



WORLD DEMOGRAPHY

Dr. Ardley S. Coale

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WORLD DEMOGRAPHY

30 October 1962

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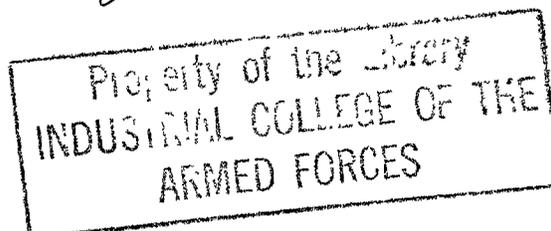
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COLONEL REID: Admiral Rose, Gentlemen:

The worldwide geometric increase in the human population has caused or been described by a number of our distinguished scholars and government officials as a problem which transcends any other problem facing the world today.

Yesterday afternoon's movie presented some of the problems which are involved in this worldwide population increase. The facts on world demography will be presented to you this morning by our distinguished guest from Princeton University, Dr. Ansley J. Coale, who is Consulting Director of the Population Division of the United Nations in addition to his job as Director of the Office of Population Research in Princeton University.

This is Dr. Coale's first lecture at the Industrial College. His subject is World Demography.

Dr. Coale, it is a pleasure to present you to the Class of 1963.

DR. COALE: Thank you, Colonel Reid. Admiral Rose, Gentlemen:

In discussing the world population I am going to attempt to outline in as brief a compass as I can the facts of current world population growth, and then I hope to turn, in this brief period that I have available, to the question of the relationship between population and military potential, thinking that to be of special interest to this audience.

The outstanding fact about world population today is the unprecedented rate of world population growth. The population of the world today is growing at an annual

rate of about 2 percent. An annual rate of 2 percent implies that the population doubles every 35 years. Now, doubling every 35 years or increasing at a rate of 2 percent does not sound very extreme to people accustomed to dealing with growth rates of national income or to people concerned with rates of return on investment. But, if we look at the implications of the 2 percent growth rate for a human population it is easily seen to be extreme.

Had the population of the world begun at the time of the birth of Christ with two persons, the minimum number to start a population, and had it grown from that margin at a constant annual rate of 2 percent, starting with two persons at the time of the beginning of the Christian era and doubling every 35 years, until today, there would today be a population of about 3 billion per square mile. In other words, on every square mile of the earth's surface there would be a number equal to the total current population of the world. So doubling every 35 years is an extreme growth. Had the population of the world grown at that rate over any extended period in the past, it would have led to such an absurd situation as I just described.

Similarly, to contemplate the continuation of this growth rate is also absurd. I say it's absurd no matter what technological inventions are made, assuming the most extreme.

For example, to continue the 2 percent growth rate for a little more than 600 years would produce one person per square foot on the surface of the earth. To continue it for 1200 years would produce a population that outweighed the earth. It would have to be some substantial fraction larger in diameter, because our density is less than that of the earth on the average, and, if it were to continue for

something like 4,000 to 5,000 years--if you will excuse the extreme metaphor-- it would produce a solid sphere of flesh whose radius, if we neglect relativity, would be increasing with the velocity of light--and of course 35 years later two such spheres.

Well, I think I make the point that a 2 percent growth rate doesn't sound extreme, but, applied to the human population and viewed in any extended context, it is extreme. This rate of growth has been achieved through a rapid acceleration. The increase in population of the world, based on rather flimsy evidence, was from a quarter of a billion at the time of the birth of Christ to about a half a billion in the middle of the 17th century, according to the consensus of estimates. In other words, it took something like 1700 years to double. It then took about 200 years to double, and then about 90 years to double, and, as I say, it is now increasing at a rate that would double every 35 years.

This rapid growth, which has given rise to the metaphor of population explosion, is not evenly distributed among the countries of the world. There is a large segment of the world's population which is growing only very moderately, and that segment is the population of Europe. The European national populations are growing at rates which would lead to a doubling every 50 to 100 years, rather than every 35 years. So that, given the European area as one of moderate growth, or slow growth, relatively, there are two categories of countries which are characterized by more rapid growth. One category consists of the most advanced countries in the world, those with the most advanced industrial economies and in general with the highest per capita income, outside of Europe, that is, the nine European countries

that are the most advanced, consisting primarily of the overseas areas of European settlement--the United States, Canada, Australia, and New Zealand. These countries are growing at rates in the general range of 1.5 to 2 percent a year, doubling every 30 to 40 years.

In somewhat the same growth category also we find the Soviet Union, although the demographic history of Russia is somewhat different. It has recently come from the kind of demographic pattern, the sort of birth and death rates we associate with an underdeveloped area, to the rates more typical of industrialized countries.

In any event, we do have a group of largely non-European areas, very advanced, with high per capita income, which have growth rates around the world average. Then the very rapid rates of population growth are found in the underdeveloped areas. In the underdeveloped areas in general they range from moderate growth rates, at approximately the world average, up to very rapid rates of 3.5 to 4 percent, in a few instances. Mexico, for example, has a population which is growing at about 3.5 percent a year. That means a doubling every 20 years. Doubling every 20 years means doubling five times or multiplying by 32 in a century, and multiplying by 1000 in 200 years. So that Mexico's growth rate would produce 35 billion Mexicans in 200 years, compared to the 35 million who live there today-- an exceedingly rapid rate of growth indeed.

