

**THE STANDARD OF LIVING IN MONTREAL,  
CANADA, 1850-1900**

The effects of industrialization upon the living standards of ordinary people have long been disputed. From Marx and Engels to Hobsbawm and Thompson the pessimistic view has been that the great transformation undermined conditions of life for virtually all early industrial workers in developing societies, Great Britain in particular. On the other hand optimists such as Macaulay, Clapham, and more recently Hartwell, while admitting that workers experienced low standards of living during the early industrial era, have held that economic development gradually improved the lot of most common folk (1). One reason why this disagreement has never been resolved is that the various statistical indices created to describe past living standards — be they price, wage, production, consumption, or demographic series — have seldom been as reliable or as closely tied to real conditions as their compilers might have wished. The study of infant birth weights offers a new and potentially rewarding approach to the standard of living problem because of the link between the weight of a newborn child and its mother's condition during pregnancy, especially her diet.

Three groups of factors collectively determine weight at birth : maternal health, pregnancy history, and the genetic or constitutional characteristics of both mother and child. Although it was not generally recognized until well into the twentieth century, nutrition is a central element in the first of these factors and has a direct bearing upon fetal growth. High calorie diets are associated with high maternal weight gain during pregnancy and high infant birth weights. Conversely, significant food deprivation is linked with lower neonatal weights. During a six month famine in western Holland in the winter of 1944-45 the mean decline in the weights of newborn infants was more than 300 grams. An average drop of over 500 grams was recorded in Leningrad during the famine seige of 1941 to 1943 (2).

Numerous other factors also affect maternal health and, in turn, the weight of a woman's offspring. Smoking, high alcohol intake, and some forms of drug consumption slow fetal development. Many debilitating medical conditions occurring in pregnancy influence the unborn, including diabetes and heart disease. Social and economic rank, marital status, and education levels are also correlated with a mother's health and thus with the weight of a child which she bears (3).

Factors associated with the history of a pregnancy, the second group of variables, also influence neonatal weights. Complications such as toxemia, uterine infection, incompatible blood types, hypertension, and congenital malformations can retard gestation. Parity and child spacing may have an effect. Those placed second, third, and fourth in the family constellation, and those born more than two years apart, are on average somewhat heavier than others. Premature and multiple births, too, are also normally associated with low weight at birth.

The third group of factors affecting newborn weights consists of genetic or constitutional influences. Race and ethnicity are linked with minor variations in birth weight means. A mother's individual genetic inheritance is also bestowed upon her child. Thus larger mothers are likely to bear larger children while smaller women most frequently produce smaller babies. A woman's age and the sex of her child are other relevant variables. Women bear heavier children between the ages of 20 and 35, and of the two sexes males are usually slightly larger.

The birth weights examined in this study were gathered at the University Lying-in Hospital in Montreal, Canada from 1851 to 1900 (4). Although not complete, the records of the hospital were carefully kept throughout most of this period. Normally 80 to 200 children were born there each year, the number gradually increasing over time. This constituted two to three per cent of all births in the city. Like most nineteenth century maternities the ULIH was a charitable organization. Its patients were almost invariably poor, three fifths of them being unmarried. Most of them were English speaking. Some significant changes occurred in the social composition of the patient body during these years. Irish Catholics predominated until the later 1860's, but thereafter the Canadian born, the majority of them being Protestants, formed the largest group. The number of married patients roughly equalled the unmarried during the early 1850's but soon dropped sharply to about one in four. These features apart, we know very little about the social characteristics of the patients in the hospital.

