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Title	The heights of Clonmel prisoners, 1845-9 : some dietary implications
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Publication date	1990
Publication information	Ó Gráda, Cormac. "The Heights of Clonmel Prisoners, 1845-9 : Some Dietary Implications" (1990).
Series	UCD Centre for Economic Research Working Paper Series, WP90/9
Publisher	University College Dublin. School of Economics
Item record/more information	http://hdl.handle.net/10197/1480
Notes	A hard copy is available in UCD Library at GEN 330.08 IR/UNI

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P/90/9

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some dietary implications

Working Paper No WP90/9

CENTRE FOR ECONOMIC RESEARCH

University College Dublin

Department of Political Economy

THE HEIGHTS OF CLONMEL PRISONERS, 1845-9: SOME DIETARY IMPLICATIONS¹

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Modern anthropometrical research² highlights the clearcut association between the average height of a population and its net nutritional status, i.e. its food intake relative to energy expended. It also shows how dietary intake affects the growth pattern to final adult height: the tempo of growth to maturity is faster in well-fed populations. Mean height is now widely used by the World Health Organization and other international agencies as a gauge of health and nutritional status in the less developed world. In response to these findings, quantitative historians have derived statistical algorithms and applied them to historical heights data.³ Such data are plentiful for the eighteenth and nineteenth centuries, particularly in military archives, and have proved a promising source for research into the health and wellbeing of the populations producing the data. The work has produced some interesting findings, not least about the pre-famine Irish. Here perhaps the most striking result is that in the late eighteenth and early nineteenth centuries the Irish were taller than the English.⁴ Admittedly, the claim does not refer to the populations as a

¹The research underlying this paper was supported by the Arts Faculty Research Fund.

²J.M Tanner, *Foetus to Man: Physical Growth from Conception to Maturity* London: Open Books ; Eveleth and Tanner, *Worldwide Variation in Human Growth* Cambridge, 1976.

³Notably John Komlos, 'The Standard of Living and Economic Development in the Eighteenth Century', *American Historic Review*, vol. 90(5) (1985), pp. 1149-61; Lars G. Sandberg and Richard H. Steckel, 'Overpopulation and Malnutrition Rediscovered: Hard Times in 19th-Century Sweden', *Explorations in Economic History*, vol. 25(1) (1988), p. 1-19; Roderick Floud, Kenneth Wachter, and Annabel Gregory, *The Height of the English* (Cambridge, 1990).

⁴Joel Mokyr and C. Ó Gráda, 'The Height of Englishmen and Irishmen in the 1770s: Evidence from the East India Company Army', *Eighteenth-Century Ireland* vol. 4 (1988), pp. 83-92.; J. Mokyr and C. Ó Gráda, 'The Heights of

whole: it refers mainly to those sections supplying recruits to various armies and to convict ships. Soldiers typically came from poor, working-class backgrounds, though the quality of the recruits varied according to the state of the labour market. Nicholas and Shergold⁵ have argued for the greater representativeness of their sample of Irish and British convicts reaching New South Wales between the 1780s and the 1830s.

The implication that the pre-famine Irish may have been healthier and better fed than the English may come as a surprise, especially given the apocalyptic malthusian tone of the bulk of the historiography. The notion that *phytophthora infestans* was only the catalyst for a disaster around the corner in any case dies hard. Without seeking to deny pre-famine Irish poverty, the results of these recent heights studies and related studies of birth-weights - which also suggest that the Irish poor were relatively well fed⁶ - leave room for less doleful counterfactuals. Of course, this result must not be stretched too far, because the most plausible explanation for it is Irish reliance on the potato. Since the potato was an inferior good (i.e. consumption declined as income rose), the outcome is also consistent with Irish incomes being lower than the British.

the Irish and the British During the Napoleonic Wars: Evidence from the E.I.C. Army', UCD Centre For Economic Research Working Paper 90/3; Stephen Nicholas and Richard Steckel, 'Heights and Health of Workers During the Early Years of British Industrialisation, 1770-1815' (mimeo, University of New South Wales, 1990); Roderick Floud, Kenneth Wachter and Annabel Gregory, *Height, Health and History: Nutritional Status in the United Kingdom, 1750-1980* (Cambridge, 1990), pp. 200-2.