Now, in other words, there are two forms of rapid population growth found in the world today. One is more moderate than the other. One is the rapid rate of increase of about 1.5 to 2 percent a year that we find in the wealthiest countries

in the world, taking the United States as a prototype. The other is the rate of increase which ranges from approximately the world average of about 2 percent on up to higher rates which characterize the underdeveloped areas in the world.

These two forms of rapid population increase arise from different historical trends. They don't have the same bases. In both instances, however, the increase that I am speaking of is primarily the result of natural increase--that is, the difference between a birth and a death rate--rather than being the product of high rates of immigration. In this part of the 20th century international migration, with few exceptions, is not a consequential element in population growth. The exceptions might be Hong Kong, Singapore, and, to a slight degree, Australia. But even in Australia, for example, natural increase, the difference between births and deaths, is a much more important element in their growth than is immigration.

So that it is the difference between birth and death rates that accounts for the growth in these different kinds of areas, but the sources, the trends, that underlie these differences are diverted, are different in character. To bring out this difference I would like to describe as a prototype of the typical pattern of birth and death rates, which will serve as a background for discussing the trends in the underdeveloped areas and in these wealthy countries, the typical time pattern of birth and death rates which characterize the population history of the Western European countries, the ones which are now characterized by moderate rates of population increase.

(Draws on the blackboard)

In this diagram I have shown in very simple schematic form the typical course of mortality and fertility, of the birth rate and the death rate, in the countries which have undergone the industrial revolution, especially the Western European countries. This might describe the pattern of mortality and fertility in schematic form of, let's say, the United Kingdom. The initial stage, which I have represented as a high plateau for the birth rate and by a kind of wiggly-line plateau for the death rate, is the pre-industrial stage. What one finds in the pre-industrial stage in the history of the now industrialized countries is evidence of a uniform birth rate and a moderately high level birth rate of about 35 to 40 births per thousand persons per year, accompanied by a high death rate, with an expectation of life at birth, an average duration of life, on a general range of 35 to 40 years, and a death rate of perhaps 25 to 30 per thousand persons per year on the average.

I have drawn the death rate in this pre-industrial phase with a wiggly line because it is typical of pre-industrial mortality. It varies from year to year in response to variable fortunes--in response to bad crops, ^{to epidemics,} and to other vicissitudes of nature that the society is prey to. Crops can affect the death rate, because, in a pre-industrial society, the population is typically dependent on a local food supply. You don't have an extended transportation net, you don't have elaborate storage facilities, so, if you have bad weather, flood, or pestilence, or some form of insects or the like, and you have a crop failure, it can lead to malnutrition and a rise in the death rate. Also you have primitive sanitation, the absence of any modern public health or medicine, so that the populations are prey to period epidemics, and the death rate will fluctuate in response to these factors.

On the average the death rate was high and not very much below the birth rate. Therefore, we had gradual population increase in the pre-industrial phase as the result of high birth rates and high death rates. Then, accompanying the modernization of the economies and the societies of these countries, we had a decline in both rates, a decline in the birth rate and a decline in the death rate. The death rate declined primarily because of the development in these countries themselves of improved sanitation, public health, and, finally, of modern medicine.

You also had the regularization of the food supply through the development of transportation networks. You had the extension of modern national governments which reduced internal warfare and disorder. But, undoubtedly, the major factor in reducing the death rates to the low levels now enjoyed by these countries has been the development of public health and modern medicine. Actually some important medical advances were made by the beginning of the 19th century--the development of the cowpox vaccine for smallpox and also the beginnings of sanitary water supplies and sewage for the major cities.

One can find relationships between specific advances--the development of the germ theory of disease and associated vaccines and the like in the latter part of the 19th century, associated with segments of this downtrend in mortality. That is, when you had a major development, you could see an acceleration of the decline in mortality. But in a broader sense, the development of modern medicine and public health is another aspect of the whole modernization of these societies. The same kinds of forces which led to the development of superior techniques in industry and in agriculture, to the growth in productivity in the economic sphere, led to the

discovery of superior ways of controlling disease and provided the economic basis for the construction of sanitary systems, hospitals, and medical schools, and the like.

So that I think it is not an accident but a result of historical interconnections that we had a decline in mortality at the same time the economies were modernizing.

You also will see as a typical pattern a decline in fertility, in the birth rate, associated with the industrialization of the industrial leaders, the Western European countries. In this case, dealing with fertility, the forces at work are somewhat different in character. In the first place, fertility was high in the pre-industrial phase for reasons which were partly personal in character and partly economic. The birth rate was constant in pre-industrial societies in Western Europe, relatively constant from year to year, because of the absence of any substantial degree of voluntary control over the birth rate among married couples. The birth rate at that time was determined by such customs as the aged marriage, the degree of celibacy in the society--people who never got married--and by such elements as the prevalence of nursing, because, when a child is breast fed there is some evidence of inhibition of fertility. So that this average spacing between children is affected by the age at which children are weaned.

It was elements of this sort, which are largely customary, or determined by social attitudes which are slow to change, which were at work, and not voluntary decisions on the part of individual couples to choose a certain number of children and then regulate their behavior so as to achieve that number.

