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Medical History

Thomas Wrigley Grimshaw (1839-1900). Registrar general 1879-1900.

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SUMMARY

Thomas Wrigley Grimshaw was born in Whitehouse, County Antrim, in 1839, and learned his medicine at the Dublin School of Medicine when its reputation was at its highest. If his teachers strayed from the art of bedside medicine into science it was into meteorology that had been revived by Thomas Sydenham, the 'English Hippocrates' in the seventeenth century. When Grimshaw was appointed Registrar General for Ireland in 1879 he diverted attention from the acute epidemics of zymotic diseases to chronic pulmonary affections that numerically were far more deadly. Cartography became an obsession with him, and he used it to show that Ireland was divided by phthisis into east and west. Koch's 'great discovery' in 1882 that tuberculosis is an infection not a 'constitutional' disease made him change his long-held views, and in the decade before his death in 1900 at Carrickmines, County Dublin, he became an active advocate of the new knowledge, distressed by the fact that thriving Belfast and its hinterland had the highest mortality from phthisis in Ireland. His concern for the health of young girls employed in large numbers in the linen factories was matched by his landmark advocacy of young ladies anxious to gain the licence to practise medicine in Great Britain and Ireland.

INTRODUCTION

Like William Wilde (1815-1876) with the intensive analyses of the Censuses that earned a knighthood, Thomas Wrigley Grimshaw was not content to compile statistics, he continually analysed them. As Registrar-General for Ireland over twenty years he reviewed new data as they arrived, and he was not afraid to change his mind – and admit that he had done so. His major contribution was to divert attention from the 'zymotic diseases' (viz. small pox, measles, 'fever' i.e. typhoid and typhus) to phthisis (tuberculosis) and diseases of the respiratory organs, death rates from which greatly exceeded those from the three 'deadly acute infections'.

BRIEF LIFE.

Thomas Wrigley Grimshaw was born on 16 November 1839 at Whitehouse, then a small town on the Antrim shore of Belfast Lough five miles north of the city[1]. His great-grandfather had migrated from Whalley in Lancashire to Greencastle, at the mouth of Carlingford Lough in County Down, and brought the calico-printing industry to Ulster. Thomas's father, Wrigley Grimshaw FRCSI, established himself as an eminent dentist in Dublin and Thomas, after schooling in Newry, Carrickfergus and Dublin's High School, attended Trinity College Dublin, graduating BA 1860, MB 1861. His postgraduate qualifications included LRCSI 1862, LRCPI and MD 1867, FRCPI 1869, and Diploma in State Medicine (TCD) 1873[1,2]. In recognition of his brilliant answering in the Diploma, the MA degree was conferred on him *stipendis condonatis*[2], that is, by simply paying the

Fig 1. Thomas Wrigley Grimshaw, from Kirkpatrick Collection, reproduced courtesy of RCPI.

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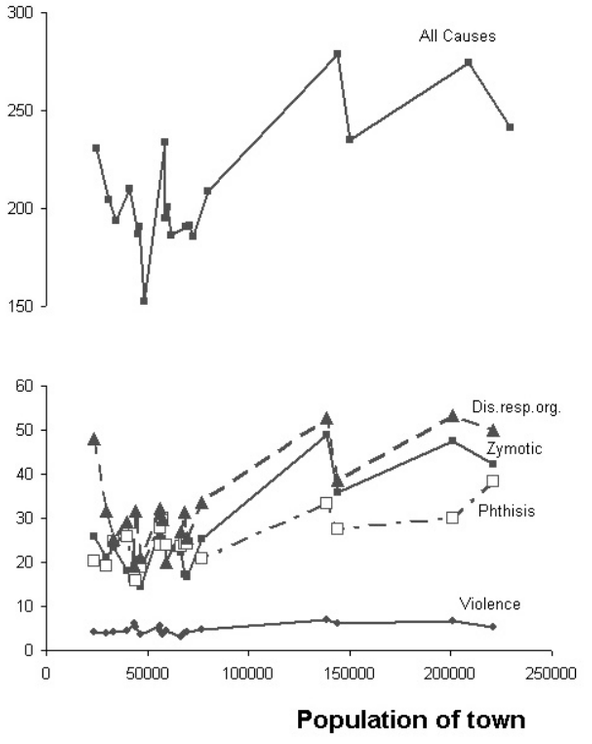

Fig 2. Mean death rates per 10,000 population in larger towns.