⁵Stephen Nicholas and Peter R. Shergold, 'Unshackling the Past', in Stephen Nicholas, *Convict Workers: Re-interpreting Australia's Past* (Sydney, 1988), pp. 7-8.

⁶W. Peter Ward and Patricia Ward, 'Birth Weight in Industrializing Montreal', *American Historical Review*, vol. 89 (1985), 324-45; Claudia Goldin and Robert Margo, 'The Poor at Birth: Weight and Infant Mortality in Philadelphia's Almshouse', *Explorations in Economic History*, 26(3) (1988), 360-79.

The Clonmel Prison Registers, 1845-9:

So far height studies of the Irish have relied largely on military or convict transportee data. Both sources suffer from potential selection biases. The quality of men recruited by the armed forces fluctuated with the state of the labour market, making time-series inferences very tricky. Questions have been raised also about the representativeness of transported convicts. It is important therefore to check other possible sources. One promising source, which has only recently become available to researchers, is the registers of several nineteenth-century Irish prisons. Some of these provide the same kind of data as the convict and army records. This paper relies on one prison register, that of Clonmel between 1845 and 1850, for added insight.⁷ It is based on an analysis of the age, height, sex, literacy, and religion of over four thousand people committed for trial in Clonmel between March 1845 and February 1848.

Clonmel was a large garrison town at this time, with a population of over thirteen thousand in 1841.⁸ Situated in a relatively prosperous agricultural region, the town itself was in decline in the pre-famine era. The Clonmel region was extremely 'disturbed', riven by faction fighting. Though their place of origin is not given, it is clear from surnames and other evidence that the prisoners hailed from the town and its hinterland. Their alleged crimes ranged from "rolling a car on a footpath" through "entering house of John Dalton and killing three hens and cocks his property" to being "wandering strangers", "trespass by pulling carrots", "stealing turnips", to greivous crime such as murder and rape. "Breaching the borough byelaws", "being a nuisance on the town", or "vagrancy" were

⁷National Archives (Dublin), VI-1-16.

⁸For some background see Patrick C. Power, *History of South Tipperary* (Cork, 1989).

common too, the town providing year-round custom in the mid-1840s for about twenty prostitutes. Indeed recidivism was so common among these women that I had to guard against including each of them no more than once.⁹ Rural conflict is reflected in the crimes too. Since the period in question straddles the worst years of the Great Famine, it seems worth looking for an effect here.

The selection biases are different than with military data. Were these people a criminal lumpenproletariat, or representative of the population at large ? The register favours the latter interpretation. It shows that the great majority of those committed rarely dabbled in crime; for nearly all except the prostitutes this was their first recorded brush with the law. The most common crimes - assault, trespass, crimes of passion - hardly indicate endemic criminality. Even those who donned the disguise of the factions or the agrarian societies by night - numerous in pre-famine Tipperary - were farmers and labourers by day. The proportions literate and protestant (see below) also speak for the data's broad reach. An important feature of the data is that about one third of those in the sample are women.¹⁰ Unlike military heights data, the register data suffer from no cut-off or shortfall problem at the lower end of the distribution; indeed, the standard chi-square test is consistent with the hypothesis that the heights of adult men and women (i.e. those aged 22-39 years) were normally distributed.

The ages of male prisoners ranged from nine years to eighty years,

⁹In the mid-1840s 20 to 30 women lived as prostitutes in Clonmel. They were mostly in their early twenties, Catholic, illiterate, and (to judge from their surnames) local women. Some of the women appearing were doing so for the twentieth time. Typically they were fined a few shillings and let go.

¹⁰Only 11.2 percent of convicts sent to New South Wales between 1817 and 1840 were women (Stephen Nicholas (ed.), *Convict Workers: Re-interpreting Australia's Past* (Sydney, 1988), p. 51).

those of women prisoners from ten to sixty. There was a preponderance of people in their late teens and early twenties. The numbers are subject to substantial age-heaping. Heights were typically given to the nearest inch, though with a substantial number to the nearest half-inch and a few to the nearest quarter-inch.