These customs--aged marriage, the proportion who don't get married at all--

tend to be slow to respond to changing social forces. They are deeply imbedded in the society, and they are reinforced, that is, these customs which maintain fertility at a high and relatively constant level, by economic motives which operate on the individual family. These economic motives were associated with the former production, which was largely agricultural in the pre-industrial phase, where the unit of production was the family, where the child became an economic asset at an early age, because he could do chores around the barn, and the like. There was not an expensive educational process to which the children were customarily subjected. Also, children formed the only reliable basis for social security. That is, if parents wanted to be supported in their old age, they had to insure that they had children who survived to take care of them in their old age, and, with high mortality rates, one needed a large number of children in order to provide any reasonable assurance that some of them would survive.

For all of these reasons one finds in the history of the pre-industrial phase of Europe birth rates constant and at a relatively high level. As the economy changed from largely agrarian, self-sufficient in small areas--this type of organization--to a market-dominated economy with a diversity of occupations, with factory employment, the locus of industry being in the city rather than in the country, with the family no longer an important unit in production, all of the elements which went together in the pre-industrial society to sustain the birth rate at a constant and high level were weakened.

In an industrialized society one typically finds the development of popular education, ultimately on a universal level. The requirement that children be educated

means they are no longer an economic asset at an early age. Rather they are an economic burden for a long period. The reduction in mortality itself means that one does not need a large number of children in order to insure that some of them will survive to adulthood. In any event in industrial societies you usually find the breakdown of the family as the dominant social unit. Jobs are allocated on the basis of more impersonal forces. It is what you can do, not who you are, that determines your job in an industrial society. The factory organization tends to diminish the importance of the family as an economic unit, and probably leads to its declining importance as a social unit. So that, in an industrial society, the various forces which promoted high fertility are all weakened.

At the same time, the spread of a rational attitude toward production and a more impersonal view of all society, living in an urban rather than a village or rural environment, the more impersonal, more rational outlook on life in general, extends to family formation itself. Instead of taking the number of children as being determined by the Deity or by fate, people who have become accustomed to producing their material wants on a rational basis, no longer believing that you need to plough by the phase of the moon, will also tend to take a rational attitude toward the number of children they have.

Much of this is speculative, but there is no doubt that every country that has undergone the procedure, the process, which we call modernization or industrialization, has experienced at least a 50 percent reduction in fertility. So I have drawn the typically descending curve. However, I have shown the terminal phase, the culmination of this process of modernization, as associated with a wiggly phase

of the birth rate. What I mean by that schematic device is that, in the industrialized state the birth rate tends to fluctuate from year to year. The death rate has become constant. You no longer have epidemics or crop failures causing any major fluctuations in the death rate. But the birth rate in an industrialized society is now determined by the individual decisions of parents to have children at a particular time. Modern parents typically regulate both the number and the spacing of their children. If there are adverse-economic circumstances, or whatever other motive, affecting a large number of people, they are influenced to have births at a particular time. You can have a rising birth rate followed by a fall and in general a fluctuating level. That wiggly line, I might say, covers a major trend, at least in the United States, of a rather large and sustained rise since the low point in our birth rate, which was reached in the 1930's.

Well, I would now like to take this scheme and use it as the basis for describing what is going on in the three groups of countries that I mentioned a few minutes ago. That general scheme can be taken as describing the history of the Western European countries without much modification. The only variation as between Western European countries would really be in the lag that exists, as I have drawn it, between these two curves (indicating). You see there is the lag between these curves. There is the fact that the death rate has typically gone down first, which leads to an interim period of rapid growth. You end up in these Western European countries with a reestablishment of moderate growth but at low levels of birth and death rates. This pattern, with an appropriate adjustment of the time axis, would describe the experience of all of the Western European countries--France, Germany,

Scandinavia, England and Wales, and the Low countries.

But in France, to illustrate the kind of deviation we have to account for, these birth rates came down without much lag. The birth rates started down in France almost as early as the death rates did, about 1770.

In the overseas areas, which I described as now having about the average world population growth--Australia, New Zealand, the United States, and Canada--this terminal phase has included this rather substantial recovery in the birth rate, so that we have reestablished a rate of growth of 1.5 to 2 percent.

But, if I look at the underdeveloped areas, and these are the ones I want to emphasize, I really have to have recourse to a separate diagram. I would deliberately draw the birth rate in the underdeveloped areas at a somewhat higher level than in the pre-industrial phase of Western Europe, because the underdeveloped areas of the world today are characterized by an earlier age of marriage and more universal marriage than we found in pre-industrial Europe. They have birth rates that range from 40 to 50, rather than the range of 35 to 40.

The death rate is probably also somewhat higher, a short time back, than the pre-industrial phase of Europe. It has, however, the remarkable tendency to drop almost vertically in recent years. I should say this is the typical pattern in the underdeveloped areas of the world today. The way in which these countries differ is in whether they have yet embarked on this precipitous drop, whether they are in its early stages, or whether they have succeeded in bringing the death rate down to a very low level.

Mexico is down around the bottom of this elbow (indicating). India is somewhere

in here (indicating) on its way down. Some of the African countries may be still just in the very early phases.

I see no reason to doubt that any underdeveloped area of the world today that has not achieved its rapid growth as a result of the recent very sharp decline in mortality is in the process of a rapid accelerating growth because of declining mortality or is about to enjoy or experience a rapid decline in mortality and a consequent acceleration in growth.

