GENETIC AND SOCIAL SIGNIFICANCE OF DIFFERENTIAL FERTILITY

I. PRESENT KNOWLEDGE CONCERNING THE EFFECTS OF DIFFERENTIAL FERTILITY

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DIFFERENTIAL rates of reproduction of separate population groups is not a new phenomenon. Although accurate statistics permitting measurement of existing differences in fertility of various groups in the population are of relatively recent origin, and even now are available only for a small part of the world's population, nevertheless there is sufficient historical evidence to support the belief that differential fertility is as old as the human race. Only one example will be cited here:

About 1650, the population of Europe numbered approximately 100,000,000 and constituted 18 per cent of the estimated total population of the world. In the following three centuries these people multiplied in number more than seven times so that by 1933 their descendants had increased to 720,000,000 and their proportion of the total population of the world had risen from 18 to 35 per cent (1). The people of Western Europe and North America have passed their peak of rapid population increase and now are reproducing at a lower rate than many other large population groups so that they will, in time, comprise a smaller proportion of the world's population.

Thirty years ago the differential rate of growth of national population groups was a subject of much discussion. In recent years however, demographers have devoted more attention to differential reproduction rates of segments of the population within national groups, so that today the term differential fertility is usually understood as implying unequal reproduction rates of social or economic classes of the population.

[1] From the Division of Public Health Methods, United States Public Health Service.

Differential fertility in this sense probably has become important only in relatively recent times. Many historical accounts exist of the failure of the "upper classes" to reproduce as rapidly as the "lower classes," but the evidence on which these accounts are founded is not clear cut (2). Regardless of their reproduction rates, the "upper classes," until the last century or so, numerically were so small relative to the total population that their fertility had little effect upon either the quantity or quality of the population of which they were a part. Today, however, numerically significant portions of our population are reproducing themselves solely as a result of an age distribution favorable to a large number of births. As the age distribution changes to that which current birth and death rates will support, the excess of births over deaths will change to an excess of deaths over births unless age specific fertility rates are increased. The probable failure of numerically large segments of our population to reproduce themselves means that the physical and mental characteristics of the future population will be determined to an increasing extent by those whose fertility is sufficiently great to provide an excess of births over replacement needs.

Table 1. Ratio of the net reproduction rate for specific urban classes to the corresponding rate for the total urban white population, United States, 1935–36.[1]

Class	Ratio
Annual Family Income	
$3,000 and over	.60
$2,000–2,999	.79
$1,500–1,999	.90
$1,000–1,499	1.07
Under $1,000	1.37
Education (Females)	
College	.74
High School	.97
7th or 8th grade	1.23
Less than 7th grade	1.39
Total Population	1.00

[1] From reference 3.

Many bases of classification of the population into groups or classes have been used: color, nativity, religion, income, education, occupation, region, and size of community are the more common. The general results of investigations in the United States of the relationship of fertility to groups of the popula-

tion classified in these ways are well known and are in substantial agreement so that they will be referred to here only briefly.

Table 1 shows the relative rank with respect to net reproduction rates of classes of the urban population when grouped by income and education. Corresponding differences exist when other bases of classification are used. The fertility of Catholics is usually higher than that of Protestants in the same area (4). Farmers, unskilled laborers, and miners exceed in fertility skilled workers and business and professional people. When population is classified by size of community, fertility rates decline from a high for the rural-farm population to a low for the population residing in large cities (5). No matter what criteria of classification are used some groups of the population are found to contribute a disproportionate number of new recruits to the population of the future. In general, these groups have the lowest income and the least education; they are primarily manual workers and live in areas with the least adequate health, educational, and cultural opportunities and facilities.

What do these differences in fertility portend concerning the characteristics of the future population of the United States? But little progress has been made in assembling scientific evidence from which an answer to this question can be made. In the absence of scientific evidence, opinion and prejudice reign supreme. No general agreement exists among demographers concerning the effects of differential fertility upon the quality of the population.

One reason for the failure of demographers to investigate more thoroughly the effects of differential fertility undoubtedly is the scientific disrepute of many of the statements concerning this subject which have been made by well-meaning but ill-informed eugenists. Contending that those who rise to the top socially and economically have the best genetic and cultural heritage, eugenists claim that the present differential fertility of social and economic classes is dysgenic and that as a result the average ability of the population is being lowered. Perhaps an

even more important reason is the fact that human genetics and psychology have not yet accumulated a sufficient body of scientific knowledge about human abilities and their distribution throughout the population to permit a valid determination of the effects of differential fertility.

Neither of these reasons however, is sufficient to excuse the failure of demographers to investigate scientifically the effects of differential fertility. The potential significance of current differences in reproduction rates among social and economic classes for the future population of the nation is great enough to demand the most careful investigation. But before much progress can be made in evaluating the effects of class differentials in fertility it will be necessary to define more specifically the objective.

Firstly, the specific traits which we desire to have perpetuated must be defined. Moreover these must be defined so that valid measures of their presence or absence can be established. Only then can verifiable observations be made of the distribution of these traits among the various social and economic classes of the population. Once traits have been identified and valid measures developed, the relation of these traits to definite types of hereditary behaviour should be investigated in order to ascertain the extent to which they are dependent upon the genetic qualities of the population and the extent to which they arise from the cultural environment. Studies of the change in the proportion of individuals with specific traits between two successive generations would furnish the basis for evaluating the effects of differential fertility upon the quality of the population.