The Results :

1. The people of Clonmel and its hinterland were quite tall by the standards of the mid-nineteenth century. The mean height of adult men (those aged between 22 and 39 years) in the sample was 66.4 inches (see Table 1). This may be compared with the estimates in Table 2, which refer to mean adult male heights for a range of European countries around this time. Nicholas and Steckel¹¹ report 65.96 inches for the rural English (n = 3113) and 65.44 for the urban (n = 1966) in 1770-1815. The result supports the findings of Mokyr and Ó Gráda¹² that pre-famine Irish were 'tall' by contemporary standards. Table 2 provides some data for comparison.

The implication is that these east Munster people had been relatively well fed (in the nutritional sense) in their youth and adolescence. The spread of ages permits some time-series inference. Given the likelihood that the older men included here had 'shed' some height, the outcome is hardly consistent with an effective fall in mean adult heights; men born c. 1820 were at least as tall as those born two or three decades earlier.

¹¹ 'Heights and Health of Workers'.

¹² Mokyr and Ó Gráda, 'The Heights of the Irish and the British During the Napoleonic Wars'.

Table 1: THE HEIGHT BY AGE PROFILE OF CLONMEL PRISONERS 1841-9

(in inches)

Age-band	Men		Women	
	All	'W' Only	All	'W' Only
25-9	66.36 (521)	67.18 (171)	61.50 (176)	62.67 (16)
30-4	66.53 (386)	67.19 (93)	62.40 (160)	61.28 (22)
35-9	65.90 (168)	66.39 (43)	61.15 (39)	...
40-4	66.41 (188)	66.68 (43)	61.52 (105)	61.40 (5)
45-9	65.99 (84)	65.78 (25)	61.36 (28)	...
50-4	65.88 (89)	66.85 (21)	61.67 (27)	...
55-9	66.45 (44)	66.96 (11)	60.88 (8)	...
60 +	65.38 (66)	65.68 (10)	60.97 (15)	...

Note: '...' indicates fewer than five observations. Number of observations in parentheses.

Table 2: Estimates of the Mean Heights of Males in Six European Countries c. 1825-75

Year	Country	Age	Height (cm.)
1845	Denmark	22	166.5
1819-26	France	20	166.0
1855	Norway	22	168.6
1840	Sweden	21	165.1
1875	Bavaria	Conscripts	164.6
1875	Belgium	19-25	165.5

Source: Roderick Floud, 'The Heights of Europeans Since 1750: A New Source for European Economic History', NBER Working Paper No. 1318 (1984). Note that 65 inches equals 165.1 cm.

2. Somewhat over one-fourth of the sample were girls and women. The mean height of women aged 22-39 years was 61.4 inches, so that adult men were on average almost five inches taller than adult women. The difference today about the same.¹³

¹³Tanner, *Foetus to Man*, pp. 13, 150.

3. In the 1841 census forty-four percent of the people of Clonmel (or at least those of them aged five years or more) professed an ability to read and write, and another seventeen percent a rudimentary semi-literacy, i.e. an ability to read only. In Clonmel's rural hinterland, the percentages literate or semi-literate were much lower. In the teeming, largely agricultural baronies of Iffa and Offa East and Middlethird (excluding Clonmel) twenty five percent of the people claimed to be literate, while a further fourteen percent could read. The registers indicate an ability to write by 'W', and an ability to read only by 'R'. The percentages of males and females in these categories are given below. They certainly do not support the belief that those committed for trial were a class apart - they were as likely to be able to read and write as the rest.

Prisoners declaring an ability to write were considerably taller than those who did not. The difference is striking, and applies both to men and to women. However, the effect of literacy on men's height - almost one inch - was more than double that on women's. The outcome is a reminder that in poor societies literacy is a very powerful proxy for income: the cost of even elementary schooling, whether in fees or earnings foregone, bulks large. It also suggests that while Irish dietary patterns were responsible for Irish heights, within Ireland greater consumption of the potato by the poor did not produce taller men.

Cross-tabulating literacy by age is consistent with some improvement in literacy over time. However, the percentage of those aged under twenty years reported literate is probably not comparable with the rest: here the selection bias against school-going is likely to be significant. The profile also suggests, for men at least, that those with only rudimentary literacy were more likely to shed it; the proportion of older people

professing an ability to read only is small.

