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CENTER DISCUSSION PAPER NO. 75

THE POPULATION QUESTION IN NORTHEAST BRAZIL: ITS ECONOMIC
AND IDEOLOGICAL DIMENSIONS

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THE POPULATION QUESTION IN NORTHEAST BRAZIL: ITS ECONOMIC
AND IDEOLOGICAL DIMENSIONS

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"The rich get richer and the poor get children." - Anonymous

"A mesa do pobre é escassa, mas o leito de miséria é fecundo." - Anonymous

I. Introduction. - The Brazilian Northeast with its 27 million people, its area of 1.5 million square kilometers, and its per capita annual income of around 150 dollars, is perhaps the poorest "country" in the Western Hemisphere.¹ Efforts to develop the region fall into two broad historical epochs.^{2,3} First the "hydraulic" epoch in which major emphasis was given to fighting the periodic droughts, which were taken as the main cause of backwardness. This is sometimes called DNOCS period, after the principal and most recent institution responsible for carrying out hydraulic policies (Departamento Nacional de Obras a Sêca). Second, the present "capital-technology-planning" epoch in which emphasis is not on the drought (which at times was as much a scapegoat and pork barrel as a scourge), but on low capital formation, backwardness of technology, and lack of planning of development efforts.

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Thanks are due my students for many stimulating debates, and to the late Dr. Ari de Sá Cavalcante for his helpfulness and hospitality. Also I am grateful for comments received in a seminar at the Fundação Getúlio Vargas and from numerous colleagues who read an earlier draft. Once again, my views do not necessarily reflect theirs. Many of the ideas discussed here are also considered in my paper, "Desenvolvimento Econômico e o Problema Demográfico no Nordeste Brasileiro" in the Revista Brasileira de Economia, December 1968.

This change in emphasis occurred in the 1950's and marked the beginning of what we might call the SUDENE period after the institution responsible for stimulating and planning investment (Superintendência do Desenvolvimento do Nordeste).⁴ The purpose of this paper is to argue the need for (and the embryonic beginning of) a third developmental epoch of "population-policy" (mainly fertility control). It is not suggested that population policy should replace the capital-technology-planning efforts any more than the latter replaced concern with the droughts. But a change of emphasis is needed, because, although population policy is obviously not a sufficient condition for development, it is shown below to be a necessary condition. SUDENE used to have a population studies division in its human resources department, but it was abolished some time ago and presently SUDENE seems to have little interest in the population question.

The population explosion has given the Northeast a natural rate of population increase of around 3.1% annually, compared to about 3.2% for all of Brazil, which is among the highest in the world for populations of comparable size.⁵ This rate of 3.1% results from the familiar post-war pattern of a high, constant crude birth rate (4.7% or 4.8% annually)⁶ with a lower and declining crude death rate (1.6% or 1.7% annually).⁷ The death rate will likely fall to the São Paulo level of 0.9% fairly rapidly as a result of mass inoculations--even smallpox has not yet been eliminated.⁸ Thus in the near future the already high growth rate is almost sure to rise, approaching 4%. Historically the Northeast has been "the region of demographic overflow par excellence," showing a strongly negative net migration balance, while all other regions show positive net balances.⁹ This outflow has brought the net growth rate of the region down to about 2.2% annually for the

decade 1950-1960.¹⁰ Net out-migration represents a transfer of wealth, human capital, and laborers of productive age out of the region, thus increasing the dependency ratio. It is not so much a lessening of population pressure as a costly result of that pressure. In 1872 the Northeast contained 47% of the Brazilian population, while in 1960 it contained only 32%.¹¹ This change is accounted for by a greater ^{foreign} immigration to the South, as well as by continuous internal migration from the Northeast to the South, and to a lesser extent to the West.

In addition to the movement southward there has been a tremendous migration from the interior to the coastal cities of the Northeast. While the 3.1% growth rate will double the population of the region in less than 23 years, the coastal cities, such as Fortaleza with its growth rate of 6.6%, will double their populations in about a decade.¹² When we consider that this rapid doubling will greatly increase the proportion of the poor, illiterate, and young in the cities (due to migrations of poor illiterates from the interior, the higher birth rate of the poorer class, and the inherent tendency for a high birth rate to produce a young population)--then we can see what Brazilian sociologists mean when they say that the cities have "swollen" rather than grown (cidades inchadas). When we further consider that this swelling presents not only problems of urban rising expectations, higher per capita investment for urban than for rural infrastructure, political stability and law enforcement,¹³ but also threatens a breakdown of precarious public health conditions and facilitates the spread of epidemics--it then becomes clear that this swelling is building up to an ecological explosion.

In spite of these facts, and in spite of the moral argument that every child should be a wanted child, the population growth rate is currently treated as a semi-sacred constant of nature, a parameter, not a variable in the development effort. In fact, "public opinion" in the Northeast is very hostile to population policy, even though birth control is widely practiced by the upper class. To better understand this tragically paradoxical situation is one of the goals of what follows. In section II we will consider the economics of the population question, arguing objectively and in detail that population control is sine qua non of economic development for the region.* In section III we will delve into the ideology and polemics of the population question, arguing that nationalism, communist influence, and the short-run interests of the oligarchy are even greater obstacles to population policy than the still significant opposition of traditional Catholicism. A few conclusions are added in section IV. To facilitate relating the case of Northeast Brazil to the general world issue of population control and economic development, frequent reference will be made to the excellent survey of recent literature on this subject by Goran Ohlin of the OECD.¹⁴

II. The economics of the population question. - For our purposes we need only the simplest analytical framework for relating income growth to population growth. The following formula converts the Harrod-Domar relationship (upon which the body of contemporary growth theory is based)¹⁵ to a per capita basis by subtracting population growth.¹⁶

$$r = \frac{s}{k} - p$$

*

*The appendix is a more rigorous restatement of some of the points of section II.

where, r = annual per capita rate of growth in value of real output.

s = annual net savings (capital formation) as a percentage of annual output.

k = marginal capital-output ratio.

p = annual rate of population growth.

The ratio s can be expressed as $\frac{\Delta C}{Y}$ (C = capital stock, Y = annual output), and k as $\frac{\Delta C}{\Delta Y}$, so that $\frac{s}{k}$ becomes $\frac{\Delta Y}{Y}$ which is the rate of growth of total output or income. Thus the formula simply says that the per capita income growth rate equals (approximately)¹⁷ the total income growth rate (expressed as $\frac{s}{k}$) minus the population growth rate. According to our simple equation an increase in r can occur in only three ways: raising s ; lowering k ; or lowering p . It is argued below that the first two alternatives have been rather fully exploited, and that reducing p is presently the only effective way to increase r for the Northeast.

Let us look more closely at each of these three variables.

The ratio s is the percentage of total income saved (somewhere) and invested (in the region), and depends not only on ability to abstain from consumption, but also on the ability to transfer what is not consumed from savers to investors, which further presupposes the existence of a class of people who invest other people's money. When savings come from outside the region this class is a fortiori necessary. Thus s is a sociological ratio which depends on the willingness and ability to save (including income distribution) and on the efficacy of financial institutions which transfer savings to a presumed class of entrepreneurs, be they private or governmental.

The ratio k reflects the state of technology, management, the availability of factors other than capital, and the length of the working day of capital. It is the total productivity of capital (differential) rather than the marginal product (partial derivative). In the first case other factors (land, labor) are free to adjust while in the second case they are held constant, as one more unit of capital is added. k has units of years,* being essentially a pay-out-period--i.e., the number of years it takes for a dollar's extra investment to generate an extra dollar of national income. The reciprocal of k has the same units as the interest rate and may be thought of as a "national interest rate" expressing the annual rate of return on the extra dollar invested, or the percentage of the extra dollar's investment recouped in one year. The "national interest rate" is greater than the ordinary interest rate received by the individual capitalist, by an amount reflecting externalities and multiplier effects. k is often treated as a purely technological variable, but its interpretation as a payout period or national interest rate reminds us of its psychological time-preference side. k may differ between two societies with identical technological possibilities because of differing rates of time-preference. Both societies will first undertake those investments with the lowest k , so for any given level of investment k will be equal in the two societies. But one will feel it worthwhile to invest more, thereby pushing the margin out further and incurring a higher k . The question of what determines the time-preference or time horizons of a people is beyond the scope of this paper, except for one important influence.

* $k = \frac{\Delta C}{\Delta Y}$ is a change in a stock divided by a change in a flow, $\frac{\Delta \$}{\Delta \$/t} = t$, where t is time measured in years.

In a pre-demographic transition society (equilibrium with high birth and death rates) the average length of life is short, while in a post-transition society (equilibrium with low birth and death rates) the average length of life is long. For example, birth and death rates of $40/1000$ annually imply an average age at death equal to the reciprocal, $1000/40 = 25$ years. If birth and death rates fall to $20/1000$ annually, the average age at death rises to $1000/20 = 50$ years. A society in which the average length of life is 50 years is likely to have both a longer time horizon and a lower discount of the future than a society in which the average length of life is only 25. It will accept and consider profitable investments with a longer pay-out period (higher k) and will be more capital intensive. Thus k would seem to have a tendency to increase with life expectancy, given the state of technology.

The rate p has been explained by biological theories, cultural theories, and economic theories, all of which are relevant and none of which are completely satisfactory.¹⁸ Perhaps the best generalization about population growth is that set forth by Ezra Bowen (An Hypothesis of Population Growth): "population size tends to vary directly with aggregate wealth, and inversely with the height of standards of living." The first clause is simply a restatement of the biological law that all life tends continually to press on the means of subsistence. Since for all animals except man, living standards are constant and uniform, it follows that greater means of subsistence (wealth) leads to greater numbers existing at the same standard of living. The unique quality of man is that his living standards are neither constant over time nor uniform throughout the population. To the extent that each person enjoys a higher standard of living, or that one class enjoys a higher standard, then fewer people can exist on any given

aggregate income. In the Northeast we shall see that the first clause, that relevant to animal population, applies to the lower class, while the second, specifically human clause, applies to the upper class. For our purposes we need not further discuss the various "laws" of population growth. It is enough to note that these "laws" can be altered by conscious policy, as witnessed by the history of Ireland, Japan, Taiwan, and other countries.

Although our formula identifies only three determinants of growth ^{IN} per capita income, each of these three depends in turn on a whole host of influences. The domains of the variables s , k , and p must, if the formula is to have any economic relevance, be considerably smaller than the field of real numbers, the limits being supplied by those myriad socio-economic factors which do not directly enter the formula. For example psychology and income distribution and capitalist institutions are such that s is generally less than 20%, technology work habits, and time preference are such that k is usually between 2 and 6 years, and biology and "culture" almost always keep p between 0% and 4%. Hence we speak meaningfully of the "savings potential" the "capacity to absorb capital or technology" or the "natural birth and death rate limits" under certain general levels or styles of civilization. In other words our simple formula becomes quite comprehensive when we try to specify the domains of the variables, and unless we know something about these domains we do not know what we are talking about.* What I wish to suggest is that the Northeast is already oper-

*Otherwise we could let k approach zero or let s become large (though not over 100% in a closed economy) and attain an r as large as we wish without worrying about p . Of course, "eliminating" the population problem in this way also "eliminates" the economic problem.

ating at its capacity to absorb capital and technology (resulting in a high rate of growth), but is a long way from its capacity to reduce population growth. Furthermore the high population growth is the main social limit holding down the capacity to absorb capital and technology, and the savings potential. It is also the factor which keeps per capita income growth in the Northeast from representing development--which leads to a "swollen economy" as well as swollen cities.

