



LABORING IN THE
“POISONOUS GASES”:

CONSUMPTION, PUBLIC HEALTH,
AND THE *LOCHNER* COURT

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Introduction

More than a liberty of contract or an hours of labor case, *Lochner v. New York* was a public health case.¹ The bakers’ agitation for the underlying Bakeshop Act² focused heavily on public health issues, particularly on the contention that bakery work created an unacceptable risk of disease, especially consumption, to themselves and to consumers. Associate Justice Rufus Peckham, author of the majority opinion in *Lochner*, admitted that “[t]he law must be upheld, if at all, as a law pertaining to the health of the individual engaged in the occupation of a baker.”³ Most of the statute directly concerned bakeshop sanitation issues,⁴ and the bakers argued strongly that the hours provision was an occupational health measure as well.⁵ Yet Justice Peckham dismissed their concerns by citing to a mortality table and relying on “the common understanding [that] the trade of a baker has never been regarded as an unhealthy one.”⁶ He further introduced a slippery slope ar-

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¹ *Lochner v. New York*, 198 U.S. 45, 57 (1905).

² 1897 N.Y. Laws, ch. 415.

³ *Lochner*, 198 U.S. at 57.

⁴ Section 110 of the Act limited bakers’ hours to ten per day and sixty per week; section 111 prescribed drainage and plumbing requirements for bakeries; section 112 set forth sanitary regulations for bakeries; section 113 mandated separation of washrooms, water closets, and sleeping areas from baking areas; section 114 empowered the factory inspectors to enforce the statute; and section 115 allowed the inspectors to require physical alterations of bakeries to meet the code. 1897 N.Y. Laws, ch. 415, §§ 110–115.

⁵ *Lochner*, 198 U.S. at 47.

⁶ *Id.* at 58–59.

gument that allowing the Bakeshop Act to stand would mean that all work places and occupations could be subjected to health regulation.⁷ While Peckham's third argument proved unusually prescient, the other two were ideologically-driven and specious distortions running contrary to accepted medical wisdom, then and now. Though it may be possible to argue, as David Bernstein does, that *Lochner* was "based on what were then mainstream (and longstanding) jurisprudential ideas," it is also true that the decision was based on a misunderstanding of contemporary medical knowledge.⁸

Recent commentators have echoed Peckham's views on the bakers' health concerns. Bernstein, who has written extensively and well on *Lochner*, faults the bakers for continuing to attribute their alleged consumption to working in bakeries a decade after Robert Koch had announced the discovery of the bacillus that causes the tuberculosis infection, but fails to consider whether the bakers' health claims were reasonable in light of the totality of contemporary medical knowledge.⁹ Paul Kens, author of a study of *Lochner* that is generally sympathetic to the workers, recognizes that bad health might well have resulted from long hours in cellar bakeries, but does not locate the bakers' health arguments in the context of contemporary medical discourse and thus ultimately concludes that the case was not really about public health at all.¹⁰ Wendy Parmet has written an insightful study of the relationship between public health, constitutional law, and the *Lochner* case, but does not focus on the history of consumption and probably overstates the early effect of the bacteriological revolution.¹¹

As a case primarily concerning public health issues, *Lochner* cannot be understood without historicizing our knowledge of the nineteenth century discourses regarding consumption and disease in general. As Willard Barbour once suggested, by "going backward from the present as well as coming forward from the past," it is possible to make sense of the legal past for our own time by understanding it in terms of its contemporary meanings.¹² To accomplish this goal—to come to grips with how and why the journeyman bakers believed that laboring in what one of them called the "poisonous gases" of the cellar bakeries was leading them to "consumptives' graves,"—requires several strategies, which have been pioneered by historians working in the field of health and medical history.

First, it is useful to recall with Hippocrates that medicine "consists of three factors—the disease, the patient, and the physician."¹³ This essay will focus on the

⁷ *Id.* at 59.

⁸ David Bernstein, *The Story of Lochner v. New York: Impediment to the Growth of the Regulatory State*, in CONSTITUTIONAL LAW STORIES 327 (Michael C. Dorf ed., 2004).

⁹ *Id.* at 328.

¹⁰ PAUL KENS, JUDICIAL POWER AND REFORM POLITICS: THE ANATOMY OF LOCHNER V. NEW YORK 9–11, 125 (1990).

¹¹ Wendy E. Parmet, *From Slaughter-House to Lochner: The Rise and Fall of the Constitutionalization of Public Health*, 40 J. AM. LEGAL HIST. 476 (1996).

¹² Paul Vinogradoff, *The Meaning of Legal History*, 22 COLUM. L. REV. 693, 700 (1922) (publishing the posthumous lecture notes of Professor Barbour).