The data also show, reassuringly, that those professing literacy were less likely to age-heap. Still, age-heaping was pervasive throughout.

Table 3: LITERACY OF CLONMEL SAMPLE BY AGE (PERCENT)

Age	Males		Females	
	'R' + 'W'	'W'	'R' + 'W'	'W'
< 20	25.5	17.5	15.8	5.4
20-9	38.2	33.8	14.2	8.2
30-9	28.9	24.4	17.6	12.1
40-9	26.5	25.0	11.3	6.0
50-9	24.8	24.8	8.6	5.7
60 +	15.2	15.2	0.0	0.0

Note: 'R' indicates an ability to read only, 'W' an ability to read and write.

4. Religion did not count for much in explaining the variation in heights. Indeed, the regression result reported below indicates that controlling for age, literacy, and sex protestants were slightly shorter than catholics.¹⁴

5. The adolescent growth path is ascertainable since the ages of those committed ranged from nine years up. However, the effect is spoiled somewhat by the huge incidence of age-heaping at twenty years. For both men and women the reported age at nineteen exceeded that for twenty, probably because many in their late teens heaped up to twenty. The data (see Table 4) suggests that peak height velocity (defined as the interval recording

¹⁴The result probably did not hold generally. An analysis of the heights of Kilmainham convicts in the 1840s (discussed in C. O Grada, Ireland 1780-1939: A New Economic History, in progress) shows that protestants were taller.

the greatest percentage growth) occurred in their sixteenth year for boys and their fifteenth for girls, or about two years later than today.¹⁵ This is also later than what Nicholas and Steckel find for their English convict data.¹⁶ The spurt was more marked in the case of boys with some literacy. For girls the spurt occurred a year earlier than for boys.

Table 4: THE ADOLESCENT GROWTH SPURT: PERCENTAGE GROWTH IN HEIGHTS BY YEARLY INTERVALS

Age Interval	Males 'N'	Males 'W'	Females (all)
14 to 15	2.8	2.2	4.2
15 to 16	6.1	6.8	2.5
16 to 17	3.6	4.7	1.4
17 to 18	1.5	1.6	1.2
18 to 19	3.1	2.9	2.0

6. How did the the Great Famine affect to the profile of Clonmel prisoners ? Two contrasting arguments have an a priori plausibility. On the one hand, more respectable people might have been forced into crime. Desperation might also have driven more women and more older men into crime. On the other hand, the relative impact of the potato failure on the poor was presumably greater. Our data do not permit a conclusive test of these arguments. I divided the data set in two, with the end of December 1846 as the dividing line. Though the Famine was certainly biting before then, those registered on a particular day were being charged with crimes committed earlier. The outcome (Tables 6-8) shows slight drops in the mean height of both adult males and females, a significant drop (from 52 to 41

¹⁵Eveleth and Tanner, 1976.

¹⁶Nicholas and Steckel, 'Heights and Health of Workers'.

percent) in the proportion of 22-39 year-olds in the total, a marginal drop (from 29 to 27 percent) in the proportion of women, an increase in the proportion aged 40 or above, a significant drop (30.5 to 23.4 percent for males, 9.3 to 6.5 percent for females) in the proportion declaring literacy. The share of non-catholics, never large, also declined. These shifts are broadly consistent with a reduction in the socio-economic status of those committed for trial. The literacy premium differed in the two periods. It was greater for men in 1845-6, for women in 1847-9.

7. Finally, I subjected the data to Ordinary Least Squares estimation, using height as the dependent variable and REL (Catholic = 0, Protestant = 1), LITERACY (illiterate = 0, read only = 1, write = 2), and AGE, AGESQ (AGE squared), and AGE CUB (AGE cubed) as the independent variables. The outcome is given in table 5. It confirms the results of the cross-tabulations.