The reason why this is so precipitous, this declining mortality, is because it does not depend, as did the decline in mortality in the Western European countries, on the indigenous development of medical science. These countries can import medical science from the West. In fact, they just can be passive and the West will bring the modern medicine to them, through the World Health Organization and other U. N. agencies, and through foreign assistance of various forms. It has been possible, through developments that took place at Hopkins and London and Harvard, and so on, to reduce the death rate at very low cost in these countries through antibiotics, through new techniques of sanitation, through techniques of persuading people to be sanitary. Even in the field of communication and public relations we've had innovations which make it possible to bring the death rate down very sharply.

One doesn't need today to develop an expensive system of hospitals, of trained doctors, and of laboratories, and so on to bring the death rate down to very low levels. DDT, antibiotics, and the like, will do so. I will give you one instance which I think illuminates this point very clearly. When I was in India a few years

ago I was talking to a public health official about the use of antibiotics, and he told me that there was an area in the hills of India where a number of villages had been found to have high rates of syphilis. The public health authorities were anxious to reduce the incidence of syphilis there, and they sent out a team to diagnose the cases of syphilis and then to cure it as they could with a massive injection of penicillin. They were giving whatever the low-cost equivalent of the Wassermann test is to the members of this population. This is a very expensive and difficult test to administer and they were finding a high incidence of 20 or 25 percent, so they decided it was cheaper to give everybody penicillin. He said they cleared up the syphilis and also they cured miscellaneous cases of tonsillitis and the like. You see, the expensive treatment wasn't worth while. A nurse can give a shot of penicillin. You don't need a good diagnostician. In many cases these drugs will handle it.

Well, this is the situation today, and it is this factor which has led to the rapid recent acceleration in world population growth--predominantly that factor--and which leads to the prospect of perhaps still more rapid increase, unless the birth rate, which I have drawn as horizontal here, can be brought down.

The implications of population growth of the sort that I have described in the different areas of the world are again different depending upon which area you are talking about. I think the most ominous implications, and the most serious implications of population growth, are in the underdeveloped areas, because this rapid increase, the difference between this birth rate and death rate, is jeopardizing the success of the modernization of the economies. In other words, I gave a very

brief, incomplete account of how modernization tends to bring the birth rate down. So one can hope that if these countries can be modernized and industrialized the birth rate will respond as it did in the Western countries. But the very existence of this population increase makes it difficult to achieve modernization. The reason it makes it difficult is that, first of all, it raises the needed pace of economic growth. If your population is stationary, if it is not growing at all, and you can raise output by 5 percent a year, then you are raising per capita output by 5 percent a year. That means, if you are raising per capita output, that you can change the life of all of your citizens. But, if your population is increasing at 3 percent a year, the 5 percent increase in national output will add only 2 percent every year to the per capita output. Two percent increase in per capita output is a very gradual increase, and will not bring the change in the way of life as rapidly as if you were achieving the 5 percent rate of increase in per capita income.

More than that, in addition to raising the pace of economic growth that is needed in order to achieve any given rate of improvement in well-being, the rapid growth which arises from a high birth rate, which is characteristic of these underdeveloped areas, actually impedes the investment of resources in economic expansion, because the high birth rate produces an age distribution, produces a distribution of the population according to age, which is unfavorable to investment and which is unfavorable to increasing productivity, because the high birth rate guarantees that a very high proportion of your population consists of children who are not yet in the productive ages. These high birth rates lead to 40 to 48 or 50 percent of the population consisting of children under age 15. The existence of a very

high proportion of your population in the ages of childhood dependency means that the national product is spent each year to an undesirable extent on current consumption. At least there is a pressure to spend a high proportion of each year's product on consumption--on shelter, clothing, and food for these children--whereas with a lower birth rate and a population which is flatter in its age distribution, having a lower proportion of children, it is easier to allocate more of your resources to building a factory instead of homes, to expanding the output of fertilizer rather than this year's crop of grain.

So the allocation of resources into growth is easier when you have a favorable age distribution than when you have an unfavorable age distribution in these underdeveloped areas. So that, even in the short run, and even without raising the question of counting on resources, the existence of rapid growth and a high birth rate which gives an unfavorable age distribution stands in the way of the successful economic development of the underdeveloped areas in the world. And, of course, in the long run--and the long run may be only 50 or 100 years-- continuation of this rate of increase produces absurd densities, absurd strains, on the resources of an area. It produces the 35 billion Mexicans in 200 years, for example.

In contrast, in the United States our rate of increase of 1.5 to 2 percent, of course, is not as rapid as in the underdeveloped areas, and we can afford it. In fact, one can argue, I think, with some validity, that the postwar baby boom has probably been a contributing factor in sustaining the economic boom in the United States. We have had many much-discussed recessions, but we haven't had anything in the way of a major economic setback. One of the stimulating factors, I

think, to our economy has been our high birth rate. But the high birth rate is a stimulus to the economy because it is a burden. In other words, since we have to provide for all of these children, it means there is a constant stimulus for people to spend more, for family units to spend more, than they would with smaller numbers of children, and in meeting the burden of raising children and of educating them we have a constant stimulus to the economy, in the same way that armaments provide a stimulus. I also have little doubt that our sustained high level of employment has been achieved in part as a result of the large arms budget that we have had every year.