required fee. He was physician to Cork Street Fever Hospital and Dr Steevens' Hospital, where he lectured in succession on botany, materia medica and medicine[2]. In the autumn of 1879 he was appointed Registrar General of Ireland (based in Charlemont House, Rutland [Parnell] Square) in succession to Dr William Malachi Burke (1819-1879, a Galwayman who graduated at St. George's Hospital, London)[1] (Figure 1). Grimshaw, even though he was appointed towards the close of the decade, effected considerable improvements in the Report issued from his department for 1871-1880[1]. As part of his duty he published a *Supplement to the Seventeenth Report*: *Official Report on Births, Marriages and Deaths, Agricultural, Emigration, Banking, Criminal and Judicial Statistics, and on the Irish Census. 1871-80* in 1884[3].

He was president of the Statistical Society of Ireland (1888-90), The Dublin Sanitary Association (1885-88) and Royal College of Physicians of Ireland in 1895 and 1896. As part of the Queen's diamond jubilee he was made a Companion of the Bath in 1897[2]. He was one of the three Irish representatives at the inaugural meeting of the National Society for the Prevention of Phthisis and other forms of Tuberculosis at Marlborough House in London in 1899. Perhaps a more lasting influence was the request to grant qualification for medical registration *to all persons without discrimination of sex* made to the King's and Queen's College of Physicians of Ireland. In December 1876 during Grimshaw's presidency, John William Moore (1845-1936) successfully requested 'that permission be granted to Eliza Walker Dunbar, MD (Zurich), to be examined for the Licentiate of the College', a hurdle she successfully negotiated on the 11 January following. Thereby registration with the General Medical Council in London was opened to women through the enlightened action of the Dublin College.

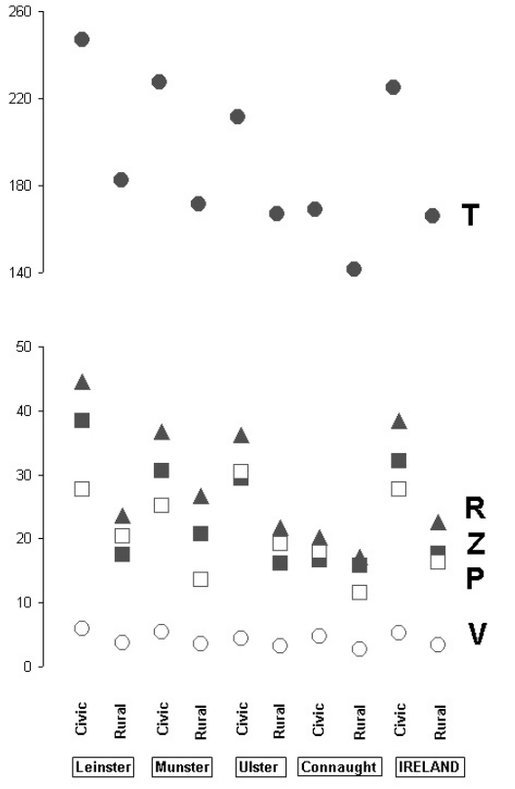

Fig 3. Death rates in civic and rural communities in the four Irish provinces. (abstracted from Grimshaw's elaborate diagram)[4].

At the early age of 26, Grimshaw married, on 11 April 1865, Sarah Elizabeth (Settie) Thomas of Broadlands, Newport, Isle of Wight. Of their twelve children, nine – seven sons and two daughters – survived their father, who died at his home at Priorsland, Carrickmines, county Dublin, on 23 January 1900[2].

REGISTRAR AND ANALYST.

The 1881 census returns gave him an opportunity to examine his view of the higher mortality among town dwellers[4]. He classified the population of Ireland into town or 'civic' populations (residing in towns of more than 10,000 inhabitants, Figure 2) and rural populations, and grouped the deaths registered according to these divisions. Although he was fully aware of the importance of the registration of diseases, he was also aware that its value was limited; 'death rates are much more exact than the statistics of disease'. Mortality and morbidity rates in town and country areas, revealed in his Tables I to IV, are summarised in Tables I and II. The contrast between civic and rural death rates stands out when demonstrated graphically (Figure 3)[4].

In the 'civic' population of 1,476,929 lung disease was the cause of death in 2.24 per 10,000, in rural districts the rate was 1.64 per 10,000 in a population of 3,816,678. The 'predominant cause of sickness and death in towns are lung diseases, not as many suppose, infectious fevers ... or the slightly greater prevalence of infectious diseases in town than in the country, but a much higher rate of mortality among affected persons'[4] (Table III). Grimshaw was struck by the

TABLE I.