The average capital-output ratio for industry in the Northeast is estimated by Hirschman to be about 2.5.¹⁹ Singer gives a similar estimate (for 1950) for the state of Ceara (2.73 for industry; 2.07 for agriculture).²⁰ Chenery and Strout estimate k for Brazil as a whole, during the high growth period of 1956-60, at 2.64.²¹ The figure 2.5 is low by international comparison, and reflects the predominance of light industry. If heavy industry follows we would expect it to rise in the future. According to Kuznets, none of the ten developed countries which he studied has in the last century had a marginal capital-output ratio less than 3.²² Hirschman's estimate of 2.5 was for the average ratio, so the marginal ratio may be a bit higher. Also population growth necessitates infrastructure investments in schools, roads, houses, and public services, which have higher capital-output ratios than industry and agriculture. Furthermore, to the extent that increasing life expectancy diminishes the time preference discount applied to the future, we would expect k to rise. Let us assume, then, that 2.5 is a reasonable estimate, and that it is probably very near the lower limit of k 's domain.--i.e. r cannot likely be increased by lowering k , at least not very much, and not over the long run. In fact, it appears likely that

k will tend to rise.

However, as Lauchlin Currie (Accelerating Development) has pointed out, it may be possible to extend k's domain downward by the relatively facile social change of lengthening the working day of capital by working shifts around the clock, thereby employing previously idle labor and increasing output of needed goods. k is measured in years, not hours. By doubling the number of hours worked per year we would halve k. Moreover we would also halve the average capital-output ratio and cash in on a one-shot gain from the increased productivity of intra-marginal units of capital. This assumes that the extra output could be sold, but with Keynesian policies to stimulate aggregate demand this should be possible. Such a policy should certainly be pursued, but several limitations will keep us from expecting too much from this in the Northeast. First, some industries are already working shifts. Second, the strategy works only for physical capital, not for human capital or skilled labor, which need leisure. This limits it to physical capital requiring mainly unskilled labor for its operation. Unfortunately it is human capital and skill which is most responsible for growth and which is in shortest supply in the Northeast. Third, the strategy is relevant mainly to industry which accounts for only 12% of the value of output in the Northeast. It is generally not relevant to agriculture because the seasonality of production cannot be rushed. It is generally not relevant to services since this sector depends mainly on human capital. It is doubtful that lengthening the working day of physical capital in industry will be sufficient to offset the higher capital-output ratios of demographic investments in education and infrastructure.

Without regional income accounts no one can say for sure what s is, but thanks to savings from the South under law 34/18,²² and from the exterior, it is clear that investment funds are not a limiting factor. Also the unequal distribution of income and the luxury consumption of the rich further testify to the existence of a large savings potential. That the limit is capacity to absorb is also indicated by the 2-to 3-year lag between availability of 34/18 funds and their disbursement.²⁴ (Since funds unused for 3 years revert to the federal treasury, the existence of unused funds is itself a spur to finding uses for them). In an interview with ten economists of the Bank of the Northeast the opinion was unanimous that the bottleneck in the Northeast is capacity to absorb capital, nor shortage of funds. In other words s is at the upper limit of its domain. Thus if raising s and lowering k are both no longer effective in increasing r , that leaves lowering p as the only remaining alternative.

But perhaps the Northeast is growing fast enough. What is the current r ? And why does growth represent swelling rather than development? Unfortunately in the absence of regional accounts we can only guess at r . The best source of information is the Bank of the Northeast whose president, Rubens Costa, published some figures for 1959-64 showing industrial growth to be 7.4% annually, and agricultural growth to be about 6.2%.²⁵ If we take a weighted average of these rates, using the percentage of total output estimated to originate in industry (12%) and in agriculture (42%) as weights,²⁶ we get a growth rate of about 6.5% for that 54% of total output coming from agriculture and industry. We might assume that the remaining 46% in the service sector increased output at the same rate, which

may err on the high side, since services include government and the bureaucratic sector. However, for the country as a whole the money value of primary and secondary output increased by a factor about 3.5 between 1962 and 1964, while value of tertiary output increased by a factor of 3.2.²⁷ Assuming no differential effect of inflation our hypothesis of equal growth is roughly verified for the country as a whole, and does not seem unreasonable for the Northeast. If this 6.5% is correct then per capita income increased at 3.4% ($6.5 - 3.1$).

A partial check on these estimates is to see what value of s they imply. Substituting in the formula ($3.4 = \frac{s}{2.5} - 3.1$) gives an s of about 16%. As already indicated regional estimates of s are not available, but for the nation as a whole s is about 15.7% for 1961-64.²⁸ If we assume that the rate of capital formation for the Northeast has attained equality with the national average, then all our other figures are consistent. There is one "if" too many here, but it is not an unreasonable "if," and we can conclude that 6 to 7% is the correct order of magnitude, which is all we need. A lower rate would give added strength to future argument, while a higher rate would only slightly weaken the basic conclusions. A rate of 6 or 7% is not only high by international comparison, but is also higher than the growth rate for Brazil as a whole in any single post-war year.²⁹ Chenery and Strout consider 6 to 7% as a maximum likely rate of growth for underdeveloped countries.³⁰ Our assumption that this rate will be maintained is therefore an optimistic one.

It appears then that total income is rising much faster than population for the Northeast. (Although the opposite is true for Brazil as a whole since during 1960-64 output grew at 2.1% while the population grew at 3.1%).³¹

But before we rejoice over the likelihood that regional per capita income is rising at 3.4% (well above the Punta del Este goal of 2.5%!) and hastily conclude that the population explosion is not a special threat to the Northeast (as is usually done), let us pause to go behind these misleading averages.

With an income distribution as skewed as that of the Northeast the arithmetic mean income for the whole population is just a number, which, although it may represent a goal or a possibility, does not describe any central tendency. The great majority of people have incomes well below the mean, and a few have incomes vastly above the mean. Modal income is a better index of central tendency or "representativeness," and there is no evidence that modal income has increased. I know of no one who claims that it is increasing now, and there are good reasons for believing that a typical lower class family (which would be a modal for the entire population) is not getting any better off. In the first place, lower class total income is surely growing more slowly than upper class total income (or total income of both classes), since the lower class is hurt more by inflation, has no education or bargaining power, and "it takes money to make money." The last is especially true since Law 34/18 means that nordestinos who have money can easily mobilize more--the credit multiplier is around 6, and by combining SUDENE funds with those of state development agencies, can be as high as 16. But even if lower and upper class total incomes both increased by 6.5%, the lower class per capita income (a mean which is a good approximation to the mode and thus representative of central tendency) would stay about the same while that of the upper class would double. This results from the fact that a typical upper (and middle) class

completed family has about 4 children, while a typical lower class completed family has about 8.³² The upper class family with a reproduction ratio of 2*, and the lower class family with a reproduction ratio of 4, will thus double and quadruple their numbers, respectively, over one generation** (about 25 years). If we make the generous assumption that the total income of each class increases at the same 6.5% rate at which the total income of both classes (the whole population) increases, then over 25 years the total income of each class will have increased by a factor of $(1.065)^{25} = 4.8$. Hence upper class per capita income will increase by a factor of $\frac{4.8}{2} = 2.4$ per generation, while the lower class per capita income will increase by a factor of $\frac{4.8}{4} = 1.2$ per generation. Since we can be sure that lower class total income grows at less than, and upper class total income at more than, the 6.5% average, we may conclude that upper class per capita income more than doubles over a generation, while lower class per capita income remains about constant, or perhaps even declines. A constant or declining lower class per capita income is consistent with the regions net outmigration. Since the poor live close to subsistence the "elasticity of migration" with respect to a fall in income must be high, although there are certainly other motives for migration besides falling income. These calculations do not pretend to great accuracy or demographic refinement, but they suffice to establish the strong presumption that in Northeast Brazil "the rich get richer and the poor get children." The social consequences of this venerable dictum deserve vastly more emphasis

*This "reproduction" ratio is treated as net of infant mortality, but gross with respect to other mortality -- i.e. the number of children surviving infant mortality divided by the number of parents.

**A generation is equal to the mean age of mothers at childbirth.

than is usually accorded them. Furthermore it follows that the percentage of the population getting richer is getting smaller, and the percentage getting children is getting larger--i.e. the population is being "proletarianized." (See Appendix).

In addition to its common-sense appeal the above argument corresponds very well with W. Arthur Lewis' model of development with unlimited supplies of labor.³³ Lewis explains growth as the result of technological change and especially capital accumulation resulting from a rise in the savings ratio from around 5% to around 15%. This rise is made possible by an increasing concentration of income in the hands of the capitalist sector (the only sector which saves), which in turn is made possible by a constant real wage resulting from unlimited supplies of labor. However in the Lewis model one presumes that excess labor will eventually be absorbed and real wages will rise, while for the Northeast unlimited labor seems a permanent condition assured by the unlimited reproduction of the proletariat. Even a very respectable growth rate of 6.5% does not begin to arrest the proletarianization of the population. Lewis also assumes that the capitalist wage rate must be higher (by about 30%) than per capita income (average product) in subsistence agriculture in order to induce migration to the city (capitalist sector). This difference is not necessary in the Northeast since migration to the cities has occurred at a rate much superior to the needs of the capitalist sector. Aside from these two exceptions the Northeast corresponds quite well to the Lewis model, with SUDENE playing the

role of spark plug of the capitalist sector.*

It certainly appears that a population policy is called for if the masses are to share in the benefits of growth. But might there not exist the possibility of increasing capacity to absorb capital and technology, thereby increasing s and r ? Certainly, but above all else this will require education, and a rapid population growth increases the proportion of children, which throws a greater burden on the already insufficient educational system, as well as increasing the dependency ratio and making it harder to save. As of 1960, for Brazil as a whole 43% of the population was under 15 years of age (versus 30% in Argentina and the U.S., and 22% in Sweden), and the percentage may be higher for the Northeast, in view of its higher birth and death rates, although higher infant mortality rates tend to reduce the dependency ratio.³⁴ In 1920 literates (15 and older) constituted 14.2% of the population of the Northeast; 15.4% in 1940; 17.7% in 1950; and 15.4% in 1960.³⁵ In other words literacy has been about constant for the last 40 years, and has actually declined since 1950. Literacy efforts were frustrated by population increase. This phenomenon is even more striking in the cities due to the immigration of illiterates from the interior. In Fortaleza the literacy rate (5-14 age group) fell from 57.6% in 1940 to 39.4% in 1950, and has probably fallen further

*The international implications of unlimited reproduction in some countries and limited reproduction in others would, as in the case of the Lewis model, be analogous to the differential class effects within the country. Countries with unlimited reproduction would find that technological improvements would not take the form of higher wages, but would take the form either of higher returns to capital, or lower prices of the product in the latter case leading to a worsening of the terms of trade vis a vis countries with limited reproduction.

since 1950.³⁶ Kuznets simply echoes common knowledge when he reminds us that "widespread use of scientific technology is impossible without a literate population..."³⁷ Yet education has fallen from 11% of the federal budget in 1965 to 7.7% in 1968.³⁸ Capacity to absorb capital and technology depends mainly on the quality of the population, not quantity. Since quantity increases have opportunity costs in terms of the quality of the population, they tend to hold down the capacity to absorb capital and technology, and thus to hold down improvements in s and k .