In neither case do I think that one should welcome a high birth rate or a large arms budget, because it provides employment. There must be a better way than that of keeping our employment at a high level. A continuation of our own rate of increase in the United States would produce a population of a billion by the middle of the next century, and by the end of that century our population would be approaching the level of the current population of the world. That seems to me a poor way to keep our employment at a high level.

I am sorry I really can't do justice to the complexity of the world population problems, because I have tried to save the last few minutes for a brief outline of the relationship between population and military potential. I will say that these views I am about to express may be a little unconventional and I suspect that you may find them not wholly convincing, but I'll try them anyway.

It appears to me that military potential today depends very heavily on industrial output and on the state of technology that a given country has achieved. It appears

to me that the industrial, advanced countries have an advantage over the underdeveloped countries which transcends any difference in population size. I think this has long been the case. As a specific instance, in the war between Japan and China in 1894 Japan was able to field a larger army than China, even though it was no more than one-eighth as big in population, because of the advantages of superior organization, capacity to arm people, and the like that is attached to a more advanced industrial state.

It also appears to me that the advantage that is associated with technology and with larger industrial output is especially great in considering the potential for nuclear warfare. It is so obvious it hardly needs to be spelled out. It seems to me, even if we reach the stage where nuclear weapons can be made in bathtubs, so to speak, it will still take a large industrial capacity to mount the whole weapon system and delivery and supporting activities, and it is unlikely that, without help from a major industrialized power, minor industrialized powers are going to achieve high levels of nuclear capacity and capability.

But I also feel that, even in the capacity to withstand attack, an industrialized area has a major advantage. Mao is alleged to have said at one time that the Chinese would emerge in a much strengthened relative position after a nuclear war because they have 600 million--700 million today, perhaps--persons, and if they lost half their population they would still have 350 million. Well, we have 180 million people, and if we lost half we would still have 90 million. I think the 90 million remaining Americans would be stronger than the 350 million remaining Chinese, just as we are prior to the attack.

More than that, I think a lot of people assume that, because they are not very industrialized, a country like China or India would not suffer as great damage as an industrialized country would from atomic attack. I think this will not stand the scrutiny of comparison with the record during World War II. In Hiroshima you had the restoration of some kind of services within about 48 hours. In Hamburg, after the great fire raid, you had production back to a substantial fraction, more than a majority of its preattack level, within a few weeks. In general the highly industrialized Germany showed itself extremely resilient in recovering from attack, whereas the presence of a military mission in Calcutta, making unusual demands for food and for services that were wholly of an economic character, contributed heavily to the famine in West Bengal. That is, there was so little margin in India that just the presence of a large military mission threw their economy out of kilter.

I would think that the presence of technicians, of educated people, of excess capacity, and of alternative communication links and the like would mean that if you dropped an equivalent number of megatons on Russia--to keep us out of it-- on the one hand and on China on the other Russia would be able to withstand it, to contain it, and to recover from it a lot better than China would.

I think in the general proposition that industrial advance gives a country a greater absorptive capacity as well as a greater military strength on the attack in the nuclear era,

So, therefore, it seems to me that, if one is going to consider the role of population in military strength, one has to consider it in the context of roughly equal technological advance and industrial output, because, if there are major differences

in these other factors, I think they will tend to transcend any differences in population. Great Britain is stronger than India today, in spite of the fact that they have about 50 million as opposed to 438 million.

But, if we take countries of about the same order of technology, then it is clear, of course, that population gives a major advantage, especially if we consider so-called conventional warfare. India is, on account of its population, a lot stronger than Ceylon, both being underdeveloped, since India has a much larger population.

In fact, to make the proper concession on this point, superior manpower can to a degree offset a difference in technology. The example might be the capacity of the Chinese Army to serve as a very difficult foe for the United States in the Korean War, in spite of their being backward in technology. But I must say that this example is contaminated, so to speak, by the access of the Chinese to Russian technology. Had they not had that access I am not sure that their reserves in manpower would have made as much difference as they did under the actual circumstances.

Finally, if we look at industrialized countries themselves, and look at the influence of population itself on potential military strength, we have to allow not only for population size--that is a conspicuous, obvious factor--population size helps to determine the potential size of the armed services, and also with equivalent technology influences the relative industrial capacity--but also for the age distribution. This is an element which is not usually given so much notice, not as much notice as it deserves. Because of the history of the U. S. birth rate,

which fortuitously I have in rough form here, and because the U. S. birth rate had reached a minimum point in the 1930's, the period from 1941 to 1945 in the United States happens to be the period in which the ratio of dependents to persons of productive age was at an alltime minimum. We had the lowest burden of dependency in the period 1941 to 1945 that we have had in the whole history of the United States. In fact, the ratio of dependents to persons of productive age was 10 percent lower than it was 20 years earlier, in 1920, or 20 years later, today. I think this was a non-negligible advantage to us at that time given the all-out mobilization effort we had. Had we had to provide for 10 percent more dependents--rationing and providing the necessary facilities for them--it would have, I think, had a not crucial but nevertheless an important influence on our capacity to mobilize and achieve the high levels of output and of military effort that we did.