¹³ Charles E. Rosenberg, *Framing Disease: Illness, Society and History*, in CHARLES ROSENBERG, EXPLAINING EPIDEMICS AND OTHER STUDIES IN THE HISTORY OF MEDICINE 305 (1992) (quoting Hippocrates).

first part of the Hippocratic triad—the disease—and it is through that prism that patients and physicians will appear. Second, to trace how the meanings of terms like “consumption” changed over time, we must go far beyond the sorts of legal texts—appellate cases and statutes—to which traditional legal history limits itself. This means delving into the relevant medical history of consumption. Third, to fully historicize these changing meanings, we must also expand our understanding of disease itself, as a number of notable medical historians, including Owsei Temkin, Charles Rosenberg, and Judith Walzer Leavitt, have been doing for some time. Temkin, one of the leading medical historians of the last century, dissected the meaning of the term “disease,” arguing that medical thinking about disease is characterized by two broad tendencies: the ontological, which defines “disease as an [external] entity that befalls a healthy person,” and the physiological, which defines “‘disease as a deviation from the normal’, where a number of factors have influenced a man so as to make him suffer.”¹⁴ The former view focuses on disease as an external entity whose nature does not change from patient to patient, while the latter emphasizes the individual and her unique feelings evoked by her disease experience. Charles Rosenberg describes the contemporary ontological definition of disease as “a biopathological phenomenon with a characteristic mechanism and a predictable course.”¹⁵ Pursuant to this definition, tuberculosis is the disease resulting from infection by the tuberculosis bacillus and has always been so.

Rosenberg argues, however, that in studying disease concepts historically, disease must “be understood in context, as a time—and place—specific aggregate of behaviors, practices, ideas, and experiences.”¹⁶ This contextual understanding of disease is essential because disease concepts are socially constructed, and “medical thought and practice are rarely free of cultural constraint, even in matters seemingly technical.”¹⁷ These cultural constraints “reflect and incorporate values, attitudes, and status relationships in the larger culture.”¹⁸ Because disease concepts are socially constructed, their history, and the history of health and medicine in general, constitute a form of social history. The history of the Hippocratic Triad—disease, patient, healer—is thus marked by a high degree of indeterminacy. It is a site of struggle. As Judith Walzer Leavitt has put it, “the history of medicine is the history of healers and sick people seen within the actual context of their interaction (social and intellectual), and one side without the other is only partial history.”¹⁹ In short, we must understand consumption in the way that nineteenth-century Americans, both physicians and lay people, understood it, avoiding anachronistic

¹⁴ Owsei Temkin, *The Scientific Approach to Disease: Specific Entity and Individual Sickness*, in SCIENTIFIC CHANGE: HISTORICAL STUDIES IN THE INTELLECTUAL, SOCIAL AND TECHNICAL CONDITIONS FOR SCIENTIFIC DISCOVERY AND TECHNICAL INVENTION, FROM ANTIQUITY TO THE PRESENT 630 (A.C. Crombie ed., 1963).

¹⁵ Charles E. Rosenberg, *The Tyranny of Diagnosis: Specific Entities and Individual Experience*, 80 MILBANK Q. 237, 238 (2002).

¹⁶ Charles E. Rosenberg, *What Is Disease? In Memory of Owsei Temkin*, 77 BULL. HIST. MED. 491, 494 (2003).

¹⁷ Charles E. Rosenberg, *Framing Disease: Illness, Society and History*, in CHARLES ROSENBERG, EXPLAINING EPIDEMICS AND OTHER STUDIES IN THE HISTORY OF MEDICINE, *supra* note 13, at 306.

¹⁸ *Id.*

¹⁹ Judith Walzer Leavitt, *Medicine in Context: A Review Essay of the History of Medicine*, 95 AM. HIST. REV. 1471, 1473 (1990).

judgments of their views based on our present-day knowledge, which is itself contested and subject to future revision. Pursuant to this outlook, “consumption” was *not* a mistaken name for what we now know as tuberculosis and other diseases, but rather a frequently fatal ill-health experience characterized by, *inter alia*, fever, shortness of breath, pallor, expectoration of blood, and a progressive wasting away of the body.

Fourth, another consequence of the social construction of disease, as Rosenberg implies, is that disease concepts and other medical ideas are often affected by the power relationships present in society. This is patently obvious when one considers racial power. For example, Tera Hunter, in her rich and detailed history of working-class freed women in Atlanta, shows how, in the half-century after the Civil War, the white southern medical establishment redefined consumption “as an antebellum white disease that had become a postbellum black disease when the ‘quarantine’ effect of slavery was removed.”²⁰ Southern whites, in effect, blamed blacks for the spread of tuberculosis and used “medical science” to advance their agenda. A similar process is evident with reference to class power, particularly regarding matters of workplace and occupational health. That corporate employers—supported by pliant medical professionals—refused to recognize the medical reality of such workplace diseases as byssinosis, radium poisoning, silicosis, asbestosis, and lead poisoning long after the medical data had proven their existence demonstrates amply how dominant economic interests shape medical discourse and the definition of disease concepts in favor of capital and to the detriment of labor.²¹

This essay, then, is an attempt to explore the social history of the disease concept of consumption, and to bring to bear that history on our understanding of the *Lochner* case. Part I will examine the public health arguments advanced by the journeymen bakers of New York during their long agitation for bakeshop reform. Specifically, the focus will be on the bakers’ argument that their working conditions were conducive to high rates of consumption. Part II will focus on historical and contemporary medical opinion regarding the meaning of the disease concept “consumption,” with particular emphasis on its etiology. Consumption will be understood contextually as a discrete disease experience and concept of the nine-

²⁰ TERA HUNTER, TO ‘JOY MY FREEDOM: SOUTHERN BLACK WOMEN’S LIVES AND LABORS AFTER THE CIVIL WAR 193 (1997).

