VIII

RATIOS OF CHILDREN TO WOMEN COMPARED WITH REPLACEMENT NEEDS

INADEQUACY OF RATES BASED ON CRUDE BIRTH AND DEATH RATES

The simplest and most obvious measurement of the natural increase or decrease of a population is found in the relation of the crude birth rates and death rates. It is clear that as long as the birth rate exceeds the death rate there is some increase. But with a steadily falling birth rate, the actual rates for births and deaths do not tell a wholly truthful tale or, at least, one easy of correct interpretation. Especially is this true if one desires to arrive at a sound judgment of what the tendencies of the growth of our numbers will be during the next three or four decades.

It is a matter of common knowledge that young children die in rather large numbers, especially during the first year of life. A rate of 7 per cent or 8 per cent for children under 1 year is a low rate. In 1925 out of each 1,000 white children born, 68.3 died before they reached the end of the first year. It is also well known that older people, those above 50, let us say, die in larger numbers than those 10 to 50. The exact rate in 1920 for white males 52 years of age was 13.83 per 1,000. The fact is that from about 12 years of age, when the death rate is lowest (2.20 per 1,000), it rises without interruption. At 42 it is 8.65 per 1,000, almost four times as great as at 12; at 52 it is about 60 per cent greater than at 42; at 62 (28.35 per 1,000), it is over twice as large as at 52; and at 72 (65.41 per 1,000), it is well over twice as large as at 62.[1] It is clear, then, that any population in which a large part of the people are under 40 will have a lower crude death rate, other things being equal, than a population with relatively more people over 40.

As is well known, women over 35 contribute comparatively few children to the population (slightly less than 20 per cent of all children according to Dublin's calculations).[2] We have shown that the fertility of women married after 17 years of age falls off rapidly. (See Chap. VI, p. 110.) It follows, then, that any population which has been increasing rather rapidly from an excess of births or by immigration must have a relatively young population in which deaths will be few and births many as compared with a more stable population.

[1] Bureau of the Census, United States Abridged Life Tables, 1920, pp. 12-13.

[2] Dublin, Louis I., and Lotka, Alfred J., On the Rate of Natural Increase, Journal of the American Statistical Association, September, 1925, p. 309.

This is just the situation of the United States. The result is that a comparison of the birth rates and death rates in our registration States gives a wholly inadequate picture of what is really happening as regards the trend of our increase at the present time. The birth rate of our registration area for the entire population stood at 23.7 per 1,000 in 1920 and 20.6 in 1927, and the death rates were 13.1 and 11.4, respectively. Thus, on the face of things, the population in our registration area was increasing at the rate of about 10.6 per 1,000 per annum in 1920 and 9.2 in 1927, or about 10 per cent in 10 years by excess of births over deaths. But with a falling birth rate the age composition of the population is steadily changing. There are fewer young people than formerly and more in the older age groups.

CHANGING AGE COMPOSITION

This is shown in Table 58, where the percentages of the population in certain age groups in the United States in 1850, 1870, and 1920 are given, together with the percentages in a stationary [3] population in the United States in 1920 and in the population of France in 1911, the last census preceding the war.

TABLE 58.—PER CENT OF POPULATION IN CERTAIN AGE GROUPS FOR THE UNITED STATES, 1920, 1870, AND 1850, AND FOR FRANCE, 1911 [1]

		PER CENT OF THE POPULATION		
		Under 20 years of age	20 to 39 years of age	40 years of age and over
Total population of the United States	1920	40.7	32.4	26.9
	1870	49.7	30.3	19.9
	1850	52.5	30.6	17.0
Stationary white population of the United States	1920	31.4	25.3	43.4
Total population of France	1911	33.9	30.5	35.6

[1] Fourteenth Census Reports, Vol. II, Population, 1920, and Statistique Générale de la France, Résultats Statistiques du Recensement Général de la Population, 1911, Tome I, Deuxieme Partie, p. 33.

These figures show conclusively that we are rapidly approaching a condition where our age constitution will approximate that of a stationary population, and as this happens, our death rate will inevitably rise (in a stationary population in the United States in 1920 it would have been 17.8 as compared with 13.1 in the actual population). The birth rate will just as inevitably fall, even if women still raise as large families, individually, because a smaller proportion of the women will be in the child-bearing ages. There is good reason to think,

[3] It will perhaps be well to state again that a stationary population is one which would arise from a given number of births and deaths annually (say 100,000) with the death rates of a given time (say 1920) when there had elapsed sufficient time for all those born in first year of the period to have died. This would require about a century, but practically there would be little increase after 75 to 80 years.

therefore, that in the registration area to-day the average number of births per 1,000 women 20 to 44 years of age does not exceed the number necessary to maintain the population at its present numbers as much as is generally supposed.

Dublin and Lotka [4] have attacked this problem from an angle quite different from ours and have arrived at the figure 5.47 per 1,000 population per annum for our true rate of natural increase instead of 10.6 as shown by deducting the crude death rate from the crude birth rate. In general the results of our study are in harmony with their conclusion.