On that score let me say that the underdeveloped countries, in addition to the disadvantages they suffer vis-a-vis the developed countries in industrial strength, are all characterized by very high burdens of dependency, and their manpower advantage has to be viewed in that context, that they have an unfavorable age distribution.

I am going to close by saying that I have taken a rather negative attitude on the importance of population in determining potential military strength but I don't for that reason feel that population has a negligible role in the problems of a military nature that the world faces today. It seems to me that the place where it does play a prominent role is in its effect on political stability in the underdeveloped areas. It is commonly believed--a belief that I share--that unsatisfied aspirations

in impoverished areas of the world are a major source of discontent and of political instability. Incidentally, I think one should not pay a great deal of attention to the belief that population pressure itself has been historically, at least, a major cause of war. It has not been the impoverished areas which started the wars in our time. Germany, I suppose, was the strongest industrial power in Europe. Japan was incomparably the strongest industrial power in Asia. Japan's population problems were nothing compared to those in China. In fact, Germany before the war was below replacement. I am not saying that it did not make effective propaganda but, as a genuine factor in causing the major wars of this century, I don't think population pressure has been an element.

I do believe that today, in this era of struggle between the Soviet bloc and with the bloc led by the United States in the underdeveloped areas, the existence of discontent, associated with an unsatisfactory pace of economic improvement, population plays a very important role, because it is this very rapid rate of population increase, which is inherent in this diagram which I have drawn here, which serves as a major impediment to the more rapid increase in economic gain, and which therefore contributes to the continued failure to satisfy the desire for rapid economic advance and the achievement of Western standards of welfare.

COLONEL REID: Dr. Coale is ready for your questions.

QUESTION: Sir, you pointed out that we have taken steps to raise the standard of living through the world by reducing the death rate and raising productivity. Now, in your opinion, sir, what would be our national position on birth control in the underdeveloped areas?

DR. COALE: Well, I have no doubt in my mind at all what course of the birth rate would be most advantageous for the underdeveloped areas, and that is sharply down. I also favor the process that we are seeking to spread very rapidly in these countries of the formulation of a national policy within the countries themselves in favor of family limitation. We find this as a matter of policy now in India, Pakistan, Egypt, Korea, Taiwan, and some beginnings in Indonesia.

As far as the policy of our Government is concerned, I have two reservations about our having an active overt policy in favor of birth control throughout the underdeveloped world. One is that if we were to formulate such a policy it would encounter a lot of internal opposition. It would create dissension within this country on understandable and, I think, quite proper grounds. That is, the Roman Catholic population finds most forms of birth control morally reprehensible and they would not like to see it a policy of the United States Government to officially sponsor it. This seems to me an understandable position. Therefore, it might be that you would jeopardize a lot of other programs if you were to espouse a public stand on this issue.

Secondly, I think that it would be the wrong auspices for the United States Government to be advocating birth control in India, because the Asians, and, in general, the populations of the underdeveloped areas throughout the world are very sensitive to charges which would readily be made that the United States wants to restrict their population and let ours grow. The idea, that Americans come in and say there should be fewer Indians would be very distasteful, especially since there is a dogmatic Communist view on this that a socialist country,

by which they mean a Communist country, doesn't have any population problem. This is a Marxist view. It goes right back to the arguments of Marx and Engels. They say that if you organize your economy in a socialist way you can use all the manpower you can get. They say that the United States and the Western powers in general are exercising imperialism; they are trying to go into those countries and hold those people in bondage.

I think we would play into their hands by having the U. S. Government be the official sponsor of birth control throughout the world.

What I would advocate is the allocation of more resources in this country to research which would help these countries solve their problem. In fact, if we were to try to give foreign aid in this area, we wouldn't know what to give. You don't send over a shipload of condurms to India. The problem is that there are already such supplies in India. The problem is that the people don't want to use them. We wouldn't know how to tell the Indian what to do to change the motivation, because there is no experience in this.

Secondly, it is likely in this field that if you had a contraceptive which required less in the way of motivation to be effective it would work. For example, there is a remote possibility now of vaccine once a year whose effect wears off. When it is administered then the woman does not need to do anything else. You don't need to take precautions with every active intercourse. There is also a device which is inserted and makes a woman sterile, but when it is removed her fertility is restored. A device of that sort would be quite different in nature, because, rather than having to do something to avoid pregnancy the woman would

have to do something to become pregnant. That requires a very different order of motivation.

I would say that research on the whole physiology of reproduction in the United States would produce knowledge which could be readily used by countries throughout the world. But I don't think it would do any good for us to go around advocating birth control. It might do positive harm.

QUESTION: It has been recommended, sir, that to many of these countries birth control should not be something that is exported. But the phrase "mortality control" has come out. What do you think about the possibilities of this so far as our channeling certain aid in this direction is concerned?

DR. COALE: I would think that, attractive though this may be in abstract intellectual grounds, it is absolutely impossible. How would you like to have that policy publicized, that we are deliberately holding back the means of saving the lives of babies in India as a matter of national policy? In the first place, I wouldn't want to advocate it. It is never the parents of the children who are dying who advocate a policy of this sort. Let's face it. It seems to me that, while this population growth constitutes a major social and economic problem, one shouldn't underestimate the humanitarian and social value of reduced mortality itself.

