THE FERTILITY OF SPECIFIC OCCUPATIONAL GROUPS IN AN URBAN POPULATION[1]

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ONE phase of the studies on population problems being made by the Milbank Memorial Fund is concerned with a fact of basic importance to any intelligent effort to control the social and biologic character of the people as well as to the planning of future programs of public health. This is the size of the family in different social classes and in urban and rural areas. Since the size of the family depends largely upon the birth rate, this phase of the Fund's inquiries has been concerned primarily with the fertility of women. So far it has shown, probably more accurately than ever before in the United States, that wide differences in fertility in broad social classes have existed for a long time and that the trends of fertility in these classes have been by no means the same.

It has been clearly indicated by our studies that various social factors are involved in these differences, but our knowledge of their causal relationships is much less satisfactory than our description of the differences themselves. It is inherent in the rather nebulous conception of "social class" that the classes, taken as wholes, differ from one another in income, character of employment, interests, standards of living, education, and achievement, and possibly in physical and intellectual capacities. Any or all of these attributes, whether environmental or genetic in origin, may be related directly or indirectly to the fertility of the classes, but by studying the classes as units we observe only the gross resultant of their complex influences and remain en-

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tirely ignorant of the part played by any single attribute.

It is the purpose of the present study to examine the data relating to the fertility of urban women whose husbands followed specific occupations, with the hope that such an examination, in addition to indicating the source of the differences in the fertility of the broad social classes, will, because it deals with relatively clear-cut divisions of the social classes, give some indication of the relation which the distinguishing attributes of the groups may have to their fertility. Little more than suggestive results may be expected, but such results may point the way to further investigation of the influence of specific determinative factors.[2]

The data employed are those obtained by a special tabulation of samples of the 1910 census returns relating to the total number of children ever born to each married woman, the length of the marriage, and the husband's occupation. Neither the women nor their husbands had been married more than once, and both the husbands and wives were of native-white parentage. The data represent a random sample of this group as found in the thirty-three northern cities with populations of between 100,000 and 500,000 in 1910.[3]

Since the specific occupations are represented in the sample by a relatively small number of cases, it is desirable to use an index of fertility which will not be disturbed by a few chance early or late marriages. The index employed in previous

[2]A number of European investigations of the subject have yielded results roughly similar to those of this study, but the populations considered and the data secured are so different that no direct comparisons have been attempted. Two of the more important of these studies are: Fertility of Marriage: Census of England and Wales, 1911, xiii, Part II. Sanders, J., M.D.: The Declining Birth Rate in Rotterdam. The Hague, Martinus Nijhoff, 1931.

[3]For detailed description of the data and the methods by which they were obtained, *see* Sydenstricker, Edgar, and Notestein, Frank W.: Differential Fertility According to Social Class. *Journal of the American Statistical Association*, March, 1930, xxv, New Series, No. 169, pp. 9-32.

Social Class and Occupation	Number of Wives under 50 Years of Age	Births per 1,000 Years of Married Life (Adjusted)[1]	Standard Error
Professions			
Dentists	556	124	6
Physicians, surgeons, and osteopaths	1,514	137	4
Accountants and auditors	335	145	7
Architects, artists, sculptors, and teachers of art	373	152	8
College presidents and professors	318	162	10
Engineers (civil, electrical, mechanical, and mining)	1,169	164	4
Authors, editors, and reporters	293	169	9
Lawyers, judges, and justices	1,855	173	4
Teachers, school and athletics	516	175	8
Clergymen	553	175	9
Proprietors			
Hotel, restaurant, cafe, lunch room, and saloon keepers	330	124	7
Druggists and pharmacists	295	125	8
Importers and exporters	336	140	9
Stockbrokers, other brokers, money lenders, promoters, et cetera	472	148	7
Retail dealers (except grocers, druggists, and pharmacists)	1,706	151	4
Insurance agents	550	153	6
Manufacturers	684	157	6
Bankers and bank officials	234	158	15
Grocers	476	158	7
Officials of manufacturing	255	161	9
Managers and superintendents of manufacturing	681	162	6
Real estate agents and officials	1,072	164	5
Conductors (steam railroad)	342	167	7
Builders and building contractors	875	190	5
Clerks and Kindred Workers			
Commercial travelers	1,437	140	4
Salesmen and clerks in stores	2,995	149	2
Bookkeepers and cashiers	1,279	152	4
Agents, canvassers, and collectors	621	157	5
Agents and clerks in railroad employ	423	157	7
Other clerks	2,022	157	3
Shipping clerks	254	171	9
Draftsmen	397	179	8
Skilled Workers			
Barbers and hairdressers	439	133	6
Machinists and loomfixers	1,445	169	4
Foremen and overseers	450	170	6
Engineers (stationary)	550	175	6
Policemen	220	175	9
Electricians	565	176	6
Compositors, linotypers, and typesetters	455	176	6
Locomotive engineers and motormen (steam railroad)	436	176	7
Painters, glaziers, and varnishers (building)	675	185	5
Plumbers, and gas and steam fitters	390	188	7
Carpenters	1,944	193	3
Brick and stone masons	216	202	10
Blacksmiths, forgemen, and hammermen	258	210	9
Moulders, founders, and casters	263	228	8
Semiskilled Workers			
Waiters and bartenders	304	128	7
Brakemen	308	166	7
Switchmen, flagmen, and yardmen	236	175	8
Motormen (street railroad)	480	177	6
Conductors (street railroad)	571	180	5
Semiskilled operatives in metal industries	461	180	6
Semiskilled operatives in other factories and shops	1,488	191	3
Unskilled Laborers			
Deliverymen	497	203	6
Laborers (n.o.s.)[2] in other industries (except building and metal)	254	212	8
Draymen, teamsters, expressmen, and carriage and hack drivers	883	218	5
Laborers (building, general, and not specified)	654	225	5
Laborers in metal working industries	245	228	9