²¹ On byssinosis, see Charles Levenstein et al., *Labor and Byssinosis, 1941–1969*, in DYING FOR WORK: WORKERS’ SAFETY AND HEALTH IN TWENTIETH CENTURY AMERICA 208–23 (David Rosner & Gerald Markowitz eds., 1987) [hereinafter DYING FOR WORK]; on radium poisoning, see CLAUDIA CLARK, RADIUM GIRLS: WOMEN AND INDUSTRIAL HEALTH REFORM, 1910–1935, at 87–111 (1997), and Angela Nugent, *The Power to Define a New Disease: Epidemiological Politics and Radium Poisoning*, in DYING FOR WORK, *supra*, at 177–91; on silicosis, see Gerald Markowitz & David Rosner, “*The Street of Walking Death*”: *Silicosis, Health, and Labor in the Tri-State Region, 1900–1950*, 77 J. AM. HIST. 525 (1990); on asbestosis, see David Kotelchuck, “*The Funeral Dress of Kings*”—and Others, in DYING FOR WORK, *supra* 192–207; on lead poisoning, see David Rosner & Gerald Markowitz, “*A Gift of God*”? *The Public Health Controversy over Leaded Gasoline During the 1920s*, in DYING FOR WORK, *supra* 121–39, and William Graebner, *Hegemony Through Science: Information Engineering and Lead Toxicology, 1925–1965*, in DYING FOR WORK, *supra*, at 140–59.

teenth century. Part III will analyze the *Lochner* decision in light of the medical discourse regarding consumption set forth in Part II.

I. The Journeymen Bakers and the Public Health

A. Avoiding Consumptives' Graves: The Bakers and Occupational Health

The journeymen bakers of New York had advocated a reduction of their working hours for at least fifteen years, from 1880 to 1895, when they finally met with success with the passage of the New York Bakeshop Act. On the basis of an 1880 survey of 505 bakers, the Bakers' Union estimated that New York City's bakery employees worked an average of sixteen hours per day.²² A major aspect of the journeymen bakers' agitation for shorter hours was advocacy of broader bakeshop reform, including a struggle for more humane and hygienic working conditions. Today, these would be termed issues of occupational health. The bakers, drawing on the medical knowledge and beliefs of the late nineteenth century, argued that long hours spent in bad conditions led to poor health among them, specifically to high rates of consumption. As detailed in Part II below, the term "consumption" referred to a specific set of symptoms and ill health—a particular disease experience—often leading to death. Following the discovery of the bacillus that causes tuberculosis, twentieth-century medicine gradually redefined much of what had been consumption as several different diseases, including tuberculosis and cancer.

Bakers were exposed to gas fumes, smoke, high humidity, flour dust, and varying temperature extremes. To make matters worse, starting in the late 1860s, master bakers in New York City increasingly located their shops in tenement basements, which the 1867 Tenement House Law decreed unfit for residential habitation because of their low ceilings, lack of ventilation, and poor plumbing.²³ New York's factory inspectors believed these same conditions rendered tenement cellars equally unfit for long hours of labor making bread, yet the statute did not bar the location of commercial establishments in tenement cellars.²⁴ Not only bakeries, but also certain "noxious trades," such as "slaughterhouses, bone-boilers, fat-renderers, tanneries, and soap makers," all of which emitted foul odors and industrial waste, began to concentrate in the city's cellars as well.²⁵ In 1883, George Block, Secretary

²² 1 *Rep. of the Comm. of the S. upon the Relation Between Labor and Capital* 438 (1885) [hereinafter *Labor & Capital*] (testimony of George G. Block, Secretary of the Journeymen Bakers' Union, Aug. 21, 1883).

²³ The Tenement House Law of 1867 was New York's first statute specifically targeted at tenement regulation. Section 6 prohibited residential occupation of tenement cellars with ceilings less than seven feet high and required ceilings to be at least one foot higher than the surface of the adjoining street or ground. 2 ROBERT DEFOREST & LAWRENCE VEILLERS, *THE TENEMENT HOUSE PROBLEM* 296-97 (1903); see also JARED N. DAY, *URBAN CASTLES: TENEMENT HOUSING AND LANDLORD ACTIVISM IN NEW YORK CITY, 1890-1943*, at 25 (1999); JOHN DUFFY, *A HISTORY OF PUBLIC HEALTH IN NEW YORK CITY, 1866-1966*, at 220-26 (1974).

²⁴ ANNUAL REPORT OF THE FACTORY INSPECTORS OF THE STATE OF NEW YORK, FOR THE YEAR ENDING DECEMBER 1ST, 1886, at 5-6 (1887).