Malaria is a terrible disease. It ends up in elephantiasis. It's just chronic fever. You are miserable all the time. I think a population would rather live on the verge of starvation free of malaria than it would moderately well fed and subject to chronic malaria. The reduction of mortality is a human achievement

comparable in magnitude to any kind of economic development one might attain. I don't think that one can consciously advocate holding back on it. It seems to me that the rational procedure is to hope to find a way of living with low mortality rates by bringing birth rate down, too. I just don't think you can advocate something of this sort. It would be equivalent to advocating solving the population problem by shooting one person out of ten. I don't think you could do it.

QUESTION: I wonder if the record has been long enough to show whether any government which has pursued programs of birth control and encouraged it have met with any reasonable success with it.

DR. COALE: There are developments which are just now breaking which give some basis for optimism on this score. Let me mention two. One is in certain Chinese populations which are outside of China. The other is in India. First let me take the Chinese. In Singapore and in Taiwan in the last half-dozen years there has been a sharp break in the birth rate. In Singapore it has been concentrated among the Chinese population. The Malaysians have continued unchanged. It has been more than 25 percent in Singapore, the reduction in the birth rate, in the last half-dozen years. In the last 4 or 5 years a parallel movement has taken place in Taiwan. Some colleagues of mine are involved in an intensive study and in helping to promote this, though they haven't had any part in it so far, but they have studied it, and there is good registration in Taiwan. It is one of the rare underdeveloped areas, or somewhat undeveloped, where you have good records, set up by the Japanese. There has been a major decline of 10 to 25 percent in the birth rates among women over 30. It is clearly due to their

practice of birth control. It is occurring in rural as well as in urban Taiwan.

The Taiwanese government is now prepared to back this up with an active program, and an American foundation has supplied materials and an educational kit which is going to be sent out to all the villages. They will go around and propagandize the peasants to undertake birth control and will offer free supplies, including this device I was speaking of which can be inserted, left in place, and a woman is not pregnant as long as it is there. It keeps her from getting pregnant. That seems to me a very hopeful development.

This is the first incidence in an Asian population outside of Japan where the birth rate has gone down.

Secondly, the Indian government, which had in its first 5-year plan starting in 1951 expenditures on family planning, stepped them up in the second 5-year plan and intends to put them at a still higher level in the third. It has been pretty ineffectual because they open clinics and people don't come to them. But there has been an experiment in a special health district outside of Calcutta, called Singur, where they tried what they called a shotgun approach. They tried every single means that seemed feasible at reasonable cost to bring the birth rate down, every means of persuasion and offering every reasonable device. They educate people in the physiology of reproduction. They try to persuade them to use coitus interruptus withdrawal, which, incidentally, was the technique which would account for the decline in the birth rate in both England and France. There wasn't a single contraceptive device involved. It was simply a high enough level of motivation which led the people in England and France to reduce their birth rate by a method mentioned

in the Old Testament. So it doesn't necessarily depend on invention.

They have been trying to get the peasants in Singpur to use coitus interruptus, to use the safe period, and then they have offered foam tablets and other low-cost techniques. Then they have sent out jeeps with sound equipment and strip films, and they have gone to the community leaders and tried to interest them in birth control. They have operated through the health services and they have operated through the schools. This is what I mean by the shotgun.

In five years they've got the birth rate down by 25 percent. The idea is to try to evaluate what parts of this program are the most effective, because it is purely beyond the means of the Indian government to do this all over. If they can find some part of it that is responsible for most of it, then they will have a program that they can use throughout India.

QUESTION: You talked about the population in the United States. It would appear that at some point we will have to do something in this country, even though we have all the resources. Will you comment on that?

DR. COALE: Yes. I think the problem here is of a totally different character, because the problem in the United States is not bringing to a population hitherto ignorant of family limitation this knowledge. Our birth rate in the thirties was down at replacement, actually. Had we kept the birth rate at the level we had in the thirties our population would have ended up stationary. The American public hasn't forgotten about birth control since that time. It is not a matter of people giving up a practice which they had achieved in the thirties. In fact, it is quite clear that a much larger proportion of the population is practicing birth control

today than then. To put that in quantitative terms, we know from a nationwide survey that 90 percent of white couples--and it is restricted to them simply because the sample didn't cover the Negro population--in the United States, where the woman is more than 30 years of age and has no fertility impairment, are practicing birth control. For the remaining 10 percent it is not a substantial factor and the approximately 10 percent of the nonwhite population again is not a substantial factor in our birth rate.

Our high birth rate is the result today of couples deciding that they want 2, 3, or 4 children. There is a very high consensus that about 90 percent of American couples agree on that range, 2, 3, or 4. It used to be in the thirties that a lot of couples voluntarily remained childless or had only one child and then went on to two. It isn't a return to very large families. My father was one of 10 children, and you don't find 10 children in families/ ^{any more.} We haven't returned to that but we have settled down, that is, the current generation of parents have settled down, on a consensus of 2, 3, or 4, children, or an average of about 3.32. This leads to our rapid rate of increase.

Well, as I said, the reason that this is different is that you can't formulate a policy of birth control education. I think you may need that as a social policy, so that you don't have unwanted children occurring to people who can't afford and are not equipped to raise them properly. While that's a social policy to relieve individual suffering, justice, or whatever it may be, it isn't an important contributor to our nationally high rate. To bring the national birth rate down in the United States you have to have people who are controlling their family size and decide that they

want fewer.