Table of total deaths, and deaths from principal zymotic diseases, phthisis, and inflammatory diseases of respiratory organs, with rates per 1,000 population, in urban and rural districts.

1871 to 1880 Localities	Total deaths	rate	Zymotic diseases	rate	Phthisis	Rate	Other respir.	rate
Civic Districts	332526	22.5	47,656	3.2	40,849	2.8	56,724	3.8
Rural Districts	634219	16.6	67,391	1.8	62,688	1.6	86,267	2.3
Total Ireland	966745	18.3	115,047	2.2	103,537	2.0	142,991	2.7

TABLE II.

Death rates per 10,000 inhabitants in civic and rural districts

Respiratory illnesses	Phthisis	Diseases of Respiratory Organs	From both conditions
Civic districts	27.7	38.4	66.1
Rural districts	18.4	22.6	41.0

observation that whereas the rate for other lung diseases was lower, the death rate for phthisis in Belfast was higher than in Dublin. In concluding his 1881 Report he remarked 'the higher mortality from phthisis in Belfast must, I think, be attributed to the occupations of the people, especially among young girls, employed as factory hands' (p 403-4)[4].

In his Presidential Address to the Dublin Sanitary Association on 3 February 1887 Grimshaw had to admit that the death rate from tuberculosis in Dublin had risen slightly from 31.7 to 33.2 per 10,000, and that consumption was the 'principal cause of death in the constitutional class of diseases' (cited by Moore, p 316)[5].

In the Twenty-fourth Annual Report of the Registrar General for 1887, Grimshaw stated that consumption accounted for 21.3 deaths per 10,000 in the country as a whole, a tiny decrease on the average annual rate for the previous ten years; of the 10,329 deaths, 5,495 were of females. Of the total, 7,480 deaths or 72 per cent were of persons between 15 and 45 years of age. 'As heretofore, Leinster and Ulster yielded the highest rates, and Connaught the lowest. The rates were: Leinster 240; Ulster 219; Munster 179; Connaught 128 per 100,000.'. John William Moore contributed his usual Report on Meteorological Observations[6]. In highlighting the phthisis problem in Belfast Grimshaw was preceded by Henry MacCormac LRCPEd, MD (1832-1886) from Fairlaw, county Armagh, author of *On the Nature, Treatment, and Prevention of Pulmonary Consumption, and, incidentally, of Scrofula, with a Demonstration of the Cause of the Disease* and 'fresh air' enthusiast reputed to have broken the panes in closed sickroom windows. He retired from his post in the Belfast Medical School in 1866 to devote himself to science and philology – armed with his knowledge (so it was said) of twenty languages[7].

CARTOGRAPHY

On 19 May 1887 the Registrar General read a paper 'On the prevalence and distribution of phthisis and other diseases of the respiratory organs in Ireland' before the subsection of State Medicine of the Royal Academy of Medicine in Ireland[8]. He showed that pulmonary consumption, accounting for more than one-tenth of all deaths, was the most potent cause of death during the decade 1871-1880; it accounted for 103,528 deaths out of a total of 966,745. The countrywide death rate from phthisis was 19.6 per 10,000 annually. In towns with a population of 10,000 or more, the rate rose to 34.7. In Belmullet on the Mayo coast the annual death rate per 10,000 of the population from phthisis was 4.8; in the North Dublin Union it was 33.4, and in Belfast it was 38.2. A line drawn from Londonderry to Skibbereen divided the poverty-stricken west with little phthisis from the richer east with its phthisical towns[8]. Grimshaw improved on Wilde *a.* by contracting the social classes into four categories, and *b.* by recourse to cartography. (Figure 4, greatly simplified from the author's elaborate diagram). The four social classes in Dublin were: I. professional and independent, II. middle class III. artisan class and petty shopkeepers, and, IV. general service class[8].