In addition to being concerned with domains of variables, we must also look for "behind the scenes" interrelations not evident in our simple formula. Two such relations come to mind. First k is influenced by the availability of factors other than capital, so if labor were in short supply a high p would mean an (eventual) easing of the labor shortage thus making possible a lowering of k . However, since unskilled labor is superabundant in the Northeast we can ignore this possibility. Secondly, and much more importantly, a high p gives a structural impulse to inflation, thereby distorting investment toward more speculative, less productive alternatives (raising k), and perhaps also tending to hold down savings (reduce s), both of which would have a negative effect on r . It is possible of course that inflation might increase s by bringing about a further concentration of income, but this is still, on balance, an unhappy influence. The structural impulse to inflation from a high p comes about in two ways. For one, a high p (with a high birth rate) means that the young dependent cohorts are adding more people each year than are the older productive cohorts. Thus demand (or need) for commodities tends to grow faster than production or supply. This age effect

is reinforced by the higher reproduction ratio of the more needy and less productive lower class. Further reinforcement comes through the fiscal system since the absolute increase within the taxpaying cohorts is less than the absolute increase in the cohorts demanding or needing government services such as schools, public health, and welfare. Very likely the government will find itself forced to run an inflationary deficit.*

The population question becomes more acute when one realizes that in all developed countries agriculture has been a "disemployer" of labor as it becomes more productive. The existence of surplus people and low wages makes technical advance in agriculture appear uneconomic in the short run, thus slowing down formation of the large agricultural surplus upon which industrialization ultimately depends. Furthermore in industry as well there is a tendency for new technologies to be highly automated and thus provide a relatively small amount of employment--and that for educated people. Since the workers of the next 20 years have already been born, this problem will not be alleviated by birth control for quite some time. This hardly constitutes an argument against birth control, although it is often mentioned in that context--rather it means that population control should have been initiated twenty years ago. Also, we must not forget that at an individual level there is an immediate and inestimable benefit to be gained by the lower class from birth control. To say that the parents of ten

*I am grateful to Professor Isaac Kerstendeky for calling this to my attention.

hungry children really want five more, is, paraphrasing Marx, to commit libel on the human race. Also the Northeast's infant mortality rate in excess of 174 per thousand (versus 70 per thousand in Sao Paulo)³⁹ argues for the relevance to both families and whole populations of what Boulding has called the "utterly dismal theorem" of economics--viz. if nothing is done to control population the ultimate result of any increase in productivity will be to allow more people (the reserve army of dying infants) to subsist at the same level, thus increasing the sum total of human misery.⁴⁰

Granted the benefits of population policy, what are the costs, and is it really feasible in Northeast Brazil? Stephen Enke calculates that the current margin, funds spent on birth control in an underdeveloped country are about 100 times more effective in raising per capita income than funds spent on conventional development projects.⁴¹ After critically reviewing the calculations of Enke and others, and the highly simplified assumptions underlying them, Ohlin nevertheless concludes,

"What is worth emphasizing is that it is difficult to undertake any calculations of economic gains that might be realized from population control which does not point to very spectacular benefits. On the other hand it is currently believed that successful family planning campaigns can be achieved at costs which are extremely low, except in comparison with the negligible amounts spent so far. The purely economic case is convincing--so convincing that one is tempted to say that population control might bring the dawn of sustained economic growth within sight of the developing countries."⁴²

The feasibility of birth control in the Northeast is generally considered nil, and one of the few studies of the region's demographic problems dismisses the possibility as "still very remote."⁴³ Nevertheless the practice of family planning is widespread among the upper class, and to say that the poor do not want birth control is true only in the same sense that they do

not "want" to go to school. Recent studies indicate that in urban Brazil over 93% of all families having 3 or more children do not want more.⁴⁴ Another significant finding is that 71.3% of Catholic women in legal or common-law marriage in Rio de Janeiro have used contraception before the fourth pregnancy.⁴⁵ Most significant of all is the estimate of Professor Rodrigues Lima that (in public hospitals) 22.3 cases were treated for the effects of induced abortion, for every 100 live births.⁴⁶ Furthermore most voluntarily induced abortions occur outside hospitals. This figure corresponds with results of studies in Santiago, Chile, where it was found that the ratio of provoked abortion to live births was 23%, and that 26% of women of reproductive age admitted to a history of provoked abortion.⁴⁷ The contention that people, as individuals, do not want birth control is a myth.

To sum up, Northeast Brazil should adopt a population policy (emphasizing fertility control) for the following reasons:

(1) Without it modal income is unlikely to increase (likely to decline), which means that the benefits of growth will not extend to the masses, who will form an ever larger percentage of the population.

(2) It will greatly reduce the burden of educating the masses, a precondition for modern technology as well as democracy. Indeed, without population control the percentage of illiterates will probably continue to increase.

(3) It will increase the savings potential by lowering the dependency ratio.

(4) It will facilitate the introduction of high-productivity methods in agriculture which are not feasible with surplus farm population and low wages. Likewise for industrial automation. Alternatively it will mitigate the problems of technological unemployment when automated methods become more economical than even subsistence labor.

(5) It is necessary to keep the swollen cities from bursting.

(6) The lower class wants birth control, although not articulately, and the upper class already practices it.

(7) A dollar spent on birth control is, at the current margin, vastly more productive in raising per capita income than a dollar spent on conventional development projects.

(8) Ultimately birth and death rates will be brought inexorably into equality. Without some form of birth limitation, death rates will rise to equal the birth rate at around 48/1000, implying an average length of life of 21 years, with a corresponding high rate of time preference and low level of capital intensity, and general poverty. Why not lower the birth rate instead?

(9) The region is unable to support its present population as evidenced by high emigration, illiteracy, disease, and infant mortality rates.

(10) A high birth rate gives an impulse to structural inflation, which reacts unfavorably on k and s .

The list could be extended but it already presents a highly convincing case which one would expect to command general agreement.* Nevertheless the

*Among modern Western economists from developed countries the most sanguine views of the influence of population growth on development are probably held by Albert Hirschman and Colin Clark, especially the latter.

Hirschman points out that the skills developed to meet the challenge of a population explosion are the same skills necessary for development. This is a rather obvious variation on the theme of "challenge and response." The same observation was made and developed in greater detail by Sir William Temple in 1673 as an explanation of why the densely populated Dutch were more prosperous than the English (see E.S. Furniss, The Position of the Laborer in a System of Nationalism, p. 139). Also one might argue that the prudence and foresight required by birth control are very useful habits for development. The most important thing to note about Hirschman's observation is that from a policy viewpoint nothing follows from it. Underdeveloped countries are already long on challenge and short on response--an additional challenge, e.g., bombing them, is really not going to help. Nor will the population explosion. Hirschman himself draws no policy implications from his statement, but it is widely quoted by those with pro-natalist views.

In the preface to his book Population and Land Use, Colin Clark recognizes that high population growth brings economic hardship to communities living by traditional agriculture, "but it is the only force powerful enough to make such communities change their methods, and in the long run transforms them into much more advanced and productive societies." This is really an incredible statement. Are we to believe that all modernization of agriculture has resulted from population pressure? Why is not China's or India's agriculture

SUDENE policy has concentrated on s and k , treating p as a parameter. They have had considerable success in this strategy as witnessed by the high rates of "growth" (i.e. swelling) in both total and per capita income, but the strategy itself is insufficient for development--if by development we mean increasing the welfare of the majority of the population. This can be further shown in a rough empirical way by taking as estimates of future s and k the most favorable values found by Kuznets to have prevailed over the last century in the ten industrial countries he studied. These were $k = 3$ and $s = 22\%$, both for postwar Japan.⁴⁸ We know that p will approach 4% as the death rate falls and the birth rate remains constant. Thus we have $r = \frac{22}{3} - 4 = 3.3\%$, which we have already seen is insufficient to counteract the effect of differential fertility and the resulting proletarianization of the population. Furthermore it is very doubtful that even the famous discipline of the Japanese could have achieved such an s (and k) had it not been for their drastic population policy which cut the birth rate in half in only ten years--from 34/1000 in 1947 to 17/1000 in 1957.⁴⁹ It is no accident that the industrial country with the world's highest s and lowest k , should have at the same time experienced the world's most impressive fall in p . Thus even assuming that the Northeast could match the Japanese s and k , and do it without the help of population policy, it would still not halt the process of proletarianization!

more modern than that of the United States, Canada, or Australia? Is population pressure really "strong enough"? It has not been in India. The challenge of high birth rates has throughout history generally been met by the easy response of high death rates, rather than by the difficult response of modernization--"thou shalt not kill, but needst not strive officiously to keep alive." Clark's use of the "long run" here richly deserves Keynes' famous putdown that "in the long run we are all dead," because in fact the most common short run response to population pressure is a rise in the death rate, not the modernization of agriculture. The latter is rather uncommon even as a long run response.

It has perhaps occurred to the reader that if per capita income is growing at 3.4%, then it is at least arithmetically possible for everyone's income to grow at 3.4%, add thus double in 21 years. So if income is redistributed only proportionally (not equally) so that all per capita incomes grow at 3.4%, what happens to the population problem? It is palliated, but not cured, since nothing physical can for long grow exponentially. Indeed, if families received extra income for extra children, as would have to be the case in such a plan, population may grow even more rapidly. There are many good arguments for redistributing income, but to escape facing the population question is not one of them. On the contrary, population policy is itself a most powerful means of effecting income redistribution between classes.

According to Malthus,

"It is unquestionably true that the laws of private property, which are the grand stimulants to production, do themselves so limit it as always to make the actual produce of the earth fall very considerably short of the power of production. On a system of private property no adequate motive to the extension of cultivation can exist unless the returns are sufficient not only to pay the wages necessary to keep up the support of a wife and two or three children, but also afford a profit on the capital which has been employed. This necessarily excludes from cultivation a considerable portion of land which might be made to bear corn. If it were possible to suppose that man might be adequately stimulated to labor under a system of common property such land might be cultivated, and the production of food and the increase of population might go on till the soil absolutely refused to grow a single additional quarter, and the whole of society was exclusively engaged in procuring the necessaries of life. But it is quite obvious that such a state of things would inevitably lead to the greatest degree of distress and degradation. And if a system of private property secures mankind from such evils, which it certainly does in a great degree by securing to a portion of the society of leisure necessary for the progress of the arts and sciences, it must be allowed that such a check to the increase of cultivation confers on society a most signal benefit."⁵⁰

The necessary condition for progress in the arts and sciences is leisure, and the necessary conditions for leisure are unequal distribution of income

and/or limitation of population to a level such that only that land and those processes which are productive enough to yield a surplus need be employed. To the extent that we prefer equal distribution of income, then population control becomes all the more necessary if we are to maintain leisure for non-subsistence pursuits.

But if the economic case for population policy is so strong why has it not been adopted, and why is it still very strongly resisted? One very important reason is simply lack of information and lack of understanding of the economic arguments, plus natural inertia. It is, after all, essentially a post-World War II phenomenon. But this is far from being the whole story. To understand the rest we must turn to the realm of ideology.