[1]Adjusted by applying the specific rates for women under 30, 30 to 40, and 40 to 50 years of age, to the age distribution of the wives in the entire sample.

[2]Not otherwise specified.

Table 1. Children born to women under 50 years of age per 1,000 years of married life, for specific occupational groups of a native-white urban population.

analyses of the same data, i.e., the number of children ever born to women of specific age groups, has accordingly been replaced by the number of children ever born to women under 50 years of age per 1,000 years of married life.[4] This rate holds the length of "exposure to risk" of childbirth constant, but, in its crude form, it does not insure an equality of exposure. Since the early years of married life are more fertile than the later, a group of women would have a higher ratio of births to married years when thirty than when forty years of age. Therefore, the fertility of occupational groups can be compared only when the age distributions of the wives are not widely dissimilar. This condition is approximated by the standardized rates used in this study. These rates were obtained by computing the number of children ever born per 1,000 years of married life for each of three age groups: under 30, 30 to 39, and 40 to 49, and using an average of these rates weighted by the proportion of women of the total sample found in each age group. The resulting rates are those which would have been characteristic of each occupation had the wives in each occupational group been distributed by age groups in the same manner as those of the entire sample. It should be observed that variation in age at marriage can have little influence on such rates.[5]

These birth rates, the number of cases on which they are based, and approximations to their standard errors, are pre-

[4]In the earlier studies, age 45 was arbitrarily selected as the end of the childbearing period. In this study, the limit has been set at 50 in order to simplify the mechanics of tabulation.

[5]It is possible that the adjusted ratio of births to married years reduces the index for early marrying groups somewhat too much. It carries the implicit assumption that the fertility of a given year of married life is independent of that of the preceding years. Doubtless this is not strictly the case. It seems likely that women who married early and had their families well under way might in the succeeding years be less fertile than equally fecund women of the same age whose married life had only begun.

sented in the accompanying table for the occupational groups represented in our sample by more than 200 cases.[6] The occupations are shown in order of ascending birth rates within their respective social classes, but the standard errors indicate that in most cases significance cannot be attached to the details of this ranking. The business and skilled-worker classes of the previous studies have been subdivided into proprietors and clerks, and skilled workers and semiskilled workers, respectively. The professional and unskilled-labor classes remain unchanged.

The birth rates for the constituent groups of each social class had such a wide range of variation that there were no clear-cut differences between the classes. When the more extreme cases are disregarded, however, it appears that the majority of the rates fall into three fairly distinct groups, the lowest comprising largely those for the white-collar classes, the middle those for the skilled-worker classes, and the highest those for the unskilled laborers. The similarity of the rates for the professional class and those for the two business classes

