The Relative Supplies *from* Town *and* Country Families, *to the* Population *of* Future Generations. *By* Francis Galton, F.R.S.

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This is an inquiry into the relative fertility of the labouring classes of urban and rural populations, not as regards the number of children brought into the world, but as regards that portion of them who are destined to live and become the parents of the next generation. It is well known that the population of towns decays, and has to be recruited by immigrants from the country, but I am not aware that statistical measurement has yet been attempted of the rate of its decay. This inquiry is part of a larger one, on the proportionate supply to the population from the various social classes, and which has an obvious bearing on investigations into the influences that tend to deteriorate or to improve our race. If the poorer classes, that is to say, those who contain an undue proportion of the weak, the idle, and the improvident, contribute an undue supply of population to the next generation, we are justified in expecting that our race will steadily deteriorate, so far as that influence is concerned. The particular branch of the question to which I address myself in this memoir is very important, because the more energetic of our race, and therefore those whose breed is the most valuable to our nation, are attracted from the country to our towns. If, then, residence in towns seriously interferes with the maintenance of their race, we should expect the breed of Englishmen, so far as that influence is concerned, to steadily deteriorate.

I am well aware that the only perfectly trustworthy way of conducting the inquiry, is by direct investigation. I mean that a large number of women living under urban or rural conditions of life, and the same number in either case, should be noted as they arrived at a marriageable age, say æt. 20, and that the number of children they bear, who survive to a marriageable age, should also be noted. We might do this prospectively, but it is impossible, from want of historical data, to work backwards. I therefore have had recourse to an indirect method, based on a selection from the returns made at the last census, which I submit to the criticism of others as appearing to myself calculated to give a fair approximation to truth. The principle on which I have proceeded, is this:—

I find (A) the number of children of an equal number of urban

and rural mothers, within certain limitations of age, and I correct the results on the following grounds, which I will shortly explain more fully, namely, (B) the relative mortality of the two classes between childhood and maturity; (C) the relative mortality of the mothers during childbearing ages; (D) relative celibacy; and (E) the span of a generation. It will be seen that B and C are substantial corrections, but that I have not occasion to pay regard to D and E.

Returns were made in the census schedules of the names and ages of the members of each "family," by which word we are to understand those members of the family in its ordinary sense, who are alive and resident in the same house with their parents. Where the mothers are still young, the children are necessarily very young and nearly always (in at least those classes who are unable to send their children to boarding schools), live at home. If, therefore, we limit our inquiries to the census families of young mothers, the results will be identical within the same limits of age with what we should have obtained if we had direct means of ascertaining the number of their living children. The limits of age of the mothers which I adopted in my selection were, 24 and 40 years. Had I to begin the work afresh, I should prefer the period from 20 to 35, but I have reason to feel pretty well contented with my present data.

In deciding on the districts to be investigated, it was important to choose well marked specimens of urban and rural populations. In the former, a town was wanted where there were various industries, and where the population was not increasing. A town where only one industry was pursued, would not be a fair sample, because the particular industry might be suspected of having a special influence, and a town that was increasing would have attracted numerous immigrants from the country, who are undistinguishable as such in the census returns. Guided by these considerations, I selected Coventry, where silk weaving, watchmaking, and other industries are carried on, and whose population has scarcely varied during the last decade. It is an open town, in which the crowded alleys of larger places are not frequent. Its urban peculiarities are therefore minimised, and its statistical returns would give a picture somewhat too favourable of the average condition of life in towns. For specimens of rural districts, I chose small agricultural parishes in Warwickshire.