TABLE 59.—A STATIONARY POPULATION, FOR WHITES AND NEGROES, IN SELECTED STATES AND CITIES: 1920 [a]

	STATIONARY POPULATION					CHILDREN UNDER 5 PER 1,000 WOMEN 20 TO 44 YEARS OF AGE		PER CENT OF WOMEN 20 TO 44 YEARS OF AGE	
	Total	Children under 5 years of age	Deaths per 1,000		Births per 1,000 [b]	In a stationary population	Necessary to maintain population as at present constituted	In a stationary population	In the actual population
			Males	Females					
WHITES	A	B	C	D	E	F	G	H	I
States									
Total	11,561,412	940,768	18.1	17.4	17.75	469	313	17.3	19.3
California	11,567,766	950,468	18.3	17.1	17.70	472	312	17.4	20.1
Indiana	11,730,983	945,047	17.6	17.4	17.50	474	330	17.0	18.4
Kansas	12,383,570	962,531	16.7	16.4	16.55	464	289	16.8	18.1
Kentucky	11,822,840	952,922	17.3	17.4	17.35	481	297	16.8	17.2
Massachusetts	11,333,257	927,260	18.5	17.7	18.10	466	305	17.6	20.5
New York	11,121,945	929,427	18.9	17.9	18.40	469	301	17.8	20.8
North Carolina	11,867,434	950,732	17.3	17.2	17.25	472	309	17.0	17.0
Pennsylvania	11,189,784	926,752	18.8	17.9	18.35	470	332	17.6	18.5
South Carolina	11,654,569	946,948	17.8	17.3	17.55	470	305	17.3	17.5
Utah	11,677,046	955,070	18.1	17.1	17.60	472	312	17.3	17.1
Cities									
Total	10,910,242	923,800	19.4	18.2	18.80	472	273	17.9	22.1
Baltimore	10,883,144	917,004	19.4	18.3	18.85	472	300	17.9	20.9
Detroit	10,810,784	911,051	19.2	18.7	18.95	483	277	17.4	21.5
Los Angeles	11,389,368	943,110	18.7	17.3	18.00	474	284	17.5	22.9
New Orleans	10,631,924	941,898	20.2	18.4	19.30	479	318	18.5	21.2
New York	10,901,561	927,609	19.4	18.2	18.80	470	284	18.1	22.0
Pittsburgh	10,004,772	893,876	21.2	19.8	19.50	489	336	18.3	20.8
Washington	11,627,170	948,066	18.6	16.7	17.65	455	222	17.8	26.4
NEGROES									
Original registration States	8,483,129	866,558	24.7	23.6	24.15	571	344	17.9	26.3
States with less than 4 per cent Negro	8,524,662	870,534	24.7	23.4	24.05	572	361	17.9	25.1
States with more than 5 per cent Negro	9,416,589	918,004	21.6	22.0	21.80	576	418	16.9	18.9
Large cities	8,095,233	854,005	26.0	24.6	25.30	744	328	14.2	28.0

[a] Based upon special data supplied by the division of vital statistics, Bureau of the Census.
[b] Birth rate obtained by averaging the male and female death rates, since in a stationary population the birth and death rates are the same.

[4] Dublin, Louis I., and Lotka, Alfred J., On the Rate of Natural Increase, Journal of the American Statistical Association, September, 1925, pp. 305–339.

STATIONARY POPULATION STUDY

Before proceeding further it will be necessary to say something regarding Table 59.

It may be well to explain that the number of children under 5 in a stationary population (column B) represents the number of this age that would be living at any given moment from 105,000 male births and 100,000 female births annually, a total of 1,025,000 births in the period of 5 years during which the living children under 5 have been born. One hundred and five thousand male births are used because children are born approximately in the ratio of 105 males to 100 females.

Column G is the ratio of children to women necessary to maintain the population of the given area as long as the present age and sex constitution persists, with the death rates for specific ages that prevailed in 1920—*temporary* maintenance ratio.[5] This number will rise steadily as the birth rate falls until it approaches the corresponding ratio in column F—*permanent* maintenance ratio.[6] Of course, as long as any community receives a large immigration the approach to the age and sex constitution of a stationary population is retarded. But when the birth rate of a whole nation is undergoing a rapid decline there can be few, if any, communities that will not be appreciably affected by the changes in sex and age constitution consequent upon such a decline.

We can see how unequally different communities will be affected by this decline, coupled with the effects of decreasing immigration, if we compare the several communities in respect to the data in columns H and I, Table 59 (the per cent of women 20 to 44 years of age in the actual and stationary populations). North Carolina, South Carolina, and Utah have about the same proportion of women 20 to 44 years of age in their actual populations that they would have in a stationary population. Massachusetts and New York, on the other hand, have over one-sixth more women in this age group now than they would have in a stationary population.[7] Among the cities, Los Angeles has

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[5] The *temporary maintenance ratio* is the number of children under 5 per 1,000 women 20 to 44 needed to maintain a population at a given number as long as the age and sex composition and specific death rates remain as they were at a specified time.

[6] The *permanent maintenance ratio* is the number of children under 5 per 1,000 women 20 to 44 needed to maintain a population at a given number when the age and sex constitution of a population is that of a stationary population having the death rates of a given time.