²⁵ Jared N. Day, *Tainted Neighbors: Cellar Industries, Industrial Waste, and Urban Reform in New York City, 1866-1915*, at 8-9 (Mar. 21, 2000) (unpublished conference paper presented at the Annual Meeting of the American Society for Environmental History in Tacoma, Washington), at <http://www.epp.cmu.edu/csir/taintedneighborscellarindustries.pdf> (last visited Jan. 31, 2005). For a

of the Journeymen Bakers' Union, described the sanitary conditions of the cellar bakeries simply as "miserable."²⁶ He later amplified this theme in a pamphlet entitled "Slavery in the Baker Shops," in which he provided a vivid description of the cellar bakery as a workplace, including these comments regarding temperature and ventilation: "It must be borne in mind that this labor is to be performed in a high temperature almost throughout, and at the same time in places where ventilation is hardly possible, or even hurtful to the success of the operation, and that the rooms are mostly underground."²⁷ High temperatures and poor ventilation in underground rooms yielded, in Block's opinion, unhealthy air. In 1895, the State Bureau of Labor Statistics concurred, stating that many of the bakeries were "nothing more nor less than cellars of the worst description and absolutely unfit for the manufacture of food products. They are damp, fetid and devoid of proper ventilation and light."²⁸ The year before, the factory inspectors had concluded of baking that "there appears to be no other industry, not even the making of clothing in sweat-shops, which is carried on amid so much dirt and filth."²⁹

The bakers argued that working so many hours per day in what one anonymous writer called the "poisonous gases" of the cellar bakeries led to poor health, illness, and specifically consumption.³⁰ As a letter-writer to the Gilded Age labor newspaper *John Swinton's Paper* put it:

[P]ure air is needed to strengthen the body of human kind. It is not an uncommon thing for the baker to be at service early in the morning and keep at it till late at night, or even to work all night. As a rule bakers are confined to the cellars or basements of the stores where they are employed, which are often damp and not fit to work in or eat in, much less to sleep in In the bakers' trade there is the most extreme strain upon the nervous and physical system of the stoutest of us. A few years of this continual strain sends many of us into the *consumptive's* graves, or racks us with rheumatism.³¹

The journeymen bakers strongly believed that flour dust, heat, humidity, fumes, and smoke—particularly when encountered for hours on end in the poorly ventilated cellar bakeries—contributed to high rates of consumption in their trade. Nor were they alone in this belief. One factory inspector's report confirmed those claims, stating that

contemporary account of other food manufacturing industries in New York's cellars, see Mary Sherman, *Manufacturing of Foods in the Tenements*, 15 CHARITIES & COMMONS 669 (1906).

²⁶ BAKERS' J., Dec. 8, 1888, at 2. *Labor & Capital*, *supra* note 22, at 437. On the poor working conditions of the cellar bakeries, see KENS, *supra* note 10, at 7-9.

²⁷ BAKERS' J., Dec. 8, 1888, at 2.

²⁸ 2 N.Y. BUREAU OF LABOR STATISTICS, THIRTEENTH ANNUAL REPORT OF THE BUREAU OF STATISTICS OF LABOR OF THE STATE OF NEW YORK, FOR THE YEAR 1895, at 6 (1896). The report further found that 1049 of 1059 New York City bakeries (99%) were located in cellars, and most had ceilings seven feet or lower in height. *Id.*

²⁹ N.Y. BUREAU OF FACTORY INSPECTION, NINTH ANNUAL REPORT OF THE FACTORY INSPECTORS OF THE STATE OF NEW YORK, 55 (1895).

³⁰ BAKERS' J., Aug. 4, 1888, at 1.

³¹ JOHN SWINTON'S PAPER, Apr. 25, 1886, at 1 (emphasis added).

[o]ut of seventy [bakers] questioned . . . in the course of two nights' inspections in the Jewish quarters, . . . eight of them acknowledged that they had "lung trouble," or consumption, five others stated that they were afflicted with a "weakness," but they would not acknowledge that it was consumption, although a layman could form that opinion from their appearances.³²

In particular, it was the combination of poor working conditions and long hours that the bakers protested, thus locating the problem—and its solution—at the intersection of "labor" and "public health" law, what is now called occupational health. Further, as the next section will show, the bakers pointed out that if their working conditions were making them sick, that did not bode well for the public consuming bakery goods made under such circumstances.

B. Bread and Filth Baked Together: The Bakers and Public Health

The struggle for shorter hours was not solely a self-regarding one, and became successful only when the journeymen bakers reached across class lines to enlist the support of the consumers of their products, among whom were many middle class citizens, especially women. Along with their concern for the health consequences of working long hours in poorly ventilated cellars, the journeymen bakers evinced a related concern for the health consequences suffered by the consuming public owing to the unhygienic quality of the overworked bakers and their unsanitary shops.

Indeed, the bakers achieved the legislation they had sought for so many years only when they managed to garner middle class consumer support for their movement. As early as 1892, for example, bakers' union spokesman Henry Weismann drew a connection between the bakers' hours and the public health when he observed that

the consumers like clean, wholesome bread, yet if they could go into the shops at night and see the men at work they would lose their appetites altogether. It is not the fault of the men if they are unkempt and dirty, because, tired and sleepy, they do not feel like washing their hands five times in the course of a night.³³

Tired workers were not apt to be cleanly workers, and dirty bakers surely made unhygienic bread.

Further, in 1893, the *Bakers' Journal* discussed their ongoing struggle for more sanitary bakeshop conditions and the obstacles they faced:

The movement for clean and healthy bakeshops is evidently in time throughout the world. The organized bakers are taking the matter up and forcing public attention to the existing anomalies. . . . The spirit of self assertion among the journeymen . . . is making itself felt in every custom of the baker. For years he willingly abided by the dictates of boss and master,

³² N.Y. BUREAU OF FACTORY INSPECTION, TENTH ANNUAL REPORT OF THE FACTORY INSPECTORS OF THE STATE OF NEW YORK, 47 (1896).