III. The ideology of the population question. - Ohlin says:

"Discussions of population problems inevitably touch on the intimate spheres of life as well as the ultimate: birth, procreation, and death. They also evoke seductively simple and often contradictory notions of the collective fate: a declining rate of growth evokes the prospect of decline and extinction; a growing population seems to strengthen the tribe or the nation, but excessive numbers lead the thought to famine and hunger. Such basic ideas have dominated population thought in the past, and they remain influential today."⁵¹

One red herring which is inevitably dragged across the path of argument is the impracticability of "enforcement" of birth control. Our discussion deals only with voluntary control. Far from limiting anyone's freedom the idea is to extend to the lower class the same option enjoyed by the upper class of limiting and spacing their progeny.*

*Ultimately any positive growth rate will lead a population to an impossible size, so that in the very long run a zero growth rate will be necessary. Since current preferences for 3 or 4 children imply a positive growth rate, some conditions restraining pure voluntarism may have to be imposed in the future. To discuss this before the case for voluntarism has been won is putting the cart before the horse. Before one can be convinced that all have a social duty to limit their progeny, one must accept the prior condition that all have an individual right to do so, and that the exercise of that right does not have anti-social consequence.

As Rubens Costa notes,

"It is well known by everyone that in our country there is in practice no official control on the production and sale of contraceptives. In fact many middle and upper class urban families limit births. But rural and low-income urban families possess neither the means nor the information for planning the number of children they wish to have. Thus it happens that those who can best feed, educate, and prepare their children for life are the ones who have the fewest children...resulting in a continuous deterioration in the composition of the population."⁵²

The relation between "proletariat" (literally, "those with many offspring") and "proliferation" is embedded in our very language, and is even more apparent in Portuguese (prole, proletariado). Caldas Aulete, the authoritative dictionary of Portuguese, defines "proletario" or proletarian as, "citizen of the lowest class of a people, the class whose members, poor and exempt from taxes, were useful to the republic only for the procreation of children." (My emphasis.) Although this is the Ancient Roman sense of the word it is by no means obsolete, and as will be shown later, is more relevant to the Northeast than the later Marxian meaning.

What is the attitude of the "public opinion class" (oligarchy, students, professionals) of the Northeast toward population policy? To begin with a personal experience, during the year of 1967 I discovered that out of my class of 15 graduate students in economics, from all over the Northeast, only one favored a policy of making birth control information available to the lower class.* Certainly this sample is far from random, containing only university graduates in economics, who presumably have a better than average understanding of socio-economic problems. Also the ECLA-BNDE course

*However in the 1968 group of nineteen students, six favored some minimum population policy and the opposition seemed less intense.

on the economy of the Northeast simply ignored population. From the 9,000 word summary of their 1967 course given in Fortaleza, one would never guess that there was such a thing as a population explosion--although one does learn that in the fifteenth century the Turkish invasions created serious difficulties for European commerce!⁵³ One of the leading young professors of this course told me in a discussion that he found population control "personally repugnant, and besides, look at all the land we have--we need land reform, not population control." Nor would he accept the idea that both might be desirable. The problem is not just ignorance.

During April and May of 1967 there was a national flare-up against U.S. missionaries in the Amazon, who were supposedly engaged in birth control education and insertion of IUD's. The following headlines of Ultima Hora (May 4, 1967) show the leftist reaction, "national indignation against genocide in the Amazon," and "sterilization destroys morality of Brazilian women." Dr. Alberto Ramos, Archbishop of Belen, protested against "sterilization" of women in the Amazon and along the Belen-Brasilia road by Presbyterian missionaries, calling it "this new slaughter of the innocents."⁵⁴ Congresswoman Julia Steinbruck called for an investigation of the sterilization of Brazilian women in the Amazon by Presbyterian missionaries, done "with the sole purpose of depopulating those regions, aiming at, in the not too distant future, an almost authorized foreign penetration."⁵⁵ A congressional investigation failed to turn up any evidence of "sterilization" and the more responsible newspapers reacted against the furor.⁵⁶ The incident is significant because it shows how sensitive the issue is and how easy it is for the leftist "nationalist" press to play on the

ripe predisposition of useful innocents. In fact even a government smallpox vaccination drive in Ceara provoked rumors spread among the masses that the campaign was really an American plot to sterilize the nordestino.

The weekly magazine Manchete⁵⁷ reported the results of a public opinion poll (2,800 men and women in seven major cities), as indicating that 79% of the population thought that a couple should not have more children if they cannot afford it. The least favorable response to that idea was found in Fortaleza where only 65% accepted it. Fortaleza also had the greatest discrepancy between male and female opinion (69% for women, 60% for men). It was also found that the poorest class was most favorable to the opposite notion--that one should have any number of children he pleases, of money, regardless. Manchete attributed these results to the belief that many children is a sign of virility of men, and that for the poor, children represent hands to work as well as mouths to feed, and are also a kind of old age insurance. In spite of the majority acceptance of family planning at an individual level, there is no such acceptance of a national effort to reduce the population growth rate. Manchete reports in an article entitled "Sterilization is Genocide" that "the majority of Brazilians react unfavorably to the idea of a policy designed to contain the so-called population explosion...."⁵⁸ It is also suggested that the movement in favor of birth control is propaganda from the developed countries "so that the old powers will not be surpassed demographically, nor have their prestige lessened by the appearance of new densely-populated countries."⁵⁹

One could continue citing examples and studies, but most informative of all, and most relevant to the Northeast, is an article by Rachel de

Queiroz, one of the leading writers and most respected citizens of the region. Since the views of a leading literary figure not only reflect but also help form public opinion, they are worth a hundred polls for finding out what a community thinks. Hence we will quote extensively.⁶⁰

"...I have my prejudices against birth control. Well, where would I be if my parents and grandparents had practiced that control?"

"...from a national and human point of view one can think of many arguments: which indicate that this kind of international pressure they put on us to limit the birth of Brazilians, is not only impertinent but also suspect."

...What logic can there be in campaigning for the limitation of natural-born Brazilians while we are trying to increase population with European immigrants? Does this mean that one reverts to the old thesis of Count Gobineau, of Dr. Goebbels, and the other racists, according to whom our people is composed of degenerate mestizos who should be replaced by white Europeans?"

"The entire Amazon is empty, deserted and unexplored. What population does Mato Grosso have in relation to its area--and Goiás, and Pará and Amapá...There is not a state in Brazil, not even Ceará, which can be called overpopulated."

"Brazil, contrary to the opinions of fickle friends and niggardly benefactors, has plenty of space to plant and to graze herds to sustain her children. Whoever wants to help us, let them help us in this task and not take advantage of our current difficulties to buy for a vile price that which we produce."

"...would Red China have the force and power to confront a coalition of almost the whole world, if it were not for the tremendous capital represented by her immense population?

Let our people grow...And do not preach national suicide for fear of lack of food."

It would seem that population policy is advocated only by racists in the developed countries who desire national suicide for Brazil. Sra. Queiroz's highly-regarded fiction contains some excellent social comment, but unfortunately her social comment, in this instance, contains some excellent fiction. Furthermore, the poor migrants who leave the Northeast evidently consider

it overpopulated and they do not usually head for the Amazon.

The vast Amazon with its population density of less than one person per square kilometer is usually offered as conclusive evidence that Brazil has no population problem. This is a popular fallacy--the Sahara Desert has even fewer people per square kilometer, yet no one thinks it is underpopulated. Furthermore such a hostile environment as the Amazon is more likely to be conquered by educated, technically competent adults than by the unlimited progeny of hungry illiterates. But even if the Amazon were a temperate fertile plain the relevant consideration is the rate of population growth, not the absolute size or spatial density at a given moment. A rapid increase in the quantity of people has opportunity costs in terms of the quality of people. If minimum quality standards are desired, one way of aiding the attainment of these standards is clearly to slow down the quantitative increase.

This fallacy of looking only at density and neglecting the rate of increase is committed in high places.* President Costa e Silva, in a letter to Pope Paul praising the encyclical Humanae Vitae, says,

"In name of the people and government of Brazil I express to Your Holiness the joy and gratitude occasioned by the encyclical in which the supreme voice of the Church gives the appropriate condemnation of the anti-Christian methods of birth control. As leader of a country which is still seeking to occupy more than half of its territory, and still exposed to the risks of a population density which is incompatible with the global necessities of development and security, I applaud this notable document. I applaud it not only because of our unshakeable faith in the Christian commandments, but also as the strategic and moral foundation of the policy followed by Brazil on the journey toward material and spiritual progress of her people, and as a contribution to peace and harmony among nations." (Jornal do Comercio 8/13/68.)

*Also, Richard Nixon, before being elected President, was quoted as saying, "This (population control) would be a false position in this country, with vast areas to be colonized. As a matter of fact, Brazil needs to develop its natural resources and to increase its birth rate, to increase the value of its own territory." (Jornal do Brasil, 5/14/67.)

We have enough information now to draw some conclusions. While the arguments of section II in favor of population control assume that the goal is to maximize per capita (or better, modal) income, it is clear that underlying the views cited in section III is the goal of maximizing the power and prestige of the nation--i.e. total income, not per capita.

It is interesting that laissez-faire libertarians, who want to leave as much as possible of economic life to automatic regulation, have usually made an exception of population and pointed to dismal consequences if not controlled.⁶¹ Conversely, the planners and authoritarians have wanted to control everything but population. Marx's contempt for Malthus was almost limitless, and Marxians have generally considered socialist reform and population control to be incompatible alternatives for lifting the proletariat. This paradox is easily resolved by redrawing the categories along the more fundamental lines of individualism and collectivism. Individualist libertarians want to protect the worth of the single individual from the depreciation of emitting too many, as well as from the discretionary authority of the state. Collectivists are more interested in the total, and one more individual usually adds to total power, in the sense of increasing the herd. In addition collectivists prefer to deny the possibility of improving one's own condition by individual action, and to emphasize class solidarity and collective action--vice versa for individualists. Furthermore, a moderate number of persons can be treated individually, but an immense number can only be dealt with collectively. Thus the population explosion fits in nicely with both collectivist dogma and with revolutionary tactics of building up social pressures in underdeveloped

countries. For example, the Brazilian socialist journal Problemas da Paz e do Socialismo reconstructs a scissor and paste "debate" among world population experts, on the question "does the threat of overpopulation exist?" The negative clearly "wins" and the central theme is that "it is necessary to defend the populations from capitalism, not capitalism from the populations."⁶² One also hears the slogan "one more hungry child today means one more guerilla fighter tomorrow."

Malthusian writers of the classical school have tended to emphasize those implications of Malthus' theory which were unfavorable to social reform--e.g. redistribution of income to the poor will only allow a greater number of people to exist at the same miserable subsistence level, and is therefore a bad policy. This comforts the conscience of the rich and for that reason has given Malthusianism a bad name with Marxists and some liberals. There is, however, a more radical implication of Malthus' basic insight, which can even be expressed in Marxist terms. From Marx we learn that capital is not a thing but a social relation.

"...property in money, means of subsistence, machines and other means of production does not as yet stamp a man as a capitalist if there be wanting the correlative--the wage worker, the other man who is compelled to sell himself of his own free will.