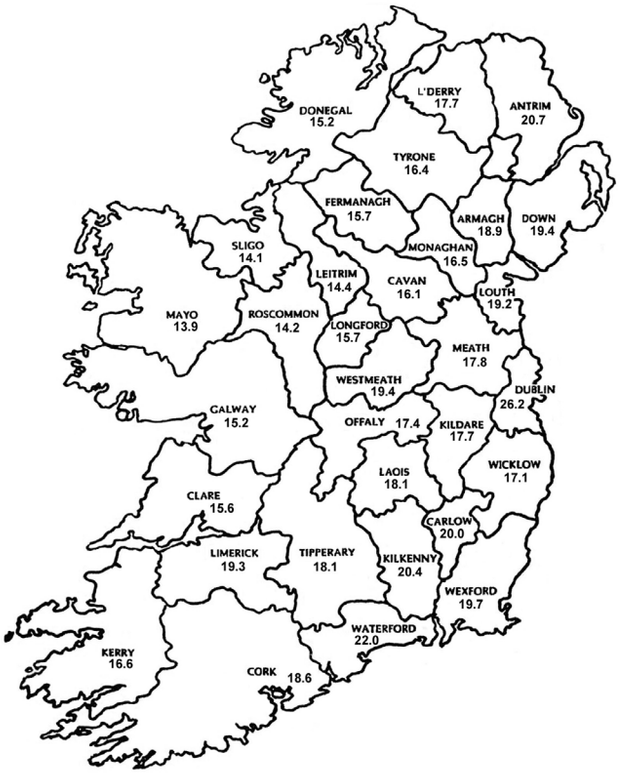

Fig 4. County death rates plotted from Grimshaw's 1881 census data[4].Grimshaw in the original map indicated by a line drawn from Londonderry to Cork (Skibbereen) the division of the west with little phthisis from the east with its phthisical towns.

Table III.

Respiratory Sickness rates in civic and rural districts.

	Civic districts No.	Sickness Rates / 10,000	Rural districts No.	Sickness Rates / 10,000
Dis Resp Organs	2,831	1.61	4,363	1.18
Phthisis	929	0.63	1,695	0.48
Total	3,760	2.24	6,058	1.66

His initial impetus to mapping phthisis and other respiratory diseases almost certainly arose from reading 'the interesting and valuable paper' by Mr Buchan and Dr Arthur Mitchell, in the *Journal of the Scottish Meteorological Society*, in July 1874 and July 1875), on the influence on mortality of different diseases and at different ages[9]. When the time came for his Presidential Address in 1887, he also had the benefit of Alfred Haviland's *Geography of Heart Disease, Cancer and Phthisis* (1875)[10] and *Consumption: its Social and Geographical Causes* (1883)[11]. Haviland's *Geography* was dedicated to, among others, William Farr (1807-1885) whose observation that the geographic distribution would lead to information stimulated him to have the map engraved on copper; and he concluded 'When once the colouring of maps is learnt, their teachings will prove to be simple and easily remembered; and I sincerely hope that what they will teach will be of service to those who consult them'. Furthermore, as Grimshaw acknowledged in the Address, Mr Buchan liberally placed his maps and tables at his disposal. (Grimshaw p 339)[8]. But he was a prisoner of Meteorology, one of the seven obstacles to be overcome in qualifying for the Diploma in State Medicine.

METEOROLOGY IN MEDICINE

Preventive medicine in these islands arose from Edwin Chadwick's *Report on the Sanitary Condition of the Labouring Population of Great Britain* (1842) and the subsequent *Public Health Act* of 1848[12]. The academic world was awakened to its responsibilities when Henry Wyndham Ramsey (1809-1876) circulated at his own expense one hundred copies of his *Essays in State Medicine* (1856), and his proposal for State Medicine received pride of place in the programme for the first meeting of the British Medical Association in Dublin in 1867[12,13]. William Stokes (1814-1878), regius professor of medicine in Dublin University, in his inaugural presidential address stressed at length the importance of Ramsey's work and of the need to introduce a certificate or diploma of competence in state medicine[13]. In February 1870 Stokes persuaded the medical professors in Trinity College to assent to the idea and they formally recommended to the Board (governing body) of the College that a qualification in state medicine be instituted. A more detailed proposal (curriculum etc.) followed. On the recommendation of the Board, the university agreed to offer a certificate in state medicine, but confined eligibility to its own graduates; quite deliberately no course of instruction was offered. The next year the General Medical Council accepted the Dublin proposal as the model to be followed, and candidacy was opened to Oxford and Cambridge graduates[13].

The details of the Qualification in State Medicine are crowded in small print on six cramped, crowded pages[14]. The subjects were 1 Law; 2 Engineering; 3 Pathology (including spread of fevers); 4 Vital and Sanitary Science, Statistics; 5 Chemistry: Air, Water, Gaseous Poisons (carbonic anhydride, coal); 6 Meteorology; 7 Medical Jurisprudence: i hygiene, ii forensic medicine. The candidates wrote nine papers, one on each of the seven subjects, together with one on hygiene as a separate subject from medical jurisprudence, and one set by the regius professor - which contained fifteen questions which were mostly epidemiological in content or concerned public health philosophy.