³³ Article clipping located in Bakery and Confectionery Workers' International Union Papers, University of Maryland Archives, Accession No. 27, Series VII, Box 5.

without a murmur he would submit to the most nauseating surrounding and willingly labor in a manner suicidal to life and health.³⁴

According to this view, it was the master bakers who opposed bakeshop cleanliness, so that public health became a matter of class struggle. The *Bakers' Journal* further developed this argument in a September 29, 1894 article that contended “the master bakers in their eagerness to enhance their profits give their employees neither time nor wages sufficient to keep themselves, their tools and general surroundings in a clean and wholesome condition.”³⁵ Thus, filthy bakeshops were due in part, according to the bakery employees, to long hours of labor, themselves the result of the bakery bosses' willingness to put profit ahead of the public health needs of their consumers.

Finally, on September 30, 1894, the *New York Press* published a story headlined “Bread and Filth Cooked Together,” which detailed the unhealthy and unsanitary conditions then present in many of New York City's tenement cellar bakeries.³⁶ The *Press* story, and several which followed, exposed such conditions as lack of finished walls or floors, poor ventilation, absence of tiling, and the presence of vermin such as rats and cockroaches. A public outcry ensued, a broad movement to pass legislation to reform the bakeshops developed, and a Bakeshop Act passed the state legislature within eight months.

A week after the *Press* exposé, the *Bakers' Journal* argued that “for the permanent relief of the men, which is essential to their cleanliness, the principal requirement is the reduction of the hours of labor.” With the support of the *New York Press*, the *Bakers' Journal* could confidently take credit for the conversion of these establishment figures to a viewpoint and solution generated by the bakers themselves over years of struggle.³⁷ These late participants in the Bakeshop Reform Movement of 1894–95 were in fact echoing lines of thought previously developed by the organized journeymen bakers.

For the bakers, the related issues of their own occupational health and their consumers' public health had become central to their agitation for workplace reform. If deleterious bakery working conditions were harmful to the bakers' health, they were harmful as well to the consuming public eating bread and other baked goods made and handled by diseased bakery employees. As the *Bakers' Journal* put it in 1897:

Our struggle as a Union is carried on to introduce some new principles into the calling of the baker. They may be summed up in two words—*humanity* of treatment for the employees and all that this word implies, *cleanliness* of work, tools and surroundings, in the interest of the great

³⁴ BAKERS' J., July 15, 1893, at 1.

³⁵ *Id.*, Sept. 29, 1894, at 1.

³⁶ *Bread and Filth Cooked Together*, N.Y. PRESS, Sept. 30, 1894, pt. 4, at 1. Although David Bernstein is probably correct in stating that the Bakers' Union and the *Press* coordinated the coverage, there seems little merit in his attempt to question the accuracy of the *Press* articles, given that they were utterly consistent with contemporaneous findings of New York's factory inspectors cited elsewhere herein. See Bernstein, *supra* note 8, at 331–32.

³⁷ BAKERS' J., Oct. 6, 1894, at 2.

mass of consumers. . . . Man is the product of his environment. Let us surround the baker with the tokens of cleanliness, of decency and a proper regard for the masses of the people, and his rise in the social scale as well as in quality of workmanship will follow as a matter of course.³⁸

The objective of protecting their own health led the bakers to advocate the protection of the health of their consumers among the general public. Though the bakers themselves spent little time or energy substantiating their health claims, this is probably the result of their indisputability. It would take a Supreme Court majority willing to turn a blind eye to several hundred years of received medical wisdom to dispute that which was known to everyone else.

II. Consumption, Phthisis, and Bakeries: Medical Opinion Through the Ages

Though some have contended that the bakers' argument that their working conditions induced consumption was contrary to the contemporary understanding of how tuberculosis is caused and spread,³⁹ there were medically valid foundations for the bakers' position, not only in terms of the contemporary medical knowledge, but also in light of what is known today. First, a long tradition of medical knowledge and thinking held that environmental factors, including workplace conditions, were a part of the etiology of consumption. Second, while German researcher Robert Koch had announced his discovery of the tuberculosis bacillus in 1882, for various reasons the American medical profession accepted his germ theory only gradually. Third, even pursuant to the germ theory, environmental factors play an important role in the etiology of tuberculosis as a disease. The first factor that must be understood, moreover, is the conflation during the nineteenth century of the signs "consumption," "phthisis," and "tuberculosis."

A. From Hippocrates to Ramazzini

When the bakers of the nineteenth century complained they were subject to consumption or phthisis, they were not necessarily referring to what we know today as tuberculosis. The most commonly used disease concept for what was the leading killer of the nineteenth century was, until early in the last century, "phthisis," a word used by the ancient Greeks (φθίσις) meaning "wasting."⁴⁰ Hippocrates described phthisis as "the most considerable of the diseases which then prevailed, and the only one which proved fatal to many persons."⁴¹ The term "consumption," like phthisis, referred to the fact that the body was literally "consumed" by the course of the disease. That the name of the disease referred to symptoms rather than causes is not unexpected. As Charles Rosenberg has pointed out, prior to the mid-nineteenth century, "disease concepts were focused on the individual sufferer. They were symptom oriented, fluid, idiosyncratic, labile, and prognosis ori-

³⁸ BAKERS' J., July 15, 1897, at 6–7.