...capital is not a thing but a social relation between persons, established by the instrumentality of things."⁶³

Likewise mere ownership of land does not make a man a latifundiario if there be lacking the correlative, the subsistence agricultural laborer. A plentiful supply of "correlatives" is a necessary condition for the maintenance of a privileged, propertied class. Also Arthur Lewis points out that

"the fact that the wage level in the capitalist sector depends upon earnings in the subsistence sector is sometimes of immense political importance, since its effect is that capitalists have a direct interest in holding down the productivity of the subsistence workers."⁶⁴

Note that Lewis' observation would imply a conflict between the industrial capitalist and the latifundario--a conflict, moreover, which can easily be avoided, since the capitalist is interested only in holding down the marginal productivity (or average productivity, whichever governs subsistence wages). This is also in the interest of the latifundario and is very simply effected by allowing the proletariat to live up to its name and proliferate--the more workers, the lower the average and marginal product and the lower the wage, and the less chance for conflict between capitalists and latifundarios. To the extent that the correlative proletariat becomes less numerous the burden of the niggardliness of nature must be borne in part by the capitalist and latifundario who will have to pay higher wages and get along with fewer servants. Thus preaching birth control to the proletariat is an attack on the status quo, and has no relation to the apologetic side of Malthusianism. Although Lenin was opposed to "Neo-Malthusianism" as a social policy, he was in favor of free circulation of birth control information and the abolition of laws punishing abortion.⁶⁵ Thus is it were tactically expedient to support birth control the communists could find textual support--but opportunistic revolutionary tactics call for building up the pressure of misery and diverting attention from any alternative to communist revolution. Strangely enough Western countries are often charged with hypocrisy when they advocate population control to the underdeveloped countries. But note that the Western countries themselves in this instance, practice what they preach, while the Communist bloc preaches unlimited growth, but practices limitation at home. It is well known that in Hungary the abortion rate exceeds the birth rate! Pressure for revolution from a high birth rate comes not only from numbers but from the resulting

age composition as well. A younger population is more volatile and more easily manipulated.

The Marxian concept of the proletariat (the dispossessed industrial worker dependant for his livelihood on the sale of his own labor power) is relevant to the Northeast, but the original Roman sense (producers of offspring for the republic) is far more accurate in characterizing the lowest class of Northeastern society. After all, industry accounts for only 12% of total output. Furthermore to apply a capitalist law of "relative surplus population" to an essentially precapitalist society is very much against the spirit of Marx's thought, in which "every special historic mode of production has its own special laws of population, historically valid within its limits alone."⁶⁶ The proletarian nordestinos are exploited through their role in society analogous to a herd of livestock which is valued only in terms of its total size, not for the individual well-being of its members. While exploitation in the Marxian sense has attracted much sympathetic attention, "Roman exploitation" goes largely unnoticed. It is not surprising that in the Northeast Catholic clergymen with a social conscience should tend to the left, since their dogma make it easier to sympathize with a Marxian proletariat than with a Roman one. Yet, the latter is more congruent with Northeastern realities. Exploitation via ownership of the means of production is more obvious than exploitation via the "ownership" of the means of limiting reproduction,, but it is no more effective, nor more degrading. The ownership by the oligarchy of both the means of production and the means of limiting reproduction,* leads to

*The "means of limiting reproduction" is more than just the availability of contraceptives, although that is part of it. It must also include the attainment of a cultural level sufficient to provide a minimum of understanding and motivation.

Marxian and Roman exploitation simultaneously, with the result that the proletarian population, like animal populations, is limited by its aggregate wealth, while the upper class population has the distinctively human characteristic of being limited by its standard of living.

Roman exploitation is also a much sounder theoretical concept than Marxian exploitation, since the latter is all tangled up with the labor theory of value, while the former depends for its operation only on the law of supply and demand, and on the solid fact that the lower class is more prolific. That Marx himself (as opposed to the Marxists) had some sympathy for the notion of Roman exploitation is seen the following quotations.

"The reproduction of a mass of labor-power, which must incessantly re-incorporate itself with capital for that capital's self expansion; which cannot get free from capital, and whose enslavement to capital is only concealed by the variety of individual capitalists to whom it sells itself, the reproduction of labor-power forms, in fact, an essential of the reproduction of capital itself. Accumulation of capital is, therefore, increase of the proletariat."⁶⁷

"In fact, not only the number of births and deaths, but also the absolute size of families, stand in inverse proportion to the height of wages, and therefore to the amount of means of subsistence of which the different categories of laborers dispose. This law of capitalistic society would sound absurd to savages, or even to civilized colonists. It calls to mind the boundless reproduction of animals individually weak and constantly hunted down."⁶⁸

The last sentence also calls to mind the theory of Josué de Castro, writer on Northeastern problems and nutrition expert, that the natural response of a species whose existence is threatened is to increase its reproduction rate--the doubtful physiological mechanism being that protein deficiency, up to a point, increases fertility.⁶⁹

The collectivist emphasis (usefulness to the republic) in the concept of Roman exploitation can be better understood by constantly bearing in mind that all members of the collective are not equal. The oligarchy and

the public opinion class in the Northeast already practice birth control. As we have seen, the fact that the masses do not means that there will always be a plentiful supply of labor at low wages for the development of the oligarchy's industry, and to work on the oligarchy's fazendas, and to furnish servants for the oligarchy's homes and babas to care for the oligarchy's children. Nor should we overlook the fact that land values tend to rise with population, so that the land-owning class enjoys a capital gain as well as cheap labor. An important complement to birth control would be a land tax, especially a tax on idle land, which would have the double advantage of encouraging its productive use and lowering its price, thus discouraging the speculative, unproductive investment in land which is so common in inflationary countries. Also, revenue from the tax could be used for schools to teach illiterates (some eighty per cent of the population), and to finance birth control education.

Rachel de Queiroz says "... the poor have children because the poor have the good sense to understand that children are wealth."⁷⁰ She means wealth for the poor, which is true in a sense--but there is a more significant sense in which children of the poor are wealth for the rich, who procure their services at subsistence wages. If the oligarchy should suffer an attack of conscience they can apply the opiate of traditional Roman Catholicism to their own discomfort as well as to the birth pains of the proletariat. Like Marxian exploitation, Roman exploitation is not the

the conscious intent of evil people.* The oligarchy does not hold meetings and formally vote to obstruct population policy.

*The term "Roman exploitation" has several justifications. First the literal Ancient Roman sense of the word "proletariat," already discussed. Second, the conscious limitation of family size by Roman patricians (See Sidney Coontz, op. cit. fn. 18, chp. 7). Third, and more recently, the traditional Roman Catholic opposition to birth control, which Protestants have often regarded as simply a strategy to outnumber them. Also, see Edward Gibbon, The Decline and Fall of the Roman Empire, Chapter 2, "the source of foreign supplies (of slaves) flowed with much less abundance, and the Romans were reduced to the milder but more tedious method of propagation. In their numerous families, and particularly in their country estates, they encouraged the marriage of their slaves." Encouraging the propagation of "wage slaves" is still an attractive policy for oligarchs.

Although he did not use the term, the idea of Roman exploitation was so clearly described by A.B. Wolfe in his brilliant article, "The Rationalization of Production and Reproduction", that his following words may well serve as a definition of the concept.

"Church and state were determined that contraceptive information should be withheld from the women of the lower classes, whose unremittent labor was essential to the development of British export trade. Refusal of the right to this information implied, of course, that people were not to be permitted to put any rational barrier between legitimate sex impulse and its 'natural' outcome in high natality. The sex desire was made the agency of involuntary maternity and put into the service of the state and of capitalistic industry, with a callous brutality which even the Emperor Augustus had not ventured in his famous Lex Papia et Poppea." (A.B. Wolfe, in N.E. Himes, ed., Economics, Sociology and the Modern World, Harvard Press, 1935, p. 228.)

It is also significant that the roots of the traditional Roman Catholic position on marriage and contraception are mainly non-Biblical, coming from Roman law (the purpose of marriage is procreation) and Roman philosophy (the Stoic rejection of sexual pleasure). The oft-cited "sin of Onan" (Genesis 38) was his disobedience to his father and his non-fulfillment of the Jewish law of the levirate -- not his practice of coitus interruptus. For a fascinating historical study of the Roman Catholic position on contraception, see John F. Noonan, Jr., Contraception, (Harvard University Press 1965).

The reaction is more visceral than conscious. Marx was at least half right when he said that man's social consciousness is determined by his place in society. If nationalists, the far left, the festive left, and the xenophobes rail against international movements favoring birth control-- well, that is rather convenient for the oligarchy.* And let us not forget that so far the oligarchy has successfully resisted land reform and income and wealth taxes. Perhaps they are sufficiently attached to their short-run interests to resist birth control programs for the poor as well.⁷¹ Foxes generally advocate large families for rabbits.

An interesting historical parallel can be made between the attitudes of the present day Brazilian nationalists and oligarchs, and those seventeenth century English nationalists, the mercantilists. Following E.S. Furniss' excellent study, The Position of the Laborer in a System of Nationalism, we can easily see how the national goals of the mercantilists led to the desire for a large proletariat. The more workers the more could be produced for export and the more easily it could be sold since wage costs and prices were being held down by the great supply of workers, who of course did not consume imports above barest

*This strange coalition of traditional Catholics, Nationalists, Marxists, and Oligarchs becomes even stranger if we consider the specific opposition to the IUD, because it now includes the large manufacturers of the older more expensive contraceptives. It is significant that the IUD, which is the contraceptive most applicable to the masses, is outlawed, while the more expensive pills are freely sold. It seems that contraception is only for the rich. (See Glycon de Paiva, Jornal do Comercio, 12/18/68). In the United States as late of 1910 Margaret Sanger (My Fight for Birth Control) tells of poor women begging her to tell them the secret of the rich for having few children. The bitter opposition to Mrs. Sanger is a matter of record. In reference to such opposition Ezra Bowen (An Hypothesis of Population Growth) comments that, "It is difficult to exaggerate the bitterness and energy with which anti-intelligence activities are carried out by agencies opposed to liberating the lower orders of mankind from the biting lash of the whip of bare necessity."

necessity. The desired result of a large balance of trade surplus (which was considered the true wealth of a nation) was thus insured by a numerous proletariat. Hence the conclusion so natural to the mercantilist and so strange to modern ears, that to have a wealthy nation it is necessary to have very large numbers of very poor people. In the clear words of Peter Chamberlen, (quoted in Furniss, p. 25);

"This may be a note to all men, especially to statesmen to look no more upon the poor as a burden but as the richest treasure of a nation, if orderly and well-employed. Which is the more manifest if we consider first, that though they multiply more rapidly than the rich yet they do not only feed and clothe themselves but the rich men are fed and clothed and grow rich by what they get out of the poor's labor over and above their maintenance. Secondly, that the poor bear a greater burden of taxes in the city and elsewhere. For the rich either abate what they get out of the poor's labor or (which is worse) permit them to starve for want of employment."