[7] The wide variations between the proportion of women 20 to 44 in the actual populations and the stationary populations are chiefly due to the varying extent to which the different communities are affected by migration and the amount of reduction in the birth rate that has already taken place. Thus North Carolina and South Carolina have had their populations depleted to a certain extent by emigration, and many of the women migrants have been in their twenties. Consequently, the percentages of these women in the population are lowered. Conversely, in the States which have drawn women from other States or countries there are larger proportions of them in the population. This is true of New York, Massachusetts, and many of the larger cities which are particularly attractive to young women as furnishing them abundant opportunity for self-support.

The second factor affecting the proportion of women is the decline of the birth rate. The greater this decline and the longer it has been going on the fewer people there will be under 20, provided immigration

nearly one-third more, New York City has almost one-fourth more, and Washington, D. C., has one-half more in this age group than they would have if their populations were stationary in the sense in which this word is used here. Clearly the States and cities with large excesses of women in the childbearing ages can show an increase of total population on a very low ratio of children to women.

Column A gives the total population that would arise in the several communities from 205,000 births annually with the specific death rates the same as in 1920. We can see here how the death rates in different localities affect the size of their populations. Among whites, Kansas would have over 2,300,000 more people than Pittsburgh from 205,000 births each year. Washington and Los Angeles are the only cities in this group that compare quite favorably with the States and even Washington is about 750,000 behind Kansas. This is nearly 6 per cent. With a given number of births, the rural States will support a larger population than the industrial States and a still larger one than the cities.

The death rates in these several communities for a stationary population are given in column C for males and column D for females.

Since the death rate in a stationary population does not appear likely to fall much, if any, below 16 and since the age and sex constitution of our actual population is rapidly approaching that of a stationary population, our present death rate of about 12 can not long endure.[8] The checking of immigration will also hasten the approach of the sex and age constitution of a stationary population.

Column E shows the birth rate in a stationary population, which is of course the same as the death rate for both sexes combined. It will probably surprise a good many people to learn that it will take a birth rate of 16 to 18 to maintain our numbers after a few decades at most. But the real surprise will come when we compare this birth rate and death rate in a stationary population with the crude birth rate of 20.6 in the registration area in 1927 and 19.7 in 1928. This leaves a margin

of boys and girls is not sufficient to counterbalance the deficiency in births. We can see some of the effects of a declining birth rate on age constitution if we compare North Carolina with New York. In the former 50.9 per cent of the total population is under 20 years of age, while in the latter only 35.7 per cent is of this age.

[8] This may seem an unwarranted statement in view of the increase in the average length of life which has taken place in recent years. In the original registration States in 1901 the expectation of life was 49.24 years, in 1920 it had become approximately 56.50 years, an increase of 14.7 per cent. But it must be recognized that this increase in the average expectation of life is not an increase in the life span. It is merely a reflection of the success of medicine and sanitation in saving people from early death, particularly from infant death. There is no proof whatever that individuals live to a greater age than formerly. Furthermore an average expectation of life of 57.5 years means a death rate of 17.4 in a stationary population, while a death rate of 16 means an average expectation of life of 62.5 years. The present facts and a rational outlook for the future, then, justify the belief that a death rate below 16 in a stationary population is not likely to be achieved soon, much less a death rate of 12. For a death rate of 12 in a population having the age constitution of a stationary population would mean that every person born alive would on the average live 83.3 years. To attain this average enough people must live beyond this age to make up the years lost by all those who die before reaching it. Manifestly no such increase in the life span of a considerable part of our population is in near prospect.

of about 2 to 3 available for natural increase. This is all the more significant in view of the fact that the crude birth rate will inevitably fall as the age constitution of our female population changes so that a larger proportion of all women are found in the older age groups.

In approaching the problem of our natural increase of population from the standpoint of the ratio of children to white women in a stationary population in the registration area in 1920, we are concerned primarily, however, with the data in column F. Here we find that it takes 469 children under 5 per 1,000 women 20 to 44 years of age to maintain the numbers of such a population. Of course, as at present constituted (column G), 313 children under 5 per 1,000 women 20 to 44 will keep up the numbers. But every year an addition must be made to this 313 because our age constitution is becoming less favorable from the standpoint of both births and deaths. Just how long it will be before we shall need the full 469, one can not say, but it is quite certain that before another half century 9 per cent will again be lopped off the population under twenty and most of it added to the population over 40. This is about what happened in the half-century 1870–1920, as Table 58 shows; hence, it is not unlikely that in four or five decades we shall have approximately the age and sex constitution characteristics of a stationary population.

It should further be noted that the effects of a declining birth rate are temporarily to reduce the death rate (largely because of declining infant mortality) as well as the birth rate. After a time, however, if the birth rate is declining very rapidly the further saving of infant lives becomes almost impossible and the death rate automatically begins to rise. The changing age constitution will of itself bring this about even in the face of more adequate medical and sanitary service. The rate of natural increase is thus eaten into from both ends. The last two or three decades have seen such a rapid decline in the death rate that most people apparently have failed to realize that it can not continue to fall indefinitely, to say nothing of the fact that before long it must begin to rise. It is not generally realized that a death rate of 12 in a stationary population means an average expectation of life in excess of 83 years.