³⁹ KENS, *supra* note 10, at 9–11; Bernstein, *supra* note 8, at 328.

⁴⁰ THOMAS DORMANDY, THE WHITE DEATH: A HISTORY OF TUBERCULOSIS 1–2 (2000).

⁴¹ HIPPOCRATES, OF THE EPIDEMICS bk. I, § 1 (ca. 400 BCE), available at The Internet Classics Archive, <http://classics.mit.edu/Hippocrates/epidemics.1.i.html> (last visited Feb. 15, 2005).

ented.”⁴² Physicians and lay people used the terms phthisis and consumption to refer not only to what modern medicine calls tuberculosis, but to any disease characterized by “progressive emaciation or wasting away,”⁴³ particularly where pulmonary symptoms and fever were markedly present. Thus, nineteenth-century medical nomenclature was derived from both observable symptomatology and underlying causes, rather than from causes alone: In Temkin’s terms, the nomenclature was more physiological than ontological. The list of contemporary disease categories covered by the term “consumption” includes cancer, silicosis, various lung abscesses, diabetes, catarrh, empyema, chronic bronchitis, and, of course, tuberculosis.⁴⁴ In the nineteenth century, any of these might have been called “consumption.”

The modern history of the medical understanding of consumption, to which the makers of the later nineteenth century were heirs, shows how and why the makers believed their working conditions brought on a heightened risk of the disease. Beginning in the sixteenth and seventeenth centuries, a growing interest in anatomy shed new light on the etiology of many diseases, including consumption.⁴⁵ The first to describe the lesions or tumors associated with tuberculosis in the human body—and to associate them definitively with phthisis—was Franciscus de la Boë Sylvius (1614–1672), a Flemish physician at the University of Leyden, at the time one of the leading medical schools in Europe.⁴⁶ Sylvius wrote that he “observed several times in the lung smaller or bigger glandular protuberances, which—as manifested by section—had a purulent content. These gradually suppurating tubercula, included in a thin membrane, are—in my opinion—ulcers, and the phthisis—as I see—draws its origin just from these.”⁴⁷ As this suggests, Sylvius believed the tubercles were glandular in nature and that the etiology of consumption was often the result of a lymphatic degeneration affecting the lymph glands of the lungs, causing the growth of the tubercles and then phthisis.⁴⁸

A renowned student of Sylvius, the English physician Richard Morton (1635–1698) was, according to Laszló Magyar, “undoubtedly the first to declare that these tubercula were the necessary and preliminary condition of pulmonary consumption”⁴⁹ in a well-known and popular 1694 treatise, aptly titled *Phthisiologia*.⁵⁰ However, Morton discussed many types of consumption, including nervous consumption, consumption from bleeding, diabetic consumption, and pulmonary

⁴² Rosenberg, *supra* note 15, at 242.

⁴³ ROBLEY DUNGLISON, A DICTIONARY OF MEDICAL SCIENCE 250 (1874). On Dunglison, see Samuel X. Radbill & Robley Dunglison, *The Autobiographical Ana of Robley Dunglison, M.D.*, 53 TRANSACTIONS AM. PHIL. SOC’Y 1 (1963).

⁴⁴ RENE DUBOS & JEAN DUBOS, *THE WHITE PLAGUE: TUBERCULOSIS, MAN AND SOCIETY* 4–6, 72 (1952); KATHERINE OTT, *FEVERED LIVES: TUBERCULOSIS IN AMERICAN CULTURE SINCE 1870*, at 9 (1996).

⁴⁵ Laszló Magyar, *The History of the Term “Tuberculosis”*, in *TUBERCULOSIS: PAST AND PRESENT* 25–27 (Gyrgy Plfi et al. eds., 1999), available at <http://semmelweis.tripod.com/eng/tuberc.html> (last visited Feb. 1, 2005).

⁴⁶ DUBOS & DUBOS, *supra* note 51, at 72–74.

⁴⁷ FRANCISCUS DE LA BOE SYLVIUS, *OPERA MEDICA* 692–93 (1695) (quoted by Magyar, *supra* note 52, at 26).

⁴⁸ Magyar, *supra* note 52.

⁴⁹ *Id.*

⁵⁰ RICHARD MORTON, *PHTHISIOLOGIA: OR A TREATISE OF CONSUMPTIONS* 155–58 (1694).

consumption, to which he devoted the lion's share of his treatise.⁵¹ Like his teacher Sylvius, Morton continued to believe that the tubercles had their origins in diseases of the lymph glands, having many possible causes, including environmental ones.⁵² Morton listed eleven causes of pulmonary consumption, three of which—working at night, lack of exercise, and breathing foggy, thick, or smoky air—were especially descriptive of bakers' working conditions as late as the nineteenth century.⁵³