Conclusion

The last two decades or so have been a good period for research into the economic and social history of pre-famine Ireland. Much remains to be done, however. This note has attempted to show how information on a hitherto neglected source - the heights of ordinary people - can throw a little light on the important issue of nutrition and living standards in that crucial period. While, taken in conjunction with what is known about Irish poverty before 1845, these findings do not support Villerme's celebrated hypothesis that "human growth becomes greater and growth takes place more rapidly .. in proportion as the country is richer", neither do they support the apocalyptic malthusianism that often still passes for

Table 5 : ACCOUNTING FOR THE VARIATION OF MALE AND FEMALE HEIGHTS THROUGH REGRESSION ANALYSIS

	Males	Females
Constant	29.620 (40.44)	38.719 (26.36)
AGE	2.894 (41.03)	1.985 (13.59)
AGESQ	-0.0705 (-34.22)	-0.0538 (-11.89)
AGECUB	0.00053 (28.84)	0.00045 (10.43)
REL	0.034 (0.08)	-0.346 (-0.61)
LIT	0.574 (8.96)	0.259 (1.90)
R ²	0.529	0.207
N	3066	1205

Note: variables as defined in text, t-statistics in parentheses. N is the number of observations.

¹⁷Louis-René Villermé, cited in J.M. Tanner, 'The Potential for Auxological Data for Monitoring Economic and Social Well-Being', *Social Science History*, vol. 6(4) (1982), p. 573.

Table 6a: HEIGHT AND LITERACY, 1845-9

	All Ages	22 +	22-39
a. Males			
'N'	64.16 (2106)	66.04 (1315)	66.06 (959)
'R'	63.45 (151)	66.59 (60)	66.62 (55)
'W'	66.09 (809)	66.92 (564)	67.04 (454)
b. Females			
'N'	60.87 (1034)	61.35 (681)	61.67 (513)
'R'	60.44 (78)	61.28 (41)	61.25 (34)
'W'	61.84 (93)	61.96 (67)	61.90 (59)

Note: 'N' = Illiterate; 'R' = Read only; 'W' = Read and Write
 Number of observations in parentheses.

Table 6b : HEIGHT AND RELIGION, 1845-9

a. Males			
Catholic	64.61 (3007)	66.31 (1900)	66.37 (1437)
Protestant	65.64 (59)	66.47 (39)	66.75 (31)
b. Females			
Catholic	60.92 (1182)	61.41 (776)	61.43 (594)
Protestant	60.70 (23)	60.75 (13)	60.05 (12)

Table 7a: HEIGHT AND LITERACY, 1845-6

	All Ages	22 +	22-39
a. Males			
'N'	64.83 (866)	65.94 (587)	66.11 (450)
'R'	64.83 (35)	67.09 (16)	67.07 (15)
'W'	66.53 (395)	67.12 (279)	67.17 (231)
b. Females			
'N'	60.88 (465)	61.41 (282)	61.48 (212)
'R'	60.46 (24)	61.67 (12)	61.67 (12)
'W'	61.92 (50)	61.88 (36)	61.83 (33)

Table 7b : HEIGHT AND RELIGION, 1845-6

a. Males			
Catholic	65.35 (1261)	66.33 (858)	66.47 (677)
Protestant	65.29 (35)	66.39 (24)	66.79 (19)
b. Females			
Catholic	60.96 (525)	61.48 (321)	61.56 (248)
Protestant	60.86 (14)	60.89 (9)	60.89 (9)

Table 8a: HEIGHT AND LITERACY, 1847-9

	All Ages	22 +	22-39
a. Males			
'N'	63.68 (1239)	66.01 (685)	65.96 (463)
'R'	63.03 (116)	66.36 (40)	66.41 (36)
'W'	65.66 (414)	66.72 (257)	66.91 (195)
b. Females			
'N'	60.87 (569)	61.33 (353)	61.34 (255)
'R'	60.43 (54)	61.28 (27)	61.23 (20)
'W'	61.75 (43)	62.08 (28)	62.01 (23)

Table 8b : HEIGHT AND RELIGION, 1847-9

a. Males			
Catholic	64.07 (1745)	66.21 (968)	66.25 (683)
Protestant	66.16 (24)	66.25 (14)	66.23 (11)
b. Females			
Catholic	60.89 (657)	61.39 (404)	61.40 (295)
Protestant	60.47 (9)	60.44 (4)	59.92 (3)