produce and procure the necessities for comfortable living. *There* is ignorance, pestilence, hunger, and misery. Wherever people are well-fed, sufficiently sheltered, and adjusted to their natural environment, they are *not* underprivileged. And to disturb this adjustment by creating unsatisfied desires for luxuries is a social sin.

If it were possible to produce enough food and shelter to keep a world population of 15 billion in reasonably good health—*Why should we?* What is to be gained by crowding the surface of the earth with many billions of people? I have heard many arguments about how it is possible to do it. One would think it was some kind of a game we had to win, a game to keep alive the greatest possible number. Most of them would be urbanites living controlled existences like termites.

Natural unity and beauty would be destroyed and wildlife exterminated. The freedom of which we boast would be changed to regimentation and any serious upset in the program would bring disaster on a wide scale.

Many of the great world problems of today are ecological problems. Our inability to solve them arises out of our emotional attitudes which override our intelligence. Millions go to bed hungry every night. It has long been so. In pity we offer them a share of our abundance, and the best we have offered as a solution to their ills is an attempt to teach them how to grow more food. But with more food their populations increase and their hunger continues to grow. Will we ever teach them the true cause of their predicament and allow them and ourselves to control populations to whatever size can be properly provided for? If we do not, the whole world will become as they are.

There are hopeful signs in some small areas, such as parts of India, where governments are offering financial rewards and medical care to any male who volunteers to be sterilized after having at least two children. Contraceptives are considered too expensive. Wars, pestilence, starvation, and disease are expensive too but we indulge in them continuously. Privately supported family planning clinics are being established in some countries, but they cannot receive aid from our government because they are still considered "controversial."

The next 50 years will be the most decisive era in human history. It is very late, but if we work fast and hard enough there is still time to turn down this rocketing population curve and bring it into balance with our ability to produce. To do this we will have to reach over and turn off the spigot in the kitchen sink.