The major point of similarity between the mercantilists and the Brazilian nationalists (of the right or left) is that they are both nationalists, little influenced by the libertarian individualist premises (biases) of modern economics. The national goal of the mercantilist was to maximize a balance of trade surplus, while that of the Brazilian nationalists is to maximize the rate of growth of the modern capitalistic industrial sector of their economy. To achieve this latter end investment and profits must be high and consumption low, which in turn leads to a policy of low wages guaranteed by many workers. Furniss trenchantly remarks that for the nationalist, "it is the form of economic goods, not their value in a competitive market, which gives wealth its significance. So considered, national wealth is composed only of that part of the economic goods within the country which is serviceable, directly or indirectly, in

in prosecuting group aims and purposes." For the nineteenth century English nationalists the desirable form of wealth was a balance of trade surplus in gold, for the twentieth century Brazilian nationalist the desirable form is modern capitalistic industry--for both a large proletariat is a means to the end. The ends have in common that in their historical contexts both are considered the crucial ingredient of national power.

The concept of Roman exploitation is suggested, even advocated, by the Northeast Brazilian writer quoted below, who also gives evidence supporting earlier assertions about class differences in reproduction--evidence from a source which cannot be suspected of harboring a bias in favor of birth control.

"the contribution of this class (the bourgeoisie) to demographic development is ridiculously small."

"the middle class...is in revolt against and asphyxiated by the process of proletarianization...which it resists bravely, if unprolifically. And when a pregnancy involuntarily occurs some members of the middle class resort to the weapon of Herod..."

"Only the lower class or proletariat produces. And it produces scandalously, abnormally. Office-bound scholars are perhaps not aware that these men who receive minimum salaries, starvation wages, are offering a great contribution to the nation... two Brazilians per year, (sic.) on a per couple basis, one in January and one in December."

"While recognizing the financial anguish in which the proletariat vegetates, and the marginalization in which it is sunk, I believe it to be immoral to advise a creature of that type to practice birth control. I believe it is a great transgression against the laws of man and God to suggest anticonceptional practices to men who do nothing more than work and sleep. They are like the lilies of the field, and the birds of the heavens...they are born, grow, and produce, having faith that God will give them clothing in conformity with the cold."^{1/2} (My emphasis).

This writer talks about the laws of God and the lilies of the field, but really he is saying what Peter Chamberlen said, that men do nothing but

work and sleep are handy creatures, and we should keep the nation (i.e. the oligarchy) well supplied with them!

There are people in the Northeast who courageously advocate population policy--perhaps doctors more than economists. However, Rubens Costa, president of the prestigious Bank of the Northeast, has been cited many times. In his preface to a discussion of population policy, he says that the subject is

"...charged with emotion and controversy due to the inadequate presentations of people who have not thought about the matter and have not taken the trouble to inform themselves before voicing opinions, and by others who, for unconfessable motives seek to create an uproar and generate an atmosphere impropitious to constructive, serious, and high-minded debate."⁷³ (My emphasis).

Needless to say the population question is not limited to the Northeast, or to Brazil, or to the third world. It is a world problem whose solution is greatly obstructed by the nationalist mentality of all countries, as well as by the racial and class divisions within countries, e.g. Black Nationalist opposition to birth control in the United States. The population explosion is also the major reason for the widening gap in the per capita incomes of rich and poor nations and it is therefore not surprising to find similar effects on class divergences within nations or regions.⁷⁴ No other index divides the world so sharply into "developed" and "underdeveloped" as does fertility.⁷⁵

This section has involved more polemics than some will think becoming to a "value-free" social scientist. But since our objective economic analysis led us to expect wide acceptance of population policy, it became necessary to explain its vehement rejection on another level of discourse, clearly labeled "ideological." The distinction between "positive" and

"normative" thought is an elementary rule of clear thinking. But the distinction belongs in the mind of the individual thinker--it is not a sound basis for division of labor between individuals, much less between professions.

IV. Some concluding reflections. - It is a sad commentary on "Christian civilization" that the Old Testament command to "be fruitful, multiply, and replenish the earth" is the only Biblical injunction mankind has unambiguously lived up to--and that ad absurdum. Nevertheless it is possible to hope that this will change. The Catholic Church is now deeply divided on the question of birth control, and the Pope's reaffirmation of traditional doctrine will more likely provoke than avert a schism. Ohlin is perhaps not overly optimistic when he observes that,

1 "Political opposition to birth control remains an important factor, but the reconsideration of Catholic doctrine on this subject is nowhere more intense than in Latin America, and it is also possible that this opposition has been founded on an erroneous notion of popular attitudes and will change to overt advocacy when a vocal demand for government action is heard."⁷⁶

If limiting births by artificial means is "unnatural" then so is limiting deaths by artificial means--one wonders how long this simple logic can be avoided. If one escapes this contradiction in ad hoc fashion by defining "natural" as anything tending to increase life, then one lands in the worse predicament of defining "life" in some implicit quantitative sense of the number of organisms undergoing metabolism. In any case the more relevant "natural laws" are those of population ecology, not reproductive physiology. Catholics as well as the far left and the oligarchy should be vigorously challenged on the issue, since population policy is currently the most viable individualist alternative to collectivist rev-

olution in the third world, and the Communists know this very well.*
The United States should not be so spinelessly timid about emphasizing birth control as a part of foreign aid on at least the same level as fiscal and land reform. The idea of Roman exploitation should be stressed as a more relevant cause of backwardness and social injustice than Marxian exploitation. Population control and social reform are not incompatible means for lifting the masses. They are quite complementary (often mutually dependent) and the far left's denial of this obvious fact is the clearest possible indication that their immediate aim is the building up of pressures for Revolution (that modern Armageddon leading to the secular millenium) regardless of the human costs.**

*Cf. Marxist economist R.L. Meek, Marx and Engels on Malthus, Lawrence and Wishart, London, 1953, p. 47. "If the social struggles of the early nineteenth century were essentially summed up in the controversy between Malthus and Ricardo, those of our own times are perhaps not unfairly summed up in that between Malthusians and Marxians."

**Cf. Joan Robinson, Economic Philosophy, pp. 117-18.

"Orthodox Catholicism and orthodox Marxism agree in protesting that there is no such thing as a population problem (though both seem to be softening their attitude a little in recent times). It would be possible to understand the religious argument if it ran thus: 'The explosion of population now going on is causing great misery in very many lives, and preventing very many from attaining to modest comfort. But contraception is a sin. It is wrong to help others to commit sins (even when they are not Christians) and avoiding misery is no excuse! Religious people, however, do not generally like to put so high a price on virtue; they prefer to pretend that there is no problem! With every mouth God sends a pair of hands.' True, but he does not send a combine-harvester. As for the Marxists, one cannot but suspect that they know better, and have some reason for not saying so." (My emphasis).

Although there is no conflict between social reform and family planning, there is a conflict between the Marxist's and the oligarchy's reasons for opposing birth control. The Marxist wants revolution and the oligarchy wants the status quo. Unlimited population growth

While it is possible to hope that the Northeast is on the threshold of a new developmental epoch, and that eventually population policy will be accepted, we must recognize with Ohlin that,

"...probably the race against time is more urgent than that against space...Given time, there is no doubt that the world economy could accommodate populations several times larger than the present ones. In time, the capital may be formed; in time, the necessary social reforms will be undertaken. But as things stand the developing world faces a transitional period of uncertain length in which time will be exceedingly short. Mortality will continue to decline, and population increases at rates which will absorb the bulk of the resources that could otherwise be deployed to meet the irrepressible demand for modernization and development. Millions will be born out of phase with history."⁷⁷

Nowhere is this more true than in Northeast Brazil. And nowhere is birth control more vigorously resisted.

** - cont'd.

cannot serve contradictory goals. In the Northeast it seems to me that population growth is more likely to serve the status quo than revolution, since it maintains the masses in a state of hopeless, impotent poverty. Revolution is caused by ideas, not poverty. The middle class students are the revolutionary force, not the masses. These revolutionary students may exhort the masses to produce more hungry children today in order to have more guerrilla fighters tomorrow, but they certainly practice birth restriction themselves (by contraception or late marriage) because that is all that keeps most of them from sinking into the proletariat--it is what gives them the margin of energy and resources over bare subsistence to devote to revolution. But the intellectual revolutionary feels that the proletariat can be made to do the fighting. Everyone wants a proletariat to do his dirty work!

Of course a good Marxist can "resolve" this contradiction by appeal to the dialectic--at some critical point continuous quantitative change produces a discontinuous qualitative change. At some critical number the herd will become unmanageable and trample the herdsman. Maybe so, but I doubt it.

Footnotes

1. Rubens Vaz da Costa, "A 'Festa' do Nordeste," O Povo. Fortaleza, October 28 and 29, 1967.
2. Stefan Robock, Northeast Brazil: A Developing Economy, Brookings Institution.
3. Albert O. Hirschman, Journeys Toward Progress. Twentieth Century Fund, Inc. 1961.
4. Josué de Castro, Sete Palmos de Terra e Um Caixão, Editoria Brasiliense, São Paulo, 1967.
5. Demografia: Diagnóstico Preliminar (Plano Decenal de Desenvolvimento Econômico e Social), Agosto, 1966, p. 75. Demografia gives 3.1% for the decade 1950-60. Olávio Baptista Filho, População e Desenvolvimento, University of São Paulo, 1965, gives a figure of 3.2%. See p. 23. Also Artur Hehl Meiva believes that the correct rate for all of Brazil is, "at least 3.3% and still increasing. Recently government sources have even mentioned 3.5%." Meiva, "The Population of Brazil" in J. Mayone Stycos and Jorge Arias, eds. Population Dilemma in Latin America, Potomac Books, Washington, D.C., 1966, p. 56.
6. Almir Caiado Fraga, Problemas Demográficos do Nordeste do Brasil, Instituto de Pesquisas Econômicas, Universidade Federal do Ceara, Fortaleza, 1966, p. 24.
7. Anuário Estatístico do Brasil, 1966 (IBGE), estimated from data p. 55. Only urban death rates are given. The highest urban death rates in the Northeast were taken as an estimate of the overall death rate for the region. This may be an underestimate, but we will use it anyway, since there are no other data, and the trend is for the death rate to fall, so that even if it were an underestimate today, it would not be tomorrow.
8. The divergence in infant mortality rates between the Northeast and São Paulo is even more striking: 174 per thousand versus 70 per thousand, respectively. (Anuário Estatístico do Brasil, 1966 p. 55).
9. José Francisco de Camargo, "Subsídios para uma Política Demográfica Possível Aplicação ao Brasil," Problemas Brasileiros no. 53, Agosto, 1967, São Paulo, p. 23. See also Roland Chardon, "Changes in Geographic Distribution of Population in Brazil. 1050-60." In E.N. Baklanoff, New Perspectives of Brazil, Vanderbilt University Press, 1966. For an informative map showing migration flows see Artur Hehl Meiva, op. cit., p. 53.
10. Demografia..., op. cit., p. 73
11. Almir Caiado Fraga, op. cit., p. 23
12. As Migrações para Fortaleza, Governo do Estado do Ceará, Fortaleza, 1967 p. 252.