By the courteous permission of Dr. Farr, our president, I was enabled to procure extracts from the census returns concerning 1,000 "families" of factory hands at Coventry, in which the age of the mother was neither less than 24 nor more than 40 years, and concerning another 1,000 families of agricultural labourers in rural

parishes of Warwickshire, under the same limitations as to the age of the mother. When these returns were classified (see Table I, p. 24), I found the figures to run in such regular sequence as to make it certain that the cases were sufficiently numerous to give trustworthy results. It appeared that:—

(A). The 1,000 families of factory hands comprised 2,681 children, and the 1,000 of agricultural labourers comprised 2,911; hence, the children in the urban "families," the mothers being between the ages of 24 and 40, are on the whole about 8 per cent. less numerous than the rural. I see no reason why these numbers should not be accepted as relatively correct for families, in the ordinary sense of that word, and for mothers of all ages. An inspection of the table does indeed show that if the selection had begun at an earlier age than 24, there would have been an increased proportion of sterile and of small families among the factory hands, but not sufficient to introduce any substantial modification of the above results. It is, however, important to recollect that the small error, whatever its amount may be, is a concession in favour of the towns.

(B). I next make an allowance for the mortality between childhood and maturity, which will diminish the above figures in different proportions, because the conditions of town life are more fatal to children than those of the country. No life tables exist for Coventry and Warwickshire; I am therefore obliged to seek elsewhere to learn the amount of the allowance that should be made. The life tables of Manchester* will afford the necessary data for towns, and those of the healthy districts† will suffice for the country. By applying these, we could learn the number of the children of ages specified in the census returns who would attain maturity. I regret extremely that when I had the copies taken, I did not give instructions to have the ages of all the children inserted; but I did not, and it is too late now to remedy the omission. I therefore proceeded as follows to make a very rough, but not unfair, estimate. The average age of the children is about 3 years; now, taking 25 years as representing the age of maturity, it will be found that 74 per cent. of children in Manchester, of the age of 3, reach that of 25, while 86 per cent. is the proportion in the healthy districts. Therefore, if my rough method of correction be accepted as approximately fair, the number of adults who will be derived from the children of the 1,000 factory families should be reckoned at $2681 \times \frac{74}{100}$, and those from the 1,000 agricultural at $2911 \times \frac{86}{100}$.

* "Seventh Annual Report of Registrar-General."

† Healthy Districts Life Table, by Dr. Farr. "Phil. Trans. Royal Society," 1859.

(C). We ought to compare the families of the same number of urban and rural women who had reached the age of 24. Many of them will not marry at all; I postpone the consideration of these to the next paragraph. Many of the rest will die before they reach the age of 40, and more of them will die in the town than in the country. It appears from data furnished by the above-mentioned tables, that if 100 women of the age of 24 had annually been added to a population, the number of those so added, living between the ages of 24 and 40 (an interval of seventeen years) would be 1,539 under the conditions of life in Manchester, and 1,585 under those of the healthy districts. Therefore the factors to be applied respectively to the two cases, on account of this correction, are $\frac{1539}{17 \times 100}$ and $\frac{1585}{17 \times 100}$.

(D). I have no trustworthy data for the relative prevalence of celibacy in town and country. All that I have learnt from the census returns is, that when searching them for the 1,000 families, there were noted 131 bachelors between the ages of 24 and 40, among the factory hands, and 144 among the agricultural labourers. If these figures be accepted as correct guides to the amount of celibacy among the women, it would follow that I must be considered to have discussed the cases of 1,131 factory, and 1,144 agricultural women, when dealing with those of 1,000 mothers in either class. Consequently that the respective corrections to be applied, are given by the factors $\frac{1000}{1131}$ and $\frac{1000}{1141}$. These would have so small an effect on the relative number of the two classes, as not to be worth applying, for it would be less than 1 per cent., and I do not like to apply it, because it seems to me erroneous and to act in the wrong direction, inasmuch as unmarried women can obtain employment more readily in the town than in the country, and celibacy is therefore more likely to be common in the former than in the latter.

(E). The average length of a generation in town and country, must not be omitted from our consideration. We, however, know that the correction on this ground will be insignificant, because the length of a generation is found to be constant under very different circumstances of race, and therefore we should expect it to be equally constant in the same race under different conditions. I find that one-half of the mothers in my schedule are under 31·25 years of age in the town and 32·5 in the country, but this difference of $1\frac{1}{4}$ years is fully compensated by the effects of the greater mortality of the children of the former. The omission to which I referred in (B), prevents an exact calculation being made. If the ages of the children had been copied, it would have been easy to have made

the necessary reductions, and to have obtained a table whence the average age of mothers of children destined to reach adult life could have been calculated for town and country.