Meteorology disappeared from the course after Stokes's death in 1878[13]. Stokes was a lineal descendant of Sydenham, Boyle and Locke who during the seventeenth century had revived the Hippocratic importance of geographical environment in explaining the connection between fever and seasonal changes in the local weather. Stokes's climatic intransigence is best expressed in his 'Introduction' to Graves's *Physiological Essays* where at great length he argues that the French would find no difference between typhus and typhoid in Ireland, or less prosaically in 331 out of 743 deaths among physicians from typhus fever in Ireland - a mortality of 45 per cent in devotion to duty.

As Nicolaas Rupke has reminded us 'medical geography - the study of the global distribution of human diseases as a function of environmental conditions - was a largely nineteenth-century preoccupation'[15]. What Rupke has chosen to call "Humboldtian medicine" was a form of medical geography that made the new science of physical geography - synonymous with Alexander von Humboldt's (1769-1859) name - its basis, taking from it a scientific model of both explanation and representation for the global variations of health and diseases'. By shifting the burden of responsibility from the shoulders of the governing autocracies, conveniently 'Humboldtian medicine pointed the finger of accusation at nature, and not at the conditions of social deprivation'[15].

If 'a Humboldtian could be spotted by his isomaps' as Susan Cannon advised in *Science in Culture. The early Victorian period*[16], Grimshaw was certainly one. When his map was revived by the new Registrar General in 1906 the 'isomets' were removed but meteorological data collected by J W Moore now had 31 closely typed pages.

RECENSION

The winds of change struck in the final decade of the century. The bacteriological revolution was confirmed at a symposium held by the Section of State Medicine on 17 February in 1899, subsequently published in the *Transactions of the Royal*

Academy of Medicine in Ireland for 1899: the speakers and their subjects were[17]

W T Grimshaw: The prevalence of tuberculosis in Ireland, and the measures necessary for its control;

P Letters: A statistical inquiry into the distribution of tuberculosis in Ireland;

F C Martley: The death rate from tuberculosis in England; and,

E J McWeeney: The bacteriological aspect of tuberculosis.

Grimshaw sought a wider circulation for his recension by communicating his paper to the *Dublin Journal of Medical Science*[18]. The old distinction between 'zymotic' diseases of an infectious or catching nature and 'constitutional [diseases] which are caused or promoted by general unhealthy conditions, so prominent in previous papers and in the *Manual of Public Health for Ireland*, jointly written with Dr Emerson Reynolds, R O'Brien Furlong and JW Moore in 1875, had to be abandoned after 'Koch's great discovery [that tuberculosis was] of an infectious character'.

Comparative statistics impressed on him the gravity of the tuberculosis problem.

It is estimated that about 1 million deaths are annually caused by tuberculosis in Europe … In the United Kingdom the average annual deaths (1892-96) were: tabes mesenterica 8,659, tubercular meningitis 8,707, phthisis 59,015, making a total of 76,381, equivalent to 10.8 per cent of the deaths from all causes … Taking Ireland separately … the average deaths were, from tabes mesenterica 954, tubercular meningitis 928, phthisis 9,672, making a total of 11,554 and constituting 13.9 per cent of all deaths in Ireland[18].

For Dublin and its suburbs the corresponding figures were tabes mesenterica 229, tubercular meningitis 161, phthisis 1,214; total 1,604, equivalent to no less than 17.2 per cent of all deaths[18].

The unwelcome fact that phthisis had shown a tendency to increase in Ireland had to be faced. In the decade 1871-80, phthisis caused 10.7 per cent of all deaths, that is, 19.6 per 10,000 living. In the next decade the percentage rose to 11.7 and the rate to 20.9 per 10,000. During the three years 1895, 1896 and 1897 (for which detailed statistics were available) the average annual death rate was 17.3 per 10,000, for town districts 25.4 and for the rest of the country 15.2[18].