EFFECT OF IMMIGRATION ON BIRTH RATES

The restriction of immigration in this country will have a marked effect on the birth rate, particularly in our larger cities. Not only are the numbers of foreign-born women being rapidly reduced but those admitted now are more largely coming from countries where the practice of birth control is widespread. Hence our future immigrant women are not likely to bear as many children as the immigrant

women who came to us after 1900 and who were still contributing largely to births in 1920.

Table 25 in Chapter III shows that comparable localities largely composed of "old" immigrants have much lower ratios of children than those composed largely of "new" immigrants. When the present "new" immigrants become "old" they, too, will undoubtedly have a lower birth rate. The result will be that our cities as a whole will rather rapidly tend to approximate the present ratios of the native white women in them.

COMPARISONS WITH FRANCE

Further proof that we shall need a ratio of children to women of the size mentioned above (469) merely to maintain our population in the not distant future is found in the situation in France. Before the war France's population had been increasing so slowly for several decades that its age and sex constitution approximated rather closely that of a stationary population. (See Table 58.) In 1911 in France, the ratio of children under 5 to women 20 to 44 years of age was 474, practically the same as the ratio (469) necessary to maintain a stationary population in this country in 1920. To-day the difference in rate of natural increase between France (about 1 per 1,000 per year) and the registration area of the United States (9 per 1,000 per year) is not so much a difference in birth rates as in death rates; and the difference in death rates is more largely a matter of age distribution (see Table 58) than of expectation of life. The proof of this statement is found in the fact that in 1910 the average expectation of life was 51.49 years in the United States (both sexes) and 50.42 years in France (both sexes). In 1921 the expectation of life in France (both sexes) was 54.11 and in the United States it was about 56.43. This shows very clearly that it is the difference in age constitution rather than in expectation of life that makes France's death rate (16–18) so much higher than our own (11–13); and her natural increase only about one-sixth to one-tenth of ours.[9] The actual difference in birth rates in 1920 was only two points in our favor—21.3 in France and 23.5 in the white population of our registration area. Since then they approximate even more closely—19.7 for the United States in 1928 and 18.5 for France in the same year.

[9] No one moderately familiar with general living conditions in France and in the United States would doubt that our death rate would be lower than that of France even if our age constitution were the same; but no one can reasonably doubt either that our death rate would be considerably higher than it is if our age constitution were the same as that of France.

This comparison with France serves to indicate the situation in which we shall find ourselves before long by reason of changes inevitably following from a large and rapid decline in the birth rate.

The present rates of increase in our population based on the crude rates, are entirely inadequate to show the tendency in our population growth. A study of the ratios of children to women and what they mean in relation to our temporary and permanent maintenance needs will help to supply this deficiency.[10]

TEMPORARY AND PERMANENT MAINTENANCE NEEDS

The ratio of children under 5 to all (both native and foreign born) white women 20 to 44 in the United States in 1920 was 581; with 469 needed for permanent maintenance there was a fair margin for increase, 112, or 23.8 per cent. Expressed in another way, one may say that when our death rate becomes that of a stationary population (see death rates in Table 59) only 23.8 per cent of the children under 5 will be available for increase provided the ratio remains the same as at present. And as shown above it is certain to go lower in the near future. This surplus can not be transmuted into a definite rate of natural increase. But it certainly in no way contradicts Dublin and Lotka's figure of 5.7 per 1,000 population as substantially accurate for our true annual rate of increase in 1920. These calculations, however, apply only to the white population of the country as a whole.

The ratios of children to women differ greatly from one community to another, as we have seen. The ratio of children to all white women 20 to 44 (both native and foreign born) in cities of over 100,000 was 443, and in cities of 25,000 to 100,000 it was 470. Cities of more than 25,000, therefore, did not have enough children to maintain their population permanently (without migration) with death rates of 1920.[11]

The ratio of children necessary to maintain cities of over 100,000 temporarily, that is, as long as their death rates remain as they were in 1920 and as long as their age and sex constitution is unaltered, is approximately 273. (Table 59, column G.) It is somewhat higher (293) in the cities of 25,000 to 100,000 because of the less favorable age constitution. The larger cities, then, have a fairly large surplus of children over their temporary needs for maintenance ($443-273=170$ in cities of over 100,000 and $470-293=177$ in cities of 25,000

[10] Since this was first worked out the study of Dublin and Lotka referred to above has pointed the way to a more precise measurement of true natural increase.

[11] The permanent maintenance ratio for the total of the large cities shown in Table 59 in 1920 was 472. This is three points higher than the permanent maintenance for the total of the States. Since the proportion of our population living in cities is constantly increasing and will probably continue to increase until less than about 20 per cent of our people live on farms, the permanent maintenance ratio will tend to approximate that for cities (472) rather than that for States (469); hence, we shall use 472 as the permanent maintenance ratio in the rest of the calculations in this chapter.

to 100,000). The smaller cities, less than 25,000, have even larger surpluses, for the ratio in cities of 10,000 to 25,000 is 509, and in cities of 2,500 to 10,000 it is 531. The real surplus, however, is found in the rural districts with a ratio of 744.

With present specific birth rates the cities of over 100,000 will shortly (three or four decades at most) be decreasing in population, if they are not kept up by migration to them from the surrounding country and from abroad, for we have shown above that a ratio of 472 is needed by them to maintain their present numbers when their population becomes stationary and that the age distribution is moving rather rapidly in that direction. We must remember that these calculations are based on the assumption that there are no additions to or subtractions from the population of these cities because of migration: actually this condition is not at all likely to come to pass.