[6]The writers are indebted to Professor Lowell J. Reed, of Johns Hopkins University, for suggesting the following approximation to the standard error of our rates:

$$\sigma = \frac{\sqrt{(\sigma_1 w_1)^2+(\sigma_2 w_2)^2+(\sigma_3 w_3)^2}}{w_1+w_2+w_3}$$

where σ_1, σ_2, and σ_3 are the standard errors of the ratios of births to married years for each component age group, and w_1, w_2, and w_3 are the per cent of women in the whole study who were in each age group. Since the number of births for any one age group was small compared with the number of married years, σ_1, σ_2, and σ_3 were computed by the formula $\sigma = \sqrt{\frac{pq}{n}}$ where p equals the number of births per married year, and $q = 1 - p$. The validity of this method of approximating the standard errors of the adjusted rates was tested by drawing twelve random samples of 200 cases each from the 1,944 carpenters' wives, computing the adjusted ratios for each sample, and comparing the standard deviation of their scatter with their standard errors obtained by means of the above formulas. The standard deviation of the rates computed for the samples was 10.5 ± 2.1, and the standard errors of the rates computed by the formulas range from 9.6 to 10.8.

was in part due, as has been shown in an earlier study, to the fact that our present index is unaffected by the relatively late marriages of professional people.[7] The clerks and semi-skilled workers constituted respectively the low-income groups of the white-collar and skilled-worker classes, but their birth rates were not characteristically higher.

When we come to consider specific occupational groups, it is possible only to speculate as to the reasons for the variation in the birth rates. If groups with similar characteristics have similar birth rates, inferences may be drawn, but such inferences must be in the nature of provisional hypotheses, which can be tested only by more precisely controlled investigations. The reader must also bear in mind the nature of our basic data. They were collected in 1910 and give the total number of children born prior to that date to married women then under 50 years of age. The occupations reported for the husbands were those followed at the time of the census. Their characteristics and requirements differed in some cases from those of the same occupations now. Moreover the occupations reported in 1910, especially in the case of the older groups, were not necessarily those followed by the husbands during the most fertile years of married life. Similarly, the families considered were living in the larger cities when enumerated, but we have no way of knowing the length of their residence in those cities. Since the period under consideration was one of heavy migration from country to city, many of the families observed must have moved to the city after at least some of their children were born.

In the professional class the birth rates for dentists and physicians were conspicuously low, and those for lawyers, teachers, and clergymen were high. It is possibly significant

[7]Notestein, Frank W.: Social Classes and the Birth Rate. *Survey Graphic*, April, 1931, xix, No. 1, pp. 38 *ff*.

that the least fertile occupational groups were also the groups likely to be most familiar with contraceptive techniques. The high birth rates for lawyers and school teachers are particularly striking. In the period under consideration, the education of both groups was substantially less expensive than that of physicians, but not less expensive than that of dentists. School teachers could begin earning at least a regular salary as soon as their training was completed, and lawyers were in a position to supplement their professional fees by a variety of business activities. Probably both the dentists and physicians had greater difficulty in securing a regular income in the early years of their practice. Nevertheless, in view of the similarity of their standards of living, of their positions and obligations in the community, and, presumably, of their social backgrounds, it is somewhat surprising to find physicians and dentists among the least fertile groups considered, and lawyers and school teachers, together with clergymen, among the most fertile occupations of the white-collar classes.

The traditional clergyman's family leads one to expect a high birth rate for the group. It would doubtless have been higher in relation to the other professions and lower in relation to the remaining occupations, if the influence of difference in marriage age had not been eliminated. The relatively high fertility of clergymen is often ascribed to their hesitancy to practice contraception and to their sense of the obligation to "be fruitful." Conceivably a different factor is involved. Many clergymen begin both their professional and married life in the country or small town where large families are relatively common, and only receive a call to the city after their families are well on the way toward completion. It is possible, therefore, that in observing city clergymen, we are observing an unusually large proportion of rural or semirural families which moved to the city too late to be influenced by

an urban environment. Much the same thing may have occurred in the case of school teachers. If the migration in these two groups was larger than that in other occupations of the class, their birth rates were not surprisingly high, especially when contrasted with that for lawyers.

The proprietary class had two occupational groups with conspicuously low birth rates. One of these, the druggists, whose birth rate was significantly lower than those for the other retail merchants, like the dentists and physicians of the professional class, probably had more than a lay knowledge of contraception. They also had long and irregular working hours and, doubtless, an interrupted home life. This latter characteristic was also common to the other low-birth-rate group of the class, comprising hotel, restaurant, cafe, lunch room, and saloon keepers.