That the most lethal form, pulmonary phthisis, was well illustrated by comparing death-rates in the six large town districts. The mortality from the forms of tuberculosis other than pulmonary phthisis was the same in Dublin and Belfast, 1.8 per 1,000 of population; Londonderry 1.6; Waterford 1.21; Cork 1.1; and Limerick 0.7. For the pulmonary form, Belfast led with 3.9; to be followed by Cork 3.8. Dublin 3.3, Waterford 3.2, Limerick 3.0, and Londonderry 2.5. Phthisis caused 11.7 of all deaths in Ireland. In the rural districts the figure was 11.1 per cent – 'the proportion of deaths from pulmonary consumption is very high in the country districts'. After examining the question of tuberculosis in childhood (tabes mesenterica, tubercular meningitis, other non-pulmonary disease) he returned to the 'results [that] have taken me somewhat by surprise … the proportion of the people of adolescent and active adult ages who die of pulmonary consumption in the country districts of Ireland surpasses my worst anticipations' (p 252)[18].

Young adults were especially at risk. In the country as a whole 11.7 per cent of total deaths were due to phthisis; between the ages of 15 and 45 the percentage was 43.5; and between 15 and 35, 49.6; from 15 to 25, 52.8, more than half; from 25 to 35, 40.1; and from 35 to 45, 39.1 per cent. In the most fatal age decade (15-25) 44.6 of all deaths in Dublin was from phthisis; in Belfast, 55.4; in Cork, 54.4; in Limerick, 56.3; in Londonderry, 52.5; and, no less than 58.6 in Waterford. In the next decade of life the percentages were lower, but still close to one half of all deaths. Recorded from the most active portion of the community, these figures could not fail to excite considerable alarm[18].

Turning to the task of limiting the spread of tuberculosis from human sources, Grimshaw insisted first on general sanitary measures: cleanliness, letting in air and light at home and at work. Second came the cutting off and destruction of the contagious material itself, by isolation, and by destruction of sputum and discharges. 'Isolation' was not to be taken in the sense used for 'dangerous infective diseases'. The well-to-do with ample home accommodation could remain at home; for others, hospital isolation, in special voluntary hospitals provided by the local authority, was the only way to ensure 'the necessary conditions of safety for the healthy'. And 'the houses or rooms in which the patients had resided should be thoroughly cleansed and disinfected, so as to destroy all traces of the fatal bacillus (pp 254-5)[18].

Two incendiary questions were posed: 'How is the Sanitary Authority to become aware of cases? Is tuberculosis to be a compulsorily notifiable disease?' Compulsory notification he ruled out because it would be unpopular with physician and public, and should not be attempted because the Sanitary Authorities would simply be overwhelmed by the weight of numbers requiring isolation. Deaths from phthisis, no great cost there, 'should be brought under the notice of the Sanitary Authorities. And regional bacteriological laboratories would provide free sputum examinations[18].

'The Effect of Food derived from Tuberculous Animals on Human Health' was examined by Royal Commissions (1890, 1894, reported 1895), and a further Royal Commission (1896, reported 1898) 'was appointed to inquire into administrative procedures for controlling danger to man through the use as food of meat and milk of tuberculous animals' (p 166). The 1898 Report, quoted *in extenso*, met with Grimshaw's full concurrence, and he attested to the reliability of the tuberculin test in identifying infected animals in dairy herds. (pp 257-264)[18].

In closing he hoped he had 'said enough to convince the Academy that the great prevalence and destructiveness of tubercular disease constitute a most formidable danger to the public health, but was rather too sanguine in his hopes for the 'Movement for the Prevention of Consumption'. And, gracious in everything, he concluded by thanking Mr. P J O'Neill, Superintendent of the Statistical Branch of the General Register Office for the statistical portion of his paper and for correcting the proofs.

Table IV.

Death from Phthisis per 10,000 population in 1871-1880 and 1897[3,19].

Co.	1870	1897	+/-	Co.	1870	1897	+/-	Co.	1870	1897	+/-
Carl	20.0	17.8	-2.2	Clar	15.6	14.9	-0.5				
Dubl	26.2	30.5	+4.3	Cork	18.6	21.2	+2.6		**Ulster**		
Kild	17.7	19.1	+1.4	Kerr	16.6	16.6	0	Antr	20.7	29.9	+9.2
Kilk	20.4	18.9	-1.5	Lim	19.3	19.0	-0.3	Arm	18.9	22.7	+3.8
K'sL	18.1	17.5	-0.6	Tipp	18.1	17.6	-0.5	Cava	16.1	14.6	+1.5
Long	15.7	14.6	-1.1	Wat	22.0	20.5	-1.5	Don	15.2	14.1	+1.1
Lout	19.2	19.1	-0.1	Gal	15.2	15.7	+0.5	Dow	19.4	26.2	+6.8
Meat	17.8	20.8	+3.0	Leit	14.4	15.3	+0.9	Fer	15.7	15.6	-0.1
Q's	17.4	17.9	+0.5	May	13.9	15.8	+1.9	L'de	17.7	18.0	+0.3
Wm	19.4	18.9	-0.5	Rosc	14.2	16.0	+1.8	Mon	16.5	16.2	-0.3
Wex	19.7	21.8	+2.1	Slig	14.1	18.6	+4.5	Tyro	16.4	21.3	+4.9
Wic	17.1	17.5	+0.4								