What is true of the larger cities is also true of the smaller cities, but they will not reach the point of natural decrease (more deaths than births) quite so soon as the larger cities, and the rural districts seem likely to continue to have a very considerable natural increase (more births than deaths) for some time after the urban areas have ceased to increase except by migration to them.

Just how long it will be before the birth rate in different communities will fall to the level where births will be fewer than deaths can not be foretold accurately, but judging from what has happened in France it will be three or four decades before the age distribution of the country as a whole will be like that of France in 1911.[12] It may, then, be 4 or 5 decades before we shall approximate very closely in our actual population the age groups of a stationary population. There is, however, some evidence that in many localities our birth rate is falling faster than ever that of France did, hence, we may reach the stage of virtual equality between births and deaths in a shorter time than France did and it may be only a few years until certain localities will have no excess of births over deaths. The data for 1927 show that Montana had a birth rate of only 13.7, Washington of 14.9, Oregon of 16.4 and eight other States also had rates of less than 19.

TREND AMONG NATIVE WHITE WOMEN

Perhaps the general situation can be best understood by giving a little closer attention to what is happening now among native women, for under the present immigration policy the foreign-born women will not be a very important factor in our population growth in the near future.

[12] Again attention must be called to the fact that there are some omissions of young children from the census count. Our data, therefore, make the time of arriving at a stationary population appear a little closer than it actually is.

The actual ratios of children to native white women in cities of over 100,000 and in cities of 25,000 to 100,000 are 341 and 390, respectively. The margins for temporary increase in these places to-day are not very large (341 − 273 = 68 and 390 − 293 = 97) and with the changes which will ensue because of the restriction of immigration and the altering of its sources, we may not have to wait long to see the spectacle of some of our cities depending on migration, chiefly from the rural districts, for the keeping up of their actual numbers, to say nothing of the increase in numbers they all so ardently desire.

The ratio of children to native white women in the cities of over 100,000 is already nearly 27.8 per cent below the permanent maintenance needs; in the cities of 25,000 to 100,000 it is about 17.3 per cent below; in cities of 10,000 to 25,000 it is 8.4 per cent below and even in the smallest cities it is barely above the necessary level. Clearly, as our city population becomes increasingly native and as the changing age constitution results in more deaths and fewer births, our modern cities, like ancient cities, will stand forth as the great destroyers of men. All the great advances in medicine and sanitation can avail nothing beyond the saving of a few lives for a few years. As long as the cities put such great pressure on people to restrict births as they are now doing the birth rates of the cities will continue to decline and before long there will be more deaths than births in many of them.

An examination of the ratios of children to all native white women in all the cities of over 100,000 (Table 20) reveals the fact that only Salt Lake City has a ratio above the permanent maintenance ratio for the large cities (472). Also only 12 other cities have a ratio of over 400, while there are 8 that have ratios of less than 300. These latter are certainly very close to the limit of temporary maintenance now and need but a small further fall in the birth rate to have a deficit rather than a surplus. Indeed, in the cases of San Francisco and Los Angeles it would seem that only a very abnormal age distribution prevents them from having too few births to maintain themselves temporarily even now.

When we turn to the rural districts, on the other hand, the picture is quite different. In the native white population there the ratio is 721. Taking Kansas, North Carolina, and Kentucky as representing the rural districts in Table 59 the ratio of children necessary for permanent maintenance is 472, and for temporary maintenance 297. Thus, the native white population of the rural districts has three-fifths more children than are necessary for permanent maintenance and over two and one-half times as many as are needed for temporary maintenance. Since the birth rate is falling in the rural communities as well as elsewhere, we may look forward to changes in age constitution there less favorable to low death rates and to fairly high birth rates than at present. But since the proportion of women in the childbearing ages

is much the same in these rural States even now as in a stationary population and since there are comparatively few foreign born in the rural population, its age constitution will not be as much affected by a falling birth rate and by the restriction of immigration as will that of the population of the cities. One can not tell just how rapidly birth restriction will spread, nor the extent to which it will be practiced among country people, thus cutting down their rate of natural increase. Elsewhere (Chap. VI) we have given reasons for believing that country people will never practice such drastic restriction as city people. Consequently it seems probable that rural people will maintain a fair rate of natural increase for some time to come. But there can be no doubt that it will be a decreasing rate.

There is a possibility, of course, that the argument advanced above will be in part invalidated by an increase in the birth rate of the native born after the restriction of immigration has had time to make itself felt in the labor market. If there should be any significant and continued increase in the reproductive vitality of the native population this would prove Walker's contention that immigration is more largely a process of substitution than of addition. But it would be a matter of surprise if any such increase in the birth rate took place.