13. The director of the public jail in Fortaleza (a city of 700,000) resigned because overcrowding made his job impossible. The jail's capacity is 180, but it was packed with 353 prisoners, ten of whom had tuberculosis. In the preceding six months five prisoners died in fights and escapes were routine. (Jornal do Brasil, December 17, 1967).
14. Goran Ohlin, Population Control and Economic Development, Development Centre of the Organization for Economic Cooperation and Development, Paris, 1967.
15. Gustav Ranis, "Theories of Economic Growth in Capitalistic Countries," in E.A.G. Robinson, ed. Problems in Economic Development, Macmillan Co., Ltd. London, 1965, see p. 4.
16. C. P. Kindleberger, Economic Development, McGraw-Hill, Inc., New York, 1965, pp. 45-46.
17. The exact formula would be $r = \left(\frac{100 + \frac{s}{k}}{100 + p} - 1 \right) 100$, but for small rates of growth the simpler formula gives a close approximation.
18. See Sidney Coontz, Population Theories and the Economic Interpretation, Routledge and Kegan Paul, London, 1957.
19. Albert O. Hirschman, "Desenvolvimento Industrial no Nordeste Brasileiro e o Mecanismo de Crédito Fiscal do Artigo 34/18, "Revista Brasileira de Economia, Dezembro 1967, p. 17.
20. Hans Singer, International Development: Growth and Change, McGraw-Hill New York, 1964, p. 260.
21. H.B. Chenery and A.M. Strout, "Foreign Assistance and Economic Development," American Economic Review, September 1966, p. 709.
22. Simon Kuznets, Modern Economic Growth: Rate, Structure and Spread, Yale University Press, 1966, pp. 252-56.
23. Law 34/18 is an ingenious measure which grants permission to all Brazilian corporate entities (pessoas jurídicas) to reduce their income tax liability by one-half, provided they invest the saved half in Northeastern projects approved by SUDENE. (Cf. footnote 19). The device has been very successful.
24. Albert O. Hirschman, "Desenvolvimento..." op. cit., pp. 12-13.
25. Rubens Vaz da Costa, "A 'Festa' do Nordeste," op. cit., Agricultural percentages calculated from indices given, and refer to ranch as well as farm products.

An earlier source finds that Northeastern agriculture (excluding ranch products) increased output at an annual average rate of 5% during 1950-60. This increase is attributed to use of more land and labor, with productivity remaining constant. (Pelfim Netto, Antonio Pastore, Eduardo Carvalho, Agricultura e Desenvolvimento no Brasil, Estudos ANPES, no. 5, São Paulo, 1966, pp. 70-76.

26. Ibid.
27. Conjuntura Econômica, Fundacao Getulio Vargas, Setembro, 1967.
28. Ibid. (Calculated as ratio of net capital formation to NNP.)
29. Ibid.
30. H.B. Chenery and A.M. Strout, op. cit., p. 714.
31. Ibid.
32. There is no census data on this, but these figures are the estimates of Dr. Galba Araujo, president of BEITAN (Bem-estar familiar) of Ceara. They were corroborated in conversations with several gynecologists in Fortaleza. Although the average for the lower class is estimated at 8, families with 15 and 20 are not at all uncommon. Also the same pattern of relative fertility holds between rich and poor nations; the former having reproduction ratios around 1.5 and the latter around 3.0 (Ohlin, op.cit., p. 15). See also Population Bulletin, August 1958, No. 5, "Latin America: The Fountain of Youth Overflows," p. 94; which gives for rural Sao Paulo estimates of 4.1 children for men past 50 in liberal professions, and 7.6 children for men of the same age in agriculture.
33. W. Arthur Lewis, "Economic Development with Unlimited Supplies of Labor," The Manchester School of Economic and Social Studies, May, 1954.
34. Demografia: Diagnóstico Preliminar, op. cit., p. 50
35. Rubens Vaz da Costa, "Rubens Costa Depõe Sobre o Contrôlo da Natalidade," O Povo, Fortaleza, December 9 and 10, 1967. Accuracy to the first decimal place is surely spurious.
36. As Migrações para Fortaleza, op. cit., p. 29
37. Simon Kuznets, "International Differences in Income Levels," in Okun and Richardson, eds., Studies in Economic Development, Holt, Rinehart, and Winston, New York, 1961, p. 19.
38. Jornal do Brasil, Editorial, December 12, 1967.
39. Anuário Estatístico do Brasil, 1966, p. 55. This is surely an underestimate due to unregistered deaths. Estimates of infant mortality in the Northeast run as high as 50%.
40. Kenneth E. Boulding, The Meaning of the Twentieth Century, Harper and Row, 1965.

41. Stephen Enke, "The Economic Aspects of Slowing Population Growth," Economic Journal, March, 1966, p. 46. At crudest the calculation is as follows: the cost of avoiding a birth is estimated at about two or three dollars per year, and the benefit (total amount by which the sum of all per capita incomes has increased) would be approximately one per capita income, or about three or four hundred dollars in most underdeveloped countries. Calculations of discounted streams of cost and earnings yield similar results due to high interest rates and the fact that an individual does not begin earnings until after the age of fifteen or so. Such calculations are not without some value, but they must be interpreted with great caution.
42. Goran Ohlin, op. cit., p. 120.
43. Almir Caiado Fraga, op. cit., p. 22.
44. Bernard Berelson, "KAP Studies on Fertility" in Family Planning and Population Programs, Chicago, 1966. Cited in Ohlin, op. cit., p. 71.
45. Carmen A. Miró, "Some Misconceptions Disproved: A Program of Comparative Fertility Surveys in Latin America," in Family Planning and Population Programs, Chicago, 1966. Cited in Ohlin, op. cit., p. 75.
46. Corrêio da Manhã, July 9, 1967. Professor Rodrigues Lima is president of BEMFAH.
47. Rolando Armijo and Regualda Monreal, "Epidemiology of Provoked Abortion in Santiago, Chile," in Population Dynamics, eds. Muramatou and Harper. Cited in Ohlin, op. cit., p. 69.
48. Simon Kuznets, Modern Economic Growth, op. cit., p. 250.
49. Goran Ohlin, op. cit., p. 68.
50. Thomas R. Malthus, "A Summary View of the Principle of Population," 1830. Reprinted in Frank Notestein, ed., Three Essays on Population (New York: New American Library of World Literature, 1960).
51. Goran Ohlin, op. cit., p. 31.
52. Rubens Costa, "Necessidade de uma Política Populacional como Parte da Política de Desenvolvimento," Jornal do Brasil, October 27, 1967.
53. "A Economia do Nordeste Vista pelo XXI Curso da CEPAL-BUDE," Jornal do Brasil, October 27, 1967.
54. Última Hora, May 2, 1967.
55. Diário da Noite (São Paulo), May 4, 1967.
56. See O Globo, May 9, 1967 and Jornal do Brasil, May 5, 1967.
57. Manchete, May 20, 1967.
58. Manchete, November, 1967.

59. Ibid.
60. Rachel de Queiroz, "O Contrôlo da Natalidade," O Cruzeiro, May 27, 1967.
61. This point is made by José Francisco Camargo, op. cit.
62. E. Arab-Ogli, "Existe a Ameaca da Superpopulação?" Problemas da Paz e do Socialismo, Agosto, 1961. Rio de Janeiro, p. 71. The author is a noted Soviet writer on population, and the article may be taken as a fair example of Soviet propaganda for underdeveloped countries. It is incredible that Arab-Ogli could so misrepresent the French demographer, Alfred Sauvy, as to make him appear an opponent of population policy and one who counsels "Don't Worry." This is a caricature of the balanced and judicious views presented by Sauvy in Fertility and Survival: Population Problems from Malthus to Mao Tse-Tung (New York: Criterion Books, 1961). However, recent articles by Arab-Ogli and other Soviet demographers have taken a much less dogmatic view on the population question in underdeveloped countries, even admitting that birth control might be helpful in the development effort. (See "Soviet Population Theory from Marx to Kossygin" in Population Bulletin, Vol. XXIII, No. 4, October, 1967.)
63. Karl Marx, Capital, Chapter 23.
64. W. Arthur Lewis, op. cit.
65. See Sidney Coontz, op. cit., Chapter 5, fn. 53.
66. Karl Marx, Capital, Vol. 1, Chapter XXV. According to Padre Melo, vicar of Cabo, "progress in the Northeast is being carried out under a sub-capitalism...which is"...much worse than capitalism since the latter at least maintains its men-machines, while the former fails even to do this." (Jornal do Brasil, December 24, 1967.)
67. Karl Marx, Capital, Vol. 1, Reprinted in Robert Freedman, Marx on Economics p. 171.
68. Karl Marx, Capital, Vol. 1, Chapter XXV.
69. Josué de Castro, Geografia da Fome.
70. Rachel de Queiroz, op. cit.
71. For a most uncomplimentary portrait of Latin American oligarchies, see Victor Alba, Alliance Without Allies.
72. Domingos Gusmão de Lima, "Os Lírios do Campo e as Aves do Céu," O Povo, Fortaleza, December 30 and 31, 1967. To regard one's fellow man as if he were simply a "lily of the field or a bird of the air" is a rather forced interpretation of the Sermon on the Mount!
73. Rubens Costa, "Necessidade..." op. cit. For an interesting discussion of the attitudes of Latin American intellectuals toward population, see the article by J. Mayone Stycos in J. Mayone Stycos and Jorge Arias, eds., Population Dilemma in Latin America, Potomac Books, Washington, D.C.

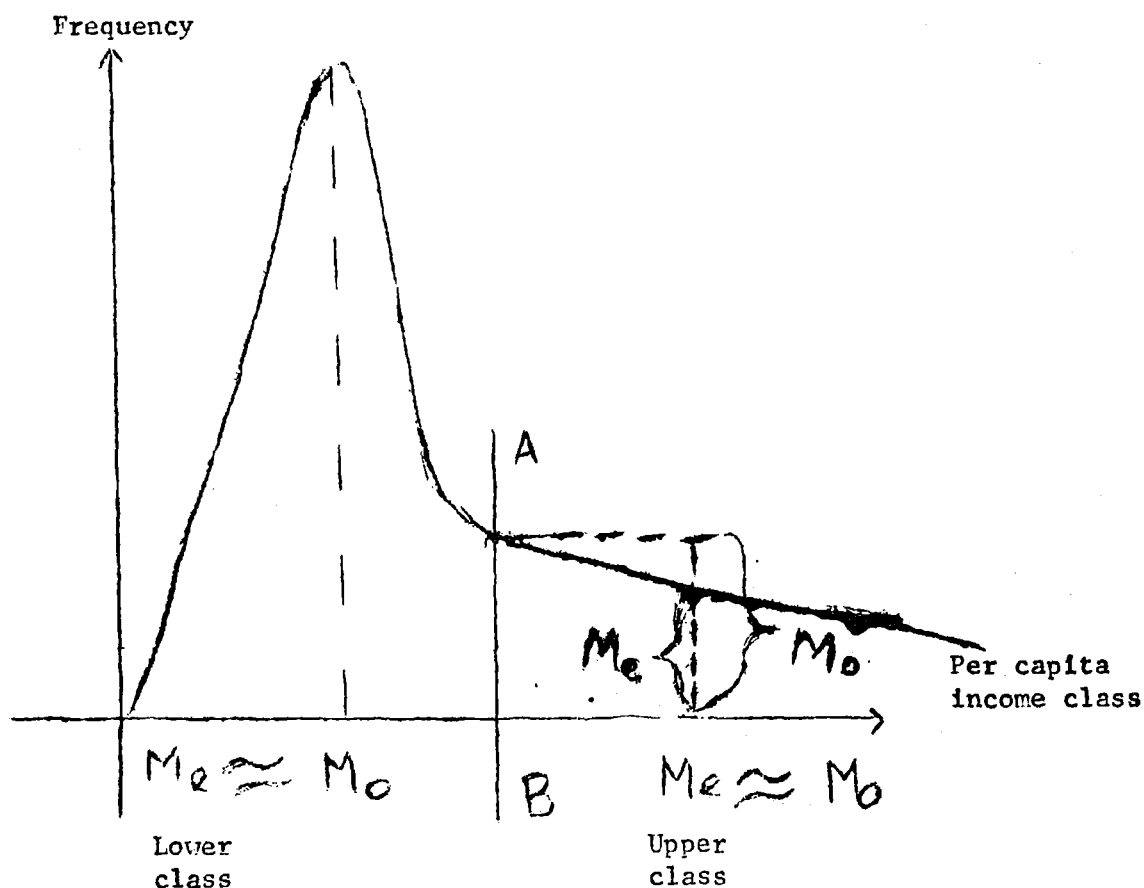
74. Robert E. Baldwin, Economic Development and Growth, John Wiley and Sons, New York, 1966, p. 8. "In the 1957-58 to 1963-64 period, the less developed nations maintained a 4.7% annual growth rate in gross national product compared to a 4.4% rate in the developed economies. The gap in per capita income widened because population increased at only 1.3% annually in the developed countries compared to a 2.4% annual rate in the less developed economies."
75. See "Conditions and Trends of Fertility in the World," in Population Bulletin of the United Nations, No. 7, 1963. New York, United Nations, 1965.
76. Goran Ohlin, op. cit., p. 75.
77. Ibid., p. 131.