Well, fortunately, we don't have to formulate such a policy in a hurry, and the question is how we would do it. For example, supposedly, would you take away the tax advantage that you now get, the deduction of \$600 per child, and put in higher taxes for people with children? I wouldn't want to run for office on this ticket. It is very hard to imagine a national policy invoked by the Government that would bring about a reduction in the birth rate. But, fortunately, from this point of view, there are signs that the peak has been passed. I was alluding to a survey earlier. There was one taken in 1955, a nationwide survey, asking people their intended family size. Then that survey was repeated, though on different samplings, of course, in 1960. The women, 20 to 24, in 1960, expressed an expectation in the number of children which was significantly lower than the corresponding group in 1955. The young women 20 to 24 are now expecting a smaller family than their predecessors five years earlier/ This is a sort of strong wind indicating that the peak of recovery of the birth rate may have been passed and that we will see a reduction down to some lower level.

Let me say that back at this time people were trying to formulate a policy for avoiding shrinkage in the U. S. population. They were worried about our declining population. This is what we got. I think that just about the time we get around to formulating policy to slow down the growth rate the perverse American couples will go back down to having very small families.

One thing certainly is that any prediction in this area is very hazardous, because it is a matter of how individual couples who are making individual decisions

are going to behave.

QUESTION: What is the U. N. doing about population increase?

DR. COALE: By the way, I must say that my connection with the U. N. was not wholly accurately represented. My actual position is as the U. S. representative to the U. N. Population Commission. The U. N. Population Commission is equivalent to a legislative committee in our Congress that acts on a particular area. This Commission consists of about 14 countries, and the U. S., as a member of the Security Council, is always represented on it. When this Commission meets for 3 weeks every 2 years I am the U. S. Delegate.

The U. N. is in somewhat the same position and perhaps even in a more delicate position than the United States is with regard to having an actual policy in favor of birth control. For example, when this Population Commission meets, it is impossible to formulate a U. N. policy which overtly favors birth control, because, as I indicated, the Communists have a dogmatic position, and also, the countries with a majority of Roman Catholic populations will not come out with an official policy. The U. N. simply cannot take an official stand in favor of birth control with these two major bodies opposed to it.

But the U. N. Technical Staff does do something about it. For example, the U. N. has demographic training centers in Bombay, in Santiago, Chile, and they are forming one in Cairo this year, and there is going to be another one probably in Ghana. What is happening is that students from the Ekatai Region, from Latin America, and from Africa are going to be brought to these centers to be trained. Part of the training they will get there is fertility control and lots of it. It's in

the curriculum.

World

Also the Health Organization once conducted an experiment in Delhi and in Ramanadaram in Mysore State trying to introduce rhythm. This was done by a U. N. organization. But it couldn't be administered.

Let me lastly say that the U. N. has, I think, provided an invaluable service of technical assistance to the censuses and the vital registrars, and so on, in these underdeveloped areas. They have been very effective, I think, in improving the level of censuses. A country like India, in formulating its population policy and in viewing its population problem, is handicapped by the fact that they really don't know what their birth rate is, because the registration is so inadequate. The U. N. has been helping them. You can't really run any kind of program without adequate statistics. In this field I think they have been effective.

QUESTION: Sir, would you comment on the projection of the Negro population in the United States and the long-range effect?

DR. COALE: Well, the Negro population in the United States is at present growing at a substantially more rapid pace than is the white population. Its birth rate is something like 33 per thousand, compared to something like 23 per thousand for the white population and because of the younger age composition. In spite of a lower life expectancy they have a somewhat lower death rate. They constitute something like 11 or 12 percent of our population. Even if they continue to grow at this rate, because of the also continued projected growth of the white population, they would rise to no more than 20 percent by the middle of the next century.

I would say that the problem I see in the more rapid growth rate of the Negro

population is that it makes the already very acute situation more acute. That is, the Negro population is changing its locational structure into the center of our great northern cities. Even though they move into these urban areas they are continuing a high birth rate and this is combined with a high level of illegitimacy. It means that the whole problem of acculturation, which I think is needed, is made a lot more difficult. It is somewhat the same sort of situation that you have in some of the underdeveloped areas.

A colleague of mine at the University of Chicago, John Bogue, is right now conducting, with the support of the American Foundation, a program in Chicago trying to bring some kind of motivational changes and superior techniques of contraception, and so on, to the Negro population in Chicago. Just as I was describing that experiment in India, at Singpur, he is trying it in a slum Negro community, and is achieving the same kind of success. It's in the early stage and it is making a difference.

My guess, as far as the projection is concerned, is that the greater growth of the Negro population will slow down. The family size among the small minority of Negroes who are college graduates and professionals, and so on, is lower than among our white counterparts. So I would expect that, with the achievement of universal education and what have you and a generally higher economic status for the Negroes, together with this kind of direct intervention, the birth rate will come down to a lower level.

It does seem to me that, with the friction entailed with the Negro population moving into the centers of the northern cities, and the friction in the South, and

so on, the continuation of a differential rate of growth tends to make that situation worse and more acute.

COLONEL REID: Dr. Coale, on behalf of the Commandant, the faculty, and the student body, thank you for presenting us with the problems faced by the world in the demographic situation.