In Chapter IX (Conclusions) reasons are given for believing that the control of births to-day is largely for immediate personal advantage and that as such it is not really intelligent control. Our present personal control is not intelligent from a long-time point of view because of inherent defects in our present social organization, and it will not be replaced by a really intelligent control until we materially alter this form of organization; this is to say, the intelligent control of births involves much besides limiting them to the number contributing most to the ease of living and the economic advantage of the individual or to the number that can be supported at customary standards of life by the economic organization of the moment. There are other values, some of them perhaps of more permanent significance, which are ignored by the present individualistic control. Without going into any detail in this matter a few questions may suggest some directions in which we should look for such values. How many children are needed in each family to keep up the present numbers of the population? What is the relation between childbearing and the mental and physical health of women? How many children are needed in a family so that the children themselves get the most out of family life? What are the effects of children upon the mental development of parents? Are children needed to insure the normal development of adult life, and if so, how many? Is there any relation between the ruthlessness of our economic system and the amount of time given by parents to the care and training of their

children? It does not seem reasonable that the reproductive life of man can be so greatly disorganized as it has been (in a very considerable part of our population) during the last few decades without producing a great variety of effects upon our whole scheme of living, some of which are almost certain to be degenerating. An intelligent control of population growth should not be confounded with the present restrictions based so largely on purely personal grounds.

DIFFERENTIAL REPRODUCTION IN THE UNITED STATES

The differential reproduction of different-sized communities in the United States and its divisions is measured roughly in Table 60. The standards of measurement used are the ratios of children needed for temporary and permanent maintenance of the population as defined on page 160. Details regarding States, particular cities of over 25,000, smaller cities in the different States, and the rural districts by States are given in Detailed Table III.

There are certain obvious defects in this method of measuring differential reproduction. In the first place, 273 has been adopted as the ratio necessary for temporary maintenance for all cities of over 100,000. This is obviously too high for some and just as obviously too low for others (Table 59, column G) because these cities vary considerably in their age and sex constitution and in their death rates. The errors arising from this source, however, can not be very great.

TABLE 60.—PER CENT CHILDREN UNDER 5 PER 1,000 WHITE WOMEN 20 TO 44 YEARS OF AGE ARE IN EXCESS OF RATIOS NECESSARY TO MAINTAIN THE POPULATION TEMPORARILY AND PERMANENTLY, BY SIZE OF CITY AND NATIVITY AND BY DIVISIONS: 1920[1]

AREA	CHILDREN UNDER 5 PER 1,000 WOMEN 20 TO 44 YEARS OF AGE		INDEX SHOWING PER CENT OF EXCESS OF RATIOS OF CHILDREN OVER TEMPORARY REPLACEMENT NEEDS [2]		Index showing per cent of excess (or deficit) of ratios of children of native white women over permanent replacement needs [3]
	Native white	Foreign-born white	Native white	Foreign-born white	
UNITED STATES	538	779	70	150	15
Cities 100,000 and over	341	679	25	150	−30
25,000 to 100,000	390	766	35	160	−15
10,000 to 25,000	434	861	50	195	−10
2,500 to 10,000	477	873	65	200	0
Rural	721	998	125	210	55
NEW ENGLAND	393	747	25	140	−15
Cities 100,000 and over	322	700	20	155	−30
25,000 to 100,000	350	710	20	140	−25
10,000 to 25,000	386	811	30	175	−20
2,500 to 10,000	412	806	40	175	−15
Rural	528	870	65	170	10
MIDDLE ATLANTIC	429	789	35	150	−10
Cities 100,000 and over	342	672	25	145	−30
25,000 to 100,000	381	863	30	195	−20
10,000 to 25,000	431	1,033	50	250	−10
2,500 to 10,000	466	1,034	60	250	0
Rural	588	1,121	85	250	25

[1] Calculated by use of ratios applied to Detailed Table I. See also Detailed Table III.
[2] Called "temporary replacement index" in text.
[3] Called "permanent replacement index" in text.

TABLE 60.—PER CENT CHILDREN UNDER 5 PER 1,000 WHITE WOMEN 20 TO 44 YEARS OF AGE ARE IN EXCESS OF RATIOS NECESSARY TO MAINTAIN THE POPULATION TEMPORARILY AND PERMANENTLY, BY SIZE OF CITY AND NATIVITY AND BY DIVISIONS: 1920—Continued