APPENDIX

Although it is impossible to make accurate calculations with such inaccurate data, we can nevertheless sharpen a few notions, show the logical relations among our main variables, and make sure that our various numerical estimates, when taken together, do not lead to absurdities or gross improbabilities.

First consider the probable distribution of income and division of classes in the Northeast, as shown below.

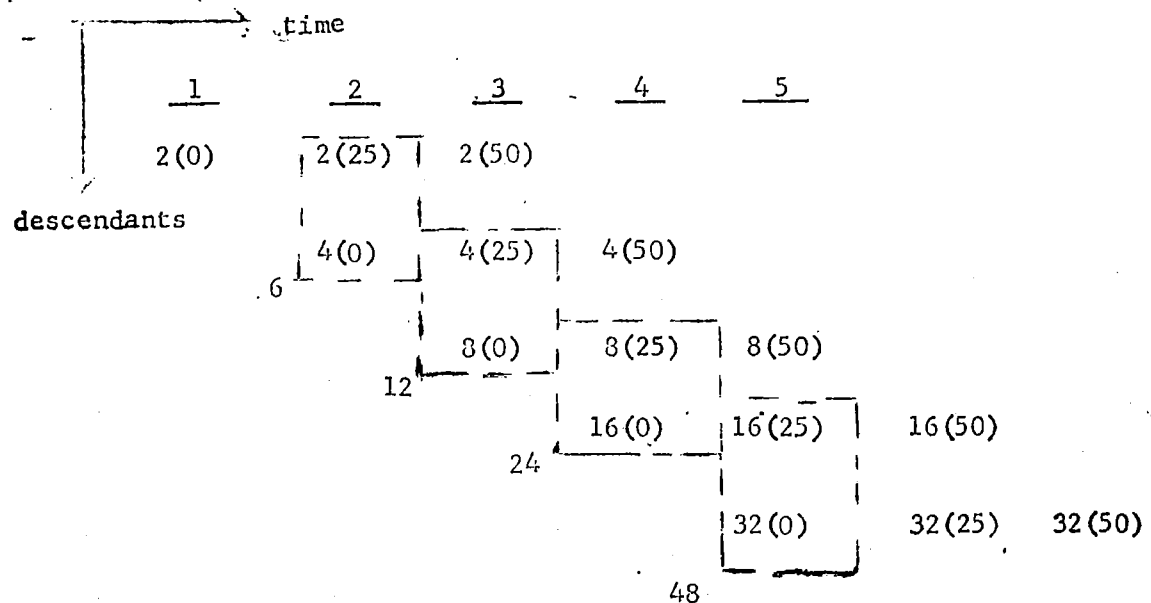
Probable Distribution of Income in Northeast Brazil



Line AB separates the skewed distribution into two sub-distributions, the upper and lower classes. Each class obeys a different law of population

growth. The lower class is limited by its aggregate wealth, the upper class by its standard of living. For each sub-distribution (especially the lower class) the mean (\bar{M}_e) is a good approximation to the mode (M_o). For the whole distribution the mode is approximated by the lower class mean. Over one generation (25 years) the lower class increases by a factor of 4 (8 children divided by 2 parents), the upper class by a factor of 2 (4 children divided by 2 parents).*

To see this more clearly, consider how a population grows, under the following assumptions: average age of parents at childbirth is 25; each couple has 4 children (who all survive to have children); everyone dies at age 50. This population will grow as shown below, where the number in parenthesis represents age (0 = children, 25 = parents, 50 = grandparents), and the number outside the parenthesis is the number of people of that particular age.



This population, consisting of children and parents (see rectangles) clearly doubles every 25 years--this doubling factor representing the proportion of children to parents, $\frac{4}{2}$. Note that we could include grand-

* (see next page)

parents (and as many simultaneously living generations as we wish), and the total population still doubles every 25 years. For two simultaneously living generations the population at time period n is given by $(2^n + 2^{n-1})$.

The total income of each class, growing at 6.5% annually, will increase by a factor of 4.8 per generation. Therefore, lower class per capita income would increase by a factor of $\frac{4.8}{4} = 1.2$ per generation, while upper class per capita income increases by a factor of $\frac{4.8}{2} = 2.4$. Allowing for the strong likelihood that lower class total income grows at less than, and upper class total income at more than the assured 6.5% annually, we may consider lower class per capita income as constant (or possibly decreasing), and upper class per capita income as increasing by more than 2.4 times per generation. In terms of the above distribution diagram, the lower class part of the curve shifts vertically upward by a factor of 4 every generation, while horizontally it remains constant or maybe even shifts a bit to the left. The upper class part of the curve shifts vertically upward by a factor of 2 and horizontally rightward by a factor of 2.4 per generation. Consequently, over time the constant mode becomes more and more "nodal"--i.e., more and more representative of the total population.

It is interesting to try to put all of our variables and numerical estimates together in a single picture and see how they hang together. To do this we may use the following "compound interest" relationship.**

$$(y \cdot R)^{1/p} = 1 + p$$

where R is the reproduction ratio, or roughly the number of children divided

*from previous page

Each class is for now assumed to consist entirely of identical families typical of that class. Also the estimates of 4 and 8 children refer to those which survive infant mortality. The number of births would be greater, especially for the lower class.

**See Hannes Hyrenius, "Population Growth and Replacement" in Duncan and Hauser, eds., The Study of Population.

by the number of parents, g is the length of a generation, or the mean age of mothers at childbirth, y is the reproducing population as a percentage of the total population, and p is the annual percentage rate of growth of the total population.

Applying the above relation to both the upper and lower class populations, and taking a weighted geometric mean of the two resulting annual growth rates, leads to the following formula.

$$\log M_g = \frac{w \log (y \cdot R)^{1/g} + w^1 \log (y^1 \cdot R^1)^{1/g^1}}{w + w^1} = \log (1 + p)$$

M_g = weighted geometric mean of upper and lower class growth rates.

w = lower class as proportion of total population

w^1 = upper class as proportion of total population

y = reproducing population as proportion of whole population, for the lower class

y^1 = reproducing population as proportion of whole population, for the upper class

R = reproduction ratio for population of typical lower class families

R^1 = reproduction ratio for population of typical upper class families

g = length of a generation in years, lower class

g^1 = length of a generation in years, upper class

p = annual percentage growth rate of the total population (upper and lower classes)

Here we have a list of the important variables of our analysis, for most of which we have rough numerical estimates. According to census data p is 3.1%. Other estimates run higher, and we saw that with falling death rates and constant birth rates, p will approach 4%. About all we can say with confidence is that p is more than 3% and less than 4%, probably closer to 3% than to 4%. From w , y , R , and g we can compute an independent estimate of p which should also come out somewhere around 3 to 4% if our

individual numerical estimates are reasonable.

R and R^1 have been discussed previously and taken as 4 and 2, respectively.

We have taken g as 25 years, more or less based on casual observation. Information on g is surprisingly hard to get, but a study by Virginia Rodriguez* of the Centro Latinoamericano de Demografia, presents data for Argentina, Paraguay, and Chile, showing the average number of children per mother by age group and educational level. By interpolation in her tables and diagrams one can find the age of mothers corresponding to the mid-point of the average number of children for women past childbearing age. In other words, if the total number of children a woman of a certain class has is 5, then let us see at what age a woman of that class has her third child, and take that age as an estimate of g . The range appears to be from about 23 for uneducated Argentiniens, to around 30 for educated Argentiniens, from about 26 to 27 for uneducated and educated Chileans, and from about 26 to 30 for educated and uneducated Paraguayans. Mortara states that the length of a generation in Brazil is 26 years.** These are rough estimates based on uncertain data, but they suggest that our estimate of $g = 25$ or 26 is reasonable. Let us follow Mortara and take $g = 26$. We will treat $g = g^1$ although an upper class generation is probably longer than for the lower class (meaning that we have probably understated class differences in rate of reproduction).

*"Fecundidad Diferencial Segun Nivel de Instruccion," May, 1967, serie C, no. 97, CELADE, Santiago, Chile.

**Giorgio Mortara, Revista Brasileira de Estadistica, 1947-48.

For w and w^1 , the proportions of rich and poor, we may get a clue from the proportions of literate and illiterate--15% and 85%, respectively. Since there are some poor who qualify as literate, but practically no rich qualifying as illiterate, we will take $w = 90\%$ and $w^1 = 10\%$, as our estimate.

y represents the percentage of the population (female) which never reproduces, and is principally determined by the death rate before reproductive age and the permanent celibacy rate during reproductive age. Since our estimates of average number of children per family were based on children surviving infant mortality (one year old) we would like to know what percentage of females one year old will die before reaching, say 20 years of age. According to a survival table prepared by G. Montara* this figure would be about 15% for Sao Paulo in 1930-32 (which he considers indicative for Brazil as a whole for around 1956). The permanent celibacy rate can be estimated as the percentage of people over 50 who are single (never married), and according to United Nations figures** this rate was 13.1% for Brazil in 1950. Adding these percentages gives roughly 30% of females who do not reproduce, or about 70% which do. Thus, our crude estimate is $y = 0.7$.

Plugging these values into the formula we have,

$$\log H_g = \frac{90 \log (.7 \times 4)^{1/26} + 10 \log (.7 \times 2)^{1/26}}{100}$$

and $H_g = 1 + p = 1.0376$ or $p = 3.76\%$, which is "between 3 and 4%."

This very rough correspondence does not prove that our guess-estimates of R , w , y , and g are correct--there is plenty of room for compensating errors and sensitivity questions. We have merely failed to prove the contrary

*Giorgia Montara, "The Development and Structure of Brazil's Population," in Demographic Analysis, Spengler and Duncan, eds. Free Press, Glencoe, Illinois, 1956, p. 663.

**United Nations Compendium of Social Statistics, 1963, p. 63.

hypothesis that our estimates have logical implications which are grossly inconsistent with census data. An attempted refutation of our conjectures has failed, therefore our confidence in them is increased somewhat.