All full term, single birth, live babies for whom weights were noted between 1851 and 1900 were selected for analysis. The means and standard deviations of these weights are recorded in the following table :

Years	Number of Infants	Mean Birth Weights (grams)	Standard Deviation (grams)
1851-55	418	3616	541
1856-60	205	3537	485
1861-65	320	3547	532
1866-70	353	3606	500
1871-75	442	3572	555
1876-80	396	3514	540
1881-85	314	3395	513
1886-90	228	3317	536
1891-95	219	3291	462
1896-1900	296	3209	553
Total/Overall mean	3191	3481	543

As the table reveals, during the first thirty years of this period the mean weights of the newborns fluctuated within a range of 100 grams, with a trend toward gradual decline. They fell an additional 200 grams during the 1880's and a further 100 grams during the last decade of the century. The overall decline in mean weights for the period was just over 400 grams, a drop of 11.3 per cent.

Owing to limitations of space, the experience of various cohorts in the hospital population can only be summarized here. All groups of women delivered significantly lighter children over time whatever their national origins. Irish mothers bore slightly heavier infants than Canadian women, the two accounting for three fourths of the sample. The weights of babies delivered by other nationalities fluctuated somewhat erratically, probably owing to the small size of the samples examined. But any ethnic differences were relatively minor when compared with the substantial downward trend for all national groups. There were no significant discrepancies between the weights of children born of Catholic and Protestant

mothers, and there was only minor variation when religion and national origin were combined. Younger and primiparous women delivered somewhat lighter than average babies but, unexpectedly, those aged over 35 and those bearing fifth or subsequent children, had the heaviest infants of all. (Perhaps older and multiparous women enjoyed superior diets because they had children in the work force who could make significant contributions to family income.) As anticipated, unmarried women had somewhat lighter infants than did married. But whatever factor is isolated, all segments of the hospital population exhibited the same trend in about the same degree : a general, substantial decline in mean birth weights.

Why did these birth weight means drop so sharply ? Throughout the entire period the hospital continued to draw its patients from the same social and economic strata of Montreal society. Thus no change occurred in the basic character of the sample. There were some distributional changes within the patient body ; a small increase occurred in the proportion of teen age mothers, as did a larger one in the number of unmarried women. But these changes had only minor effect on the observed trend. The ratio of exceptionally small infants (under 2500 grams) increased over time. But when these cases are subtracted from the sample the drop in mean weights remains striking — some 330 grams. The smoking factor can also be eliminated, for Canadian Women seldom smoked until cigarettes became fashionable after the first World War.

Other potential influences, however, cannot be so easily dismissed. In the absence of any information on alcohol and drug use the possibility exists that these may have contributed to the decline, though consumption would have had to increase enormously to account for much of the trend. Nor is there any evidence regarding changes in pregnancy complications and medical debilities apart from a slight rise in still births toward the end of this period, itself not proof of any major increase in pathological conditions during pregnancy. Without any indication of the prenatal medical condition of the hospital's patients, neither the presence nor absence of significant changes in maternal health can be assumed, although the possibility of both must be admitted. Nor is information available on maternal stature, save a few reports of late nineteenth century anthropometrists who placed mean adult female heights in North America and Great Britain at between 62.5 and 63.3 inches (5). Perhaps, however, the observed decline in infant birth weight was accompanied by a gradual drop in maternal height.

Whatever the course of maternal health conditions, the complex relationships between diet and well-being, and the growing body of knowledge about the impact of food deprivation upon weight at birth, both strongly suggest that the primary cause of the birth weight decline was nutritional. Because the available evidence is insufficient it is unlikely that this hypothesis can ever be proved conclusively. Nevertheless, the protracted decline in birth weights admits of no other convincing explanation. This being so, the social and economic significance of a 400 gram decline in mean neonatal weights is heightened considerably when the dynamics of fetal weight gain retardation associated with maternal malnutrition are considered. As the Dutch hunger experience revealed, food deprivation must be acute and protracted before it is reflected in the weights of children at birth (6). Seen in this light, the continuous decline in birth weights measured at the ULIH suggests a long history of increasing malnutrition among poor women in Montreal, including possible intergenerational transmission of its effects.