AREA	CHILDREN UNDER 5 PER 1,000 WOMEN 20 TO 44 YEARS OF AGE		INDEX SHOWING PER CENT OF EXCESS OF RATIOS OF CHILDREN OVER TEMPORARY REPLACEMENT NEEDS		Index showing per cent of excess (or deficit) of ratios of children of native white women over permanent replacement needs
	Native white	Foreign-born white	Native white	Foreign-born white	
EAST NORTH CENTRAL	493	811	55	160	5
Cities 100,000 and over	360	751	30	175	−25
25,000 to 100,000	413	833	40	180	−15
10,000 to 25,000	451	845	55	190	−5
2,500 to 10,000	478	844	65	180	0
Rural	639	984	100	205	35
WEST NORTH CENTRAL	554	849	75	170	15
Cities 100,000 and over	328	632	20	130	−30
25,000 to 100,000	385	670	30	130	−20
10,000 to 25,000	424	705	45	140	−10
2,500 to 10,000	453	778	55	165	−5
Rural	680	1,037	110	225	45
SOUTH ATLANTIC	713	831	130	165	50
Cities 100,000 and over	406	768	50	180	−15
25,000 to 100,000	459	682	55	135	−5
10,000 to 25,000	494	708	70	140	5
2,500 to 10,000	551	846	90	190	15
Rural	848	1,032	165	220	80
EAST SOUTH CENTRAL	734	710	135	125	55
Cities 100,000 and over	375	625	35	130	−20
25,000 to 100,000	406	527	40	80	−15
10,000 to 25,000	463	626	60	115	0
2,500 to 10,000	516	718	75	145	10
Rural	846	927	165	190	80
WEST SOUTH CENTRAL	682	758	120	140	45
Cities 100,000 and over	369	579	35	110	−20
25,000 to 100,000	376	603	30	105	−20
10,000 to 25,000	466	580	60	100	0
2,500 to 10,000	512	676	75	130	10
Rural	817	929	155	190	75
MOUNTAIN	631	848	100	170	35
Cities 100,000 and over	356	574	30	110	−25
25,000 to 100,000	390	648	35	120	−15
10,000 to 25,000	423	646	45	120	−10
2,500 to 10,000	535	764	80	160	15
Rural	775	986	140	210	65
PACIFIC	388	582	25	85	−20
Cities 100,000 and over	268	449	0	65	−45
25,000 to 100,000	315	534	5	80	−35
10,000 to 25,000	365	567	25	95	−25
2,500 to 10,000	407	666	40	125	−15
Rural	563	792	75	145	20

In the second place, for smaller cities where the age constitution is less favorable to a low temporary maintenance ratio, the figure 293 is used. This is the average of 273, the ratio of large cities, and 313, the ratio for certain selected States (Table 59). This ratio can not be ascertained more exactly. Three hundred and thirteen is used as the temporary maintenance ratio for the United States, each of its divisions, and the several States. For the rural districts the temporary ratio used is 320, on the assumption that they have a less favor-

able age and sex constitution than the remainder of the States. Again this ratio can not be considered more than approximately accurate. But even if the ratios used here for the calculation of indexes are not absolutely accurate (because of the fact that we do not have separate life tables for each community or even for each size-group) they will give us a fairly accurate notion of the differential rates of reproduction in the various groups and will help us to appreciate a little better the meaning of the varying ratios in these groups.

The different ratios used for the calculation of excess over temporary maintenance needs in different sized communities will account for the apparent discrepancies in some of the figures. For example, the temporary maintenance index in the United States as a whole for the foreign born is 150 (Table 60); it is also 150 for cities of 100,000 and over but higher for all other groups. It would seem that the average for the United States as a whole should be higher than 150 but 313 is the temporary maintenance ratio used here; hence the temporary replacement index for the entire United States is the same as that for cities of over 100,000 and lower than that for all other communities.

The third defect in the method of measuring differential reproduction is that this ratio of 313 is undoubtedly too high for some of the divisions where the population is largely urban—especially in the case of the foreign born—but there is no way of correcting it to suit each case.

But after all the most significant figures in this table are the permanent replacement indexes for the native population for, as has been said frequently in what precedes, our age groupings are changing rapidly and if we would judge of the future growth of our population we must look at the situation that seems certain to arise within the next four or five decades as well as, or even more than, at the conditions of the moment.

Since the ratio of children in a stationary population varies but little between groups, because the age and sex constitution of the groups are much the same under the assumption of being stationary, and because our urban population is steadily becoming a larger proportion of the whole, the ratio of 472 has been used throughout as the permanent maintenance ratio for the calculation of the permanent replacement indexes. It may be well to call attention again to the fact that a *stationary population* as that term is used here is a population that by hypothesis has neither immigration nor emigration and whose size, therefore, is determined by the relation between births and deaths. Actually there could never be such a population but the concept is of use in enabling us to determine what is likely to happen as the actual population of a community comes to approximate the condition of such a hypothetical population.

The indexes showing the excess (or deficiency) in the ratio of children to women for temporary needs are believed to give a fairly accurate idea of the relative rates of increase of these groups at the present time and the permanent replacement indexes show us what will be the relative positions of these communities as regards population growth when they approximate the age and sex constitution of a stationary population, as they are certain to do at a fairly rapid rate. The cities of over 25,000 will certainly tend to approximate this condition within three or four decades and though the rural communities may be somewhat behind them they will come to the same condition in a comparatively short time.

TABLE 61.—PER CENT OF THE NATIVE WHITE POPULATION AND THE FOREIGN-BORN WHITE POPULATION IN THE VARIOUS AGE GROUPS: 1920 [1]

AGE GROUP	PER CENT	
	Native white	Foreign-born white
Under 5	12.7	0.3
5–9	12.2	1.2
10–14	11.1	2.4
15–19	9.6	3.9
20–24	8.9	6.8
25–29	8.2	10.6
30–34	7.0	12.0
35–39	6.4	12.7
40–44	5.3	10.4
45–49	4.8	9.5
50–54	3.9	8.5
55–59	3.0	6.6
60–64	2.5	5.2
65–69	1.7	3.8
70–74	1.1	2.8
75 and over, and unknown	1.6	3.3

[1] Fourteenth Census Reports, Vol. II, Population, 1920, p. 160.