Turning to the evidence which is cited in support of statements concerning the effects of class differentials in fertility it is impossible to find any significant amount of data which meet all the criteria in the preceding paragraph. No general agreement exists concerning the traits which should be preserved in the population. Lack of agreement is not serious however, insofar as investigation of the distribution of traits

among social classes is concerned except as it may influence the traits to be investigated.

More progress has been made in the identification, measurement, and determination of the dependence upon genetic factors of physical than of mental traits. Knowledge is accumulating concerning the role of heredity and the mechanism of its action in the development of many physical defects and diseases so that statements concerning the probability of such conditions appearing among offspring can be made with considerable assurance. There is no evidence that biologically undesirable physical defects tend to be disproportionately frequent in certain social and economic classes and, except for some racial extremists, few people believe that differential fertility is causing the physical deterioration of our population. This is not to deny the desirability of discouraging individuals with physical defects, such as Huntington's Chorea, hereditary optic atrophy, and similar conditions whose mode of genetic behaviour is fairly well understood, from procreating children but such action is applicable to individuals and not to entire social or economic classes.

In contrast to our knowledge of physical traits, that concerning mental traits is exceedingly meager. In the eighty years since the publication of Galton's HEREDITARY GENIUS, interest has centered primarily on tests of "intelligence." Even today however, psychologists disagree sharply as to whether intelligence is a single specific mental trait or is a cluster of distinct elements more or less interrelated. Fortunately this disagreement has not prevented continued efforts to improve tests for the measurement of intelligence, to investigate the response of various groups of the population to such tests and to attempt to ascertain the influence of environmental factors upon its development.

Studies of twins and foster children have shown that I.Q. scores can be altered by changes in the environment. Increases of as much as twenty to thirty points have been reported but the average change to be expected is probably in the neighbor-

hood of five to ten points. It is equally clear that heredity places limits upon the possible development of a given individual and that individual differences in I.Q. scores persist in spite of the most enriched environment.

Although a few investigators claim that environmental influences can largely determine an individual's I.Q. score, probably most investigators would agree that genetic factors account for more than 50 per cent. Estimates ranging from 50 to 95 per cent for the relative weight of heredity have been put forth but these depend largely upon the investigator's predilections.

When children are grouped according to father's occupation, arranged in broad social economic classes, the average I.Q. score usually is lowest for children of unskilled laborers and highest for children of professional persons. Some studies have reported a range in average I.Q. score of as much as 20 to 25 points from the lowest to the highest classes. Other investigations show a negative correlation of about 0.2 between I.Q. score and size of family. From these facts some have concluded that the "upper" classes are more intelligent on the average than the "lower" classes so that the effect of differential fertility is to lower the average intelligence of the total population.

Cattell estimated that the average I.Q. is declining at the rate of 3 points per generation (6). Fraser Roberts reported that based upon his studies of the child population of Bath, England, the fall in average I.Q. was about 1½ points per generation (7). In the United States, Lentz calculated that in the urban population the decline in the median score from one generation to another was as much as 4 to 5 points (8). Lorimer and Osborn concluded that the average decline in the median I.Q. score was 0.9 of a point per generation (9).

It should be remembered that these calculations are theoretical and are based upon observations on a single generation. No one has yet reported investigations of I.Q. scores in successive generations which support these claims. The implication exists that intelligence tests measure the most important of all

mental traits and that an increase in the average I.Q. score of the population would be desirable. While no one seriously advocates that the quality of the population would be improved by deliberately lowering the average I.Q. score by 25 points, if this were possible, it is not at all clear that raising the average I.Q. score to 130 or 140 would in itself increase the well being of our population.

Certainly there are differences in the ability of an artist, an engineer, a mathematician, an aeroplane pilot, a motor mechanic, a pianist, and a chemist which are not represented by differences in I.Q. scores. Temperament and emotional stability undoubtedly profoundly influence an individual's achievement. Research in the domain of mental traits other than intelligence has made little headway and is no further developed than intelligence testing was forty years ago. Leadership, initiative, ambition, and similar socially desirable characteristics are merely philosophical concepts. Until temperamental, emotional, and volitional traits are defined in such a manner that valid tests can be devised for their measurement, speculation concerning the effect of differential fertility upon their distribution throughout the population, at best, can be but a well informed guess and, at the worst, will be an expression of a preconceived prejudice.

Is the present pattern of differential fertility lowering the average quality of our population? In this form the question is incapable of scientific answer. Not until the general concept, ability, is separated into specific measurable components can the scientific evidence necessary to answer this question be accumulated. As yet, repeatable measurements have been made of only one mental trait, intelligence, and the precise meaning of this trait still is a matter of dispute. Differential fertility of social classes has existed much as it is today for nearly two generations at least. No longitudinal time studies have been reported which support the conclusions drawn by some from cross-sectional time studies that the average I.Q. of our population is decreasing in successive generations.

Even though we do not have sufficient scientific evidence to determine the effects of differential fertility upon the genetic qualities of our population we do have sufficient evidence to be sure that a large proportion of the recruits of the next generation come from the classes of our population which are the least able to provide maximum cultural and health advantages. So long as differential fertility operates in a way that denies opportunity for maximum development of innate ability it acts counter to the professed ideals of our society and as such is a matter of serious concern.

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