There is no evidence that the higher-income groups of the proprietary class were characteristically either more or less fertile than those with lower incomes. The rates for brokers and bankers, for example, were not significantly different from those for insurance agents and retail dealers (except grocers and druggists), and the rates for manufacturers, officials of manufacturing, and managers of manufacturing were not significantly different from those for grocers and real estate agents. The rate for railroad conductors was the second highest in the class, although it was not significantly different from that of most of the other proprietary occupations. Interestingly enough, it was virtually the same as that for brakemen, from whom conductors are promoted, and was not significantly different from those for locomotive engineers, and flagmen, switchmen, and yardmen in the skilled and semiskilled classes. An even more striking example of the relation of early occupation to fertility is found in the birth rate for builders and building contractors. The rate

was significantly higher than that for any group in the proprietary class, and was not significantly different from those of any of the artisan builders for whom data are presented. The explanation is, of course, simple enough. Most of the contractors began as artisans. It appears that neither their "success" nor the factors inherent in it served to affect the fertility of the group.

Two of the clerical groups have almost the same fertility as higher income groups of the proprietary class which had similar working environments and were in the same line of advancement. The birth rate for salesmen and clerks in stores was virtually identical with that for the largest group of retail dealers, and the rate for "other clerks" was not significantly different from rates for bankers, manufacturers, and officials and managers of manufacturing. Commercial travelers appear to have been somewhat less fertile than retail dealers, but this may well reflect the interrupted home life of a conspicuously mobile group. Only two groups of the class, shipping clerks and draftsmen, had relatively high rates. The former was not definitely a white-collar occupation, and the rates for both groups were based on a relatively small number of cases.

Barbers and hairdressers, and the building and heavy metal trades were respectively the least and the most fertile groups of the skilled-worker class. The birth rate for barbers was not significantly different from those for druggists, keepers of hotels, restaurants, et cetera, and commercial travelers; and like these rates, may reflect the influence of long and irregular working hours on the home life of the group. The barber's occupation is definitely skilled, but like other domestic and personal service groups, his working environment is in many respects that of the white-collar classes. The fact that their occupation brings them in daily contact with mem-

bers of the white-collar classes, whose conspicuous consumption they have a vested interest in maintaining, perhaps influences their own social and economic standards and indirectly their fertility. The rates for artisan builders (and building contractors) are equalled or exceeded only by those for semiskilled operatives in factories and shops; unskilled laborers; blacksmiths, forgemen, and hammermen; and moulders, founders, and casters of metal. It is perhaps suggestive that these groups were without exception engaged in occupations requiring unusual physical exertion.

Waiters and bartenders of the semiskilled class, like barbers, are neither a strictly manual-worker nor white-collar group. Their birth rate further illustrates the characteristically low fertility of persons engaged in domestic and personal service. It was not significantly different either from the rate for barbers or from that of the higher income group, to which they may hope to advance, comprising keepers of hotels, restaurants, et cetera.

The birth rates for the steam and street railroad trainmen were neither significantly different from each other nor from those of a number of other skilled and semiskilled workers. They were somewhat lower than those for the building trades, but were not different from those for machinists. Like the relatively infertile domestic and personal service groups, their home life must have been interfered with by their working hours, but unlike those groups they were not, as a whole, thrown into close personal contact with the white-collar classes.

Only a few occupational groups of the unskilled-laborer class were represented by enough cases to warrant the presentation of birth rates. These few were, without exception, more fertile than the majority of skilled or semiskilled workers. As in the case of the skilled workers, the rates for the building and heavy metal workers were the highest in the class.

SUMMARY

This inquiry into the fertility of fairly homogeneous occupational groups of the native-white population of northern cities leads to a number of tentative generalizations, which, though far from conclusive, should point the way to more precisely controlled investigations.

The wide range of variation in the birth rates for the occupational groups of each broad class indicates that factors other than social-economic status affect fertility.

When the more extreme cases are disregarded, however, it appears that, even apart from the influence of differences in marriage age, there was an inverse association between fertility and the social status of the white-collar, skilled-worker, and the unskilled-laborer classes, as usually ranked.

Persons in different income groups but in the same line of occupational advancement had similar birth rates. The validity of this inference will be difficult to test until we have data relating to the entire occupational history of the husband.

There is no evidence that persons of higher economic status had characteristically different birth rates from those of the lower economic status in the same social classes.

The infertility of the three groups which were probably the best informed regarding contraceptive techniques suggests the influence of birth control.

An interrupted home life may have accounted, in part, for the infertility of certain occupational groups. Perhaps it was the principal cause of the low birth rates for commercial travelers, but the similarity of the rates for railroad trainmen and those for certain other skilled workers suggests that some additional factor was involved in the marked infertility of the domestic and personal service groups.

High fertility appears to have been characteristic of persons whose occupations required unusual physical exertion.