It should also be mentioned that the ratios needed to temporarily maintain the population are probably not the same for the native born and the foreign born because of differences in age and sex constitution as well as differences in actual death rates. There is no way of allowing for these differences with the data available. The same ratios are, therefore, applied in calculating the maintenance indexes in both nativity groups with the result that the temporary replacement indexes among the foreign born probably appear somewhat greater than they actually are in some communities. It should be noted that there is so little value in calculating the permanent replacement index for the foreign born that it has not been done. In the very nature of the case immigrants as a whole will never even approximately approach the age groups of a stationary population. Immigrants are generally younger people; their children are largely born in this country and they bring comparatively few old people, over 60, with them. In the course of time these younger people pass into the

older age groups, resulting in an age distribution quite different from that of the native born, as Table 61 shows. In Table 60 then, the significant comparisons are between the temporary replacement indexes of the natives and the foreign born, and between the temporary and permanent replacement indexes of the natives in communities of different sizes.

It will be worth our while to examine Table 60 in some detail in order to get a more accurate picture of the processes of population growth in this country. In the country as a whole, the native white women have a temporary replacement index of 70 (the ratio of children needed to maintain the numbers of the population with present age and sex distribution and the specific death rates of 1920) but a permanent replacement index of only 15 (when it has the sex and age distribution of a stationary population with the specific death rates of 1920).[13] This is a rather narrow margin for increase over permanent needs. The foreign-born white women have a temporary replacement index of 150. This is a little more than twice the temporary replacement index of the natives.

In comparing the divisions with one another, we find considerable differences between them in every size of community. Thus in the largest cities on the Pacific coast the temporary replacement index among native white women is about zero. In the South Atlantic States, on the other hand, it is about 50. In the other divisions it varies from 20 in New England to 35 in the East and West South Central States. Among foreign-born white women in the large cities the temporary replacement index does not vary much from the average for the United States (150) except on the Pacific coast. Here it is less than one-half of what it is elsewhere. In smaller cities, also, and to much the same extent in all divisions, the foreign-born women maintain their margin of excess over the native women, and the same is true in the rural north and in the Pacific coast rural communities. In the rural South and the Mountain States, however, the temporary replacement indexes of the native white rural women are much higher and are from two-thirds to seven-eighths those of the foreign-born rural women.

When we come to consider the permanent replacement indexes we find that, with a few exceptions, only in the rural districts do these have a positive (+) value among the native women.

If the contention made in this chapter is correct, namely, that we are rather rapidly approaching the sex and age constitution of a stationary population, then we can get a fairly accurate idea of our future situation as regards the growth of our population by supposing

[13] No doubt the specific death rates of 1920 (the number dying per 1,000 at each age) will drop somewhat in the future and as this happens the number of children under 5 needed for permanent replacement (472) will become less.

that we are now passing from the state of growth as expressed in terms of the temporary replacement indexes of 1920 toward the permanent replacement indexes of the native population.

Some communities will accomplish this passage more quickly than others but we shall not make a mistake if we assume that from two to five or six decades will see most of them in the situation indicated by the permanent replacement indexes in the last column of Table 60. Our movement in this direction in the next few decades will be faster than in the decades immediately behind us. Except in the rural districts and some of the smaller cities of the South and the Mountain States, therefore, the real situation appears to be that there will soon be little or no increase in the native white population.

Among the foreign-born white population there is a very considerable increase but one which can not continue. The number of immigrants being admitted now is only about one-fourth to one-fifth what it was in the big years before the war. At present about three-fourths of these are coming from northwestern Europe and Canada and about one-fourth from Mexico. Therefore, as soon as the pre-war immigrant women from southern and eastern Europe pass the childbearing age, we shall no doubt witness a very rapid decline in the ratio of children to foreign-born women and with the great diminution of their numbers, their total contribution to the population will diminish to a small part of what it has been recently. Consequently the tendencies prevailing in the native population will soon be the tendencies of the entire population.

It seems, therefore, that the growth of our population is certain to show a very great decline in the near future. This decline will not be fully manifest in 1930 because of the further decline in the death rate and some little increase in births consequent upon more normal times following the war. But probably by 1940, and certainly by 1950, the cities will be practically stationary, except for migration to them, and the crude [14] rate of increase in the entire country will be less than half of what it now is, that is, below 5,000 per annum. Indeed, with the steadily diminishing importance of the rural population, it seems probable that 30 or 50 years may see an end of all natural increase. Certainly the rural population will not be able to make up the deficits in the cities indicated in Table 60 for any great length of time. When three-fifths to three-fourths of our population becomes urban, the rural increase will have to be spread so widely that it will be exceedingly thin.

It should perhaps be mentioned in this connection that the steady flow of young people from the rural districts to the city will tend to prevent the natural increase of the cities from becoming *minus* or even

[14] The crude rate is merely the difference between the birth rate and the death rate. See above, p. 2, for Dublin and Lotka's estimate of the true rate of natural increase in 1920.

zero for some time after city-born people themselves have ceased to maintain their numbers by reproduction, both because of the padding of the young age groups (that is, the large proportion of the total population in the younger childbearing ages), and because of the relatively large number of children these migrants will contribute. How long they will continue to contribute more children than city-raised people is a question but that there will be a continuous flow of young people to the cities as long as conditions are more attractive there than on the farm admits of no doubt. The cities will show absolute growth because of the migration to them long after they have ceased to have any natural increase.