RETROSPECT

Freeing himself from Hippocratic meteorology, Grimshaw had eventually reached Koch's discovery of the tubercle bacillus. In doing so he had overcome the hazards of meteorology and cartography, but his faith in the accuracy of the number of deaths annually registered was misplaced. In his 1885 paper he listed (but did not map) the death rates per 1,000 population in the thirty-two counties in the decade 1871-80 (p 384)[4]. The death rate in Mayo (13.9) was practically half that in Dublin (26.2). If the rates are plotted on a map of Ireland (Figure 4), a line from Londonderry to Cork will divide the low from the high county rates except for a small central nest in the north midlands.

The Births and Deaths Registration (Ireland) Act of 1863 appeared to give Ireland accurate annual statistics, but key provisions of the Public Health Acts of 1878 and 1879 which improved death certification were necessary to ensure effective notification to district registrars. It is possible, indeed probable, that reporting a death to the Registrar twenty or more miles away was not a priority among the bereaved in rural Ireland in the nineteenth century when the registration of Roman Catholic deaths was a new departure, ordained in a language foreign to the vast majority. The dead were buried in small, remote, isolated *grave*yards, where constables were no more welcome at burials than they were at Land War evictions escorting bailiffs; *church*yards were reserved for deceased members of the Protestant churches.

And deceit was not confined to the 'peasantry'; physicians did not relish annoying paying patrons by disclosing a precise diagnosis of the abhorrent phthisis – the stigma was equally loathed by rich and poor alike. At the very next meeting of the Section of State Medicine in the same Session as Grimshaw's 1885 paper, Archibald Jacob, thundering against compulsory notification, admitted openly (in relation to venereal disease) 'Concealment, such as I anticipate, from physician-notification is, in fact, practised to a great extent in death-registration, wherever there is an incentive to concealment'. And he turned to the Registrar-General's Annual Report for 1882 to provide irrefutable evidence of gross under registration[19]. The stigma of tuberculosis, with the resultant secrecy, had not abated in the twentieth century (Cyril F Warde, personal communication May 2004).

Annual returns continued to confirm the association of tuberculosis with poverty, restricted diet and poor housing, but after the discovery of the tubercle bacillus by Robert Koch in1882, slowly but surely, it became widely though not invariably acknowledged that the disease was infectious, not constitutional or hereditary. The death rate was falling steadily in England and Wales, and Scotland. Dr. Martley, from Almroth Wright's Inoculation Department in St Mary's Hospital London, revealed to the Dublin meeting in 1899 that in some districts of England and Wales the tuberculosis death rate was 32 per 10,000, away above the 24,000 for the whole country, and in other districts it was as low as 18,000 per 10,000; 'this extreme irregularity is explained – partially at all events – by how closely dependent the fatality rate is on overcrowding'[20]. His shires were selected, but so far as Ireland is concerned such a relationship is not easily assessed with any certainty because of the progressive depopulation during the second half of the century in all the provinces, affecting even the linen counties of Ulster (with the exception of the

Table V.

Mean rates of death per 10,000 from phthisis in Ulster towns.

	1871-80	**1897**
Armagh	24.2	36.1
Belfast	38.2	38.6
Lisburn	29.9	33.1
L'derry	24.0	25.2
Lurgan	23.5	33.7
Newry	24.3	24.2

TABLE VI.

Population Increase in Belfast during the Nineteenth Century.

Census	Population	% increase	Year	Population	% increase
1821	37,277	- -	1861	131,692	39.67
1831	53,287	42.95	1871	174,412	43.43
1841	70,447	32.20	1881	208,122	19.33
1851	87, 962	23.58	1891	266,185	22.98
			1901	349,180	36.43

baronies on the southern shore of Lough Neagh where an increase of 20 percent or more resembled that in Belfast)[21]. And Martley courageously begged to differ with his host: 'The action of climate is completely overshadowed by the social condition of the population'[20].