In the century after Morton, medicine made few new advances in the study of consumption, as endless debates swirled about the precise nature of the tubercles, how they formed, and what their role was in the progress of consumption.⁵⁴ One notable contribution to medical knowledge in general, however, was the work of Bernardino Ramazzini (1633–1714), a medical Professor at the University of Mantua and later at Padua. Ramazzini is known as the founder of occupational medicine. His book, *De Morbis Artificum (Diseases of Workers)* discussed in great detail the health risks associated with fifty-four occupations, including that of bakers.⁵⁵ Ramazzini concluded that bakers were “more often ailing than other workers,” and emphasized the dangers of pulmonary conditions, including asthma, pleurisy, and pneumonia, as well as “swelled and painful” hands.⁵⁶ Ramazzini specifically observed that two environmental conditions of bakeries—the presence of flour dust and the heat—contributed to the pulmonary problems of bakers, because the dust “stuff[s] up not only the throat but the stomach and lungs too” making bakers “very liable to coughs, short of breath, hoarse, and finally asthmatic.”⁵⁷ Though he did not mention consumption, Ramazzini evinced a clear concern for the pulmonary risks of the baking trade, and advised that bakers should wear “a linen bandage” over their face, despite confessing that this precaution would not prevent the health problems he had described.⁵⁸ Thus, by the beginning of the eighteenth century, medicine recognized the pulmonary health risks that bakers faced.

B. The Pathological Revolution

Starting at the end of the eighteenth century, moreover, the “pathological revolution” began to yield important changes in the understanding of phthisis. Specifically, the work of several French and English doctors established the paradigm for thinking about consumption that continued in force until Koch: namely that consumption was one disease rather than many, caused in all cases by the presence of tubercles in the lungs or, more rarely, other organs. The cause of the

⁵¹ *Id.* at 4–11, 14–22, 41–45, 62–190.

⁵² *Id.* at 88–91.

⁵³ *Id.* at 65–68.

⁵⁴ DORMANDY, *supra* note 40, at 8–9; DUBOS & DUBOS, *supra* note 44, at 73–75; MICHAEL E. TELLER, THE TUBERCULOSIS MOVEMENT: A PUBLIC HEALTH CAMPAIGN IN THE PROGRESSIVE ERA 5–6 (1988).

⁵⁵ BERNARDINO RAMAZZINI, DE MORBIS ARTIFICUM DIATRIBA [DISEASES OF WORKERS] (Wilmer Cave Wright trans., 2d ed. 1964) (1713). On Ramazzini's life, see George Rosen, M.D., *Introduction to RAMAZZINI*, *supra* xiii–xliv.

⁵⁶ *Id.* at 225–35.

⁵⁷ *Id.* at 225–27.

⁵⁸ *Id.* at 227.

development of tubercles remained a subject of debate, however, as did the question of whether consumption was contagious.

Matthew Baillie, an English physician whose *Morbid Anatomy* was “the first practical and useful textbook of pathology and clinical pathologic relationships,”⁵⁹ established in 1793 that the tubercula were “not a morbid affection of the glands,” as Sylvius and Morton had believed.⁶⁰ Baillie demonstrated that because “there is no glandular structure in the cellular connecting membrane of the lungs” where tubercles occur, and in those parts of the lungs where lymph glands are located “tubercles have never been seen,” no relationship between the two existed.⁶¹ Like Morton, Baillie believed that phthisis pulmonalis was always caused by tubercles, and advised physicians to look for the early symptoms of tubercular formation, including mild cough, breathing difficulty, and a fast pulse.⁶² Gaspard L. Bayle (1774–1816), a French physician, “definitely proved that tubercula are not products, or results, but causes” of consumption.⁶³ Though Bayle’s empirical work was impressive (he performed over 900 autopsies in just a few years) his observation of so many tubercles, varying in structure and leaving many different types of ulcers and cavities, erroneously convinced him that consumption was actually at least six separate diseases, only one of which was true tuberculous phthisis (*phthisie tuberculeuse*).⁶⁴ Nevertheless, the term “tuberculosis,” which Morton had used a century before, and which, ironically, Bayle did not employ, soon re-appeared in the medical literature and was “connected to Bayle’s theory.”⁶⁵

The most important of these *fin-de-siècle* figures is doubtless René T.H. Laënnec (1781–1826), a Breton-French physician who not only invented the stethoscope, but also revolutionized the understanding of consumption with his unitary theory of phthisis.⁶⁶ A contemporary and friend of Bayle, and like him a consumptive, Laënnec also participated in many dissections, and made a detailed study and analysis of countless tubercles, at every stage of development and in many organs. But he reached conclusions completely opposite those of his colleague and fellow sufferer. Specifically, Laënnec concluded in 1804 that, despite the apparent differences among tubercles, ulcers, and cavities, pulmonary consumption was in fact a single disease.⁶⁷ Owing largely to the work of Sylvius, Morton, Bayle, Baillie, and Laënnec, the Swiss medical professor Johan Lukas Schönlein proposed in 1839 that the word “tuberculosis” be used to describe all pulmonary phthisis, because the

⁵⁹ Alvin E. Rodin, *Contributions of the Morbid Anatomy*, in *THE INFLUENCE OF MATTHEW BAILLIE’S MORBID ANATOMY: BIOGRAPHY, EVALUATION AND REPRINT* 31 (Alvin E. Rodin ed., 1973).

⁶⁰ MATTHEW BAILLIE, *THE MORBID ANATOMY OF SOME OF THE MOST IMPORTANT PARTS OF THE HUMAN BODY* (2d American ed. 1808), reprinted in *THE INFLUENCE OF MATTHEW BAILLIE’S MORBID ANATOMY: BIOGRAPHY, EVALUATION AND REPRINT*, *supra* note 59, at 105.