Let us now sum up the results. The corrections are not to be applied for (D) and (E), so we have only to regard (A) × (B) × (C), that is—

$$\frac{2681 \times \frac{74}{100} \times \frac{1539}{1700}}{2911 \times \frac{86}{100} \times \frac{1585}{1700}} = \frac{1796}{2334} = \frac{77}{100}.$$

In other words, the rate of supply in towns to the next adult generation is only 77 per cent., or, say, three-quarters of that in the country. In two generations the proportion falls to 59 per cent., that is, the adult grandchildren of artisan townsfolk are little more than half as numerous as those of labouring people who live in healthy country districts.

TABLE I.—*Census Returns of* 1,000 *Families of Factory Hands in Coventry, and the Age of the Mother and the*

Age of Mother.	Number of Children in Family.									
	0.		1.		2.		3.		4.	
	Factory.	Agricultural.	Factory.	Agricultural.	Factory.	Agricultural.	Factory.	Agricultural.	Factory.	Agricultural.
24 to 25	28	17	40	31	24	32	12	10	2	—
26 „ 27	19	18	36	24	36	28	23	26	8	8
28 „ 29	18	17	32	16	20*	33	36	23	14	23
30 „ 31	13	4	23	18	24	21	28*	31	18	22
32 „ 33	18	11	16	14	19	13	22*	27	23	26
34 „ 35	14	15	11	6	17	16	28	18	31	34
36 „ 37	12	17	4	11	10	13	22	14	16	20
38 „ 39	8	6	9	15	14	17	16	21	22	23
40.....	8	7	3	10	8	9	13	14	8	10
Total within outline.....	96	67	158	109	116	111	171	149	—	—
Total between outlines	42	45	16	36	56	71	29	35	142	166
Total beyond outline.....	—	—	—	—	—	—	—	—	—	—
Total	138	112	174	145	172	182	200	184	142	166

* These three cases are anomalous, the factory being less than the agricultural. In the neither of these can be correct; certainly not the first of them.

Note.—It will be observed that within the outline, that is, in the upper and left hand predominate, while the agricultural are the most numerous between the outlines, that is are from four to five in number. The two are equally numerous without the outlines, that

1,000 *Families of Agricultural Labourers in Warwickshire, Grouped according to Number of Children in the Family.*

Number of Children in Family.										Age of Mother.
5.		6.		7.		8.		9.		
Factory.	Agri-cultural.	Factory.	Agri-cultural.	Factory.	Agri-cultural.	Factory.	Agri-cultural.	Factory.	Agri-cultural.	
1	1	—	—	—	—	—	—	—	—	24 to 25
—	—	—	—	—	—	—	—	—	—	26 „ 27
6	6	4	1	2	—	—	—	—	—	28 „ 29
12	15	2	5	—	2	—	1	—	—	30 „ 31
21	25	9	5	—	1	—	2	—	—	32 „ 33
14	18	12	9	5	3	—	1	—	—	34 „ 35
15	25	12	10	4	5	5	2	—	—	36 „ 37
14	22	10	15	6	7	—	2	1	—	38 „ 39
7	11	3	9	7	7	2	1	—	—	40
—	—	—	—	—	—	—	—	—	—	Total within outline
90	123	—	—	—	—	—	—	—	—	Total between outlines
—	—	52	54	24	25	7	9	1	—	Total beyond outline
90	123	52	54	24	25	7	9	1	—	Total

instance of 20—33, the anomaly is double, because the sequence of the figures shows that

of the table, where the mothers are young and the children few, the factory families especially in the middle of the table, where the mothers are less young, and the families is, to the right of the the table, where the families are large.

TABLE II.

	Number of Families.		Number of Children.	
	Factory.	Agricultural.	Factory.	Agricultural.
Within outline	541	436	903	778
Between outlines	375	476	1,233	1,562
Beyond „	84	88	545	571
Total	1,000	1,000	2,681	2,911