In contrast to the neighbouring island, the rate was rising slowly, if unsteadily, in Ireland, tuberculosis claiming 11,000 or 12,000 lives annually[5]. In 1885 Grimshaw had accepted as '*fact* that while the deaths from phthisis were 33.4 and 30.0 for the Dublin districts (North and South), and 38.2 for Belfast, the deaths from diseases of the respiratory organs were 52.9 and 52.3 in Dublin, and only 49.9 in Belfast. This would point to the tendency of pulmonary affections in Belfast to assume the phthisical type more readily than in Dublin' (pp 403-4)[4]. The confusion arose from the classification of phthisis as a *constitutional* not an infectious disease, but hindsight must also take into account the difficulty of accurate differential diagnosis: 'it is difficult to treat of phthisis and diseases of the respiratory organs separately, as they are, in *fact*, often combined in causing death, and many cases of phthisis originate in some other form of lung disease (p 387, passage already cited)[4]. Recollect that *incipient phthisis* was still a respectable diagnosis and featured prominently in the most renowned textbooks in the first quarter of the new century.

When Patrick Letters (d. 1911, physician at Valentia Island, County Kerry), who addressed the Section in February 1899 after Grimshaw, examined the returns in the 1897 Annual Report – again with the statistical help of PJ O'Neill, and the blessing of Registrar General Grimshaw - the Belfast rate exceeded Dublin's[22]. The national rate for deaths from phthisis per 10,000 population had not changed dramatically since 1871-1880 except in Ulster, where there were sizable increases in the eastern counties: Antrim 9.2, Down 6.8, Tyrone 4.9 and Armagh 3.8, while the rate dropped in Cavan, Donegal, Fermanagh and Monaghan. In Leinster increases were seen in Dublin (4.3), Meath and Wexford. Sligo (+ 4.5) stood out in Connaught, as did Cork (+ 2.6) in Munster (table IV).

Mean deaths from phthisis in the principal towns of Ulster were still rising (table V). The linen industry came to Ireland with the Huguenots in the seventeenth century but it was not until Belfast had its first flax spinning mill in 1828 that industrial prosperity came to the northeast, and the population of the city increased progressively until in the 1880s when the rate began to taper off. And then shipbuilding revived the upward trend (table 6). But industrialisation with the rapid expansion of population exacerbated the tuberculosis problem in the province[23]. Yet it is chastening to keep in mind that the mills employed just 30,000 out of a population that fell from 1,802,500 in 1871 to 1,619,814 (368,243 of them urban) in 1897. 'Kissing the shuttle' was the popular explanation among 'young girls employed as factory hands' (mentioned in Grimshaw's 1881 Report), but the moist and dusty warmth in the (crowded) mills provided an ideal environment for dissemination of infections and promotion of respiratory diseases.

The factors involved in morbidity and mortality related to exposure and environment are very complex. In the Prophit Survey of adolescent tuberculosis conducted under the auspices of the Royal College of Physicians in 1933-43, the morbidity rates for females were very slightly higher than for males among those in contact with open cases of tuberculosis. Among nurses and medical students the rates were approximately twice as high, and among controls the morbidity was four times higher for females than for males. The authors did not proffer an explanation[24].The predominance of females among adolescents continues to be striking[25]. Immunology has undergone a sea change in the meantime and the new knowledge is relevant to the plight of the young mill girls. In addition to the innate virulence of the tubercle bacillus itself, the host response to *Mycobacterium tuberculosis* plays a major role in determining the clinical manifestations and ultimate outcome in persons who encounter this pathogen[26]. Changes in the immune system without development of immunodeficiency are included in the physiological adjustments during pregnancy, and the complex signalling involved among the immunocytes is probably triggered or influenced by hormonal changes[27]. It is conceivable that the muted alterations conducted by the endocrine orchestra in dictating the normal menstrual cycle influences the immune response to tuberculosis in adolescent girls. Certainly there is evidence that steroids controlled by the hypothalamico-pituitary-adrenocortical system can influence the response of immunocytes in chronic infection[28].

Grimshaw attended the meeting in London in 1899 that set up the National Association for the Prevention of Tuberculosis (NAPT), but in so far as Ireland was concerned it remained an elitist club of Dublin, Belfast and Cork physicians. It was subsequently completely overshadowed once Lady Aberdeen's (1857-1939) Women's National Health Association (WNHA), founded in 1907, met with popular acceptance. Ironically the WNHA made skilful use of NAPT pamphlets in their own monthly magazine *Sláinte*, as indeed the Vice-Reine did of Registrar-General Reports that focussed, like Grimshaw's had done, on the dire mortality rate from tuberculosis in Ireland.

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