As food supplies in central Canada were ample, and as their costs declined by at least 30 per cent during the last third of the nineteenth century (7), dearth offers no explanation for this phenomenon. The problem was rooted in income maldistribution, itself derived from major economic and demographic changes occurring in the city. As Montreal became progressively industrialized from the 1840s onward, most industrial employment came to be concentrated in a few low

wage industries which produced consumer goods for small, relatively poor, tariff-protected local and national markets (8). These industries had low rates of value added and they relied heavily upon cheap female and child labour. The role of women in the labour force is particularly relevant to this study. Between 1850 and 1880 the rate of growth of female employment in industrial occupations seems to have been slightly higher than that of the industrial work force as a whole. During the next twenty years, however, the urban economy created very few additional jobs in the manufacturing sector for women despite a 70 per cent increase in the civic population. In broader terms the available evidence indicates that, in working class Montreal generally, real incomes were low (9). Sustained high rates of urban population growth — averaging three per cent per year from 1850 to 1900 — also limited the possibility of general improvements in living standards.

As this birth weight study reveals, poor pregnant women in Montreal suffered grievously during this period of population growth and economic change. But what do these findings tell us of the wider experience of working people in the city during the early industrial years? Here the evidence is only suggestive. Perhaps the most important indication is that both married and unmarried patients experienced similar relative declines in the weights of the children which they bore, although the former continually delivered somewhat heavier children. Married patients were probably much more representative of the working class community than were the unmarried and, if this is so, the birth weight declines point toward a more general fall in working class nutritional standards toward the end of the nineteenth century.

Finally, was the Montreal experience atypical or was it representative? At this juncture we do not know. No similar studies have been published which explore the birth weight histories of other nineteenth century industrializing cities, and until they are this must remain an open question. In the meantime, the Montreal evidence strongly supports the pessimistic conviction that declining living standards were the lot of the first industrial workers.

#### NOTES

- (1) A. Taylor, ed., *The Standard of Living in Britain in the Industrial Revolution* (London, 1975).
- (2) Z. Stein et al., *Famine and Human Development: The Dutch Hunger Winter of 1944-45* (New-York, 1975), 92-96; A. N. Antonov, « Children Born during the Siege of Leningrad in 1942, » *Journal of Pediatrics*, XXX (1947), 250-59.
- (3) A. M. Thomson, et al., « The Assessment of Fetal Growth, » *Journal of Obstetrics and Gynaecology of the British Commonwealth*, 75 (September, 1968), 903-16; D. M. Reed and F. J. Stanley, eds., *The Epidemiology of Prematurity* (Baltimore, 1977); J. Metcalf, « Association of Fetal Growth with Maternal Nutrition, » *Human Growth*, vol. 1, *Principles and Prenatal Growth*, F. Falkner and J. M. Tanner, eds., (New-York, 1978), 415-60.
- (4) University Lying-in Hospital, Register of Patients, 1843-1905, McGill University Archives, Montreal, Canada.
- (5) H. P. Bowditch, « The Physique of Women in Massachusetts, » *Government of Massachusetts, Twenty-First Annual Report of the State Board of Health of Massachusetts* (1890), 287-304; A. Hunter, « The Medico-Actuarial Investigation of Mortality of American and Canadian Life Assurance Companies, » *Journal of the Institute of Actuaries*, XLVI (October, 1912), 384-94.
- (6) Stein, 92-96.
- (7) K. W. Taylor and H. Michell, *Statistical Contributions to Canadian Economic History* (Toronto, 1931), II, 47-52, 55.
- (8) P.-A. Linteau, et al., *Histoire du Québec Contemporaine* (Montréal, 1979), 138-62.
- (9) J. Bernier, « La Condition des travailleurs, 1851-1896, » J. Hamelin, ed., *Les travailleurs québécois, 1851-1896*, (Montréal, 1973), 31-60; B. Bradbury, « The Family Economy and Work in an Industrializing City: Montreal in the 1870's, » *Canadian Historical Association, Historical Papers*, 1979, 71-96.

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