⁶¹ *Id.*

⁶² *Id.* at 110.

⁶³ Magyar, *supra* note 45 (citing GASPARD BAYLE, *RECHERCHES SUR LA PHTHISIE PULMONAIRE* (1810)).

⁶⁴ DORMANDY, *supra* note 40, at 36; DUBOS & DUBOS, *supra* note 44, at 79–80.

⁶⁵ Magyar, *supra* note 45.

⁶⁶ DORMANDY, *supra* note 40, at 32–39; DUBOS & DUBOS, *supra* note 44, at 80–91.

⁶⁷ DUBOS & DUBOS, *supra* note 44, at 83–84.

tubercle was “the fundamental pathological unit” characteristic of the disease.⁶⁸ Thereafter, the term tuberculosis, which is more modern in the sense that it was derived from the condition’s ontology rather than its symptomatology, became gradually more dominant, though “phthisis” and “consumption” did not entirely disappear until some time after Koch’s discovery of the bacillus.

C. Two Theories of Etiology: Diathesis and Environment

In the wake of the pathological revolution, two theories, which were by no means mutually exclusive, regarding the etiology of tubercular consumption dominated: the diathetic, which emphasized heredity, and the zymotic, which emphasized the role of environmental factors. The diathetic theory held that certain people had a hereditary predisposition to consumption, termed the “consumptive diathesis,” which could be discerned not only by tracing the disease in an individual’s family background, but also by careful clinical analysis of a patient’s physical appearance.⁶⁹ Dr. James Clark, a leading expert on consumption, wrote confidently “that pulmonary consumption is a hereditary disease—in other words, that the tuberculous constitution is transmitted from parent to child, is a fact not to be controverted,” and advised that those with the consumptive diathesis “are instantly recognisable by the scrawny body, flat, narrow, or concave chest, fair freckled skin, red or very pale hair and eyes, irregularly harsh instead of silky breathing and of course the high probability that they had had elder tubercular kin with similar characteristics.”⁷⁰ This theory was overwhelmingly popular; in an 1873 poll of American physicians, 205 of 210 (97.6%) stated their belief that consumption was “caused or promoted by hereditary influences.”⁷¹ Hence, in the nineteenth century, heredity was thought to determine tubercular destiny.

Yet doctors and others did not believe that heredity was the only cause of consumption. One of the leading environmental theories of disease etiology was “miasmaticism,” a theory that unhealthy air, particularly vapors and fumes originating in the decay of organic matter, caused diseases, “either through debilitating the individual or by acting as a specific causative factor.”⁷² Thus, Anderton and Leonard explain, “[p]oisonous vapors, atmospheres, environments, and toxins were conceived to be directly responsible even for infectious diseases.”⁷³ Nineteenth century physicians, nurses, and lay people believed strongly that “bad air” was a pri-

⁶⁸ DORMANDY, *supra* note 40, at 9 & n.19; DUBOS & DUBOS, *supra* note 44, at 84.

⁶⁹ For a lucid and penetrating discussion of nineteenth century medical views regarding heredity, including diathesis, see Charles E. Rosenberg, *The Bitter Fruit: Heredity, Disease, and Social Thought in Nineteenth Century America*, 8 PERSP. AM. HIST. 189 (1974).

⁷⁰ JAMES CLARK, A TREATISE ON PULMONARY CONSUMPTION 52, 128 (1835).

⁷¹ TELLER, *supra* note 54, at 8 (citing Henry Bowditch, *Analysis of a Correspondence on Some of the Causes or Antecedents of Consumption*, in FOURTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF MASSACHUSETTS 311 (1873)).

⁷² Charles E. Rosenberg, *Cholera in Nineteenth Century Europe: A Tool for Social and Economic Analysis*, 8 COMP. STUD. SOC’Y & HIST. 452, 459 (1966). On miasmaticism generally, see DUFFY, *supra* note 23, at 112–42; JOHN DUFFY, THE SANITARIANS: A HISTORY OF AMERICAN PUBLIC HEALTH 67–68 (1990).

⁷³ Douglas L. Anderton & Susan Hautaniemi Leonard, *Grammars of Death: An Analysis of Nineteenth Century Literal Causes of Death from the Age of Miasmas to Germ Theory*, 28 SOC. SCI. HIST. 111, 112 (2004).

mary cause of consumption: Florence Nightingale was a particularly firm proponent.⁷⁴ Thus while English physician Thomas Bartlett, in his 1855 book on consumption, listed “hereditary predisposition” as the first of many causes of phthisis, he also included “breathing a vitiated atmosphere especially if it be cold and damp, deficient clothing, damp residence, [and] want of cleanliness” as well.⁷⁵ Dr. Bartlett specifically advised consumptives that “[i]n no disease is change of climate attended with such satisfactory results as in impending Consumption.”⁷⁶ Indeed, the broad popularity of climate change as a therapy for consumption, especially relocation to regions with cleaner, drier, air where sanatoria especially for consumptives were built, was based on the miasmatic theory’s belief that bad air caused or promoted phthisis.⁷⁷ This movement even gave rise to the formation of a professional medical association—the American Climatological Association—devoted to “the study of climatology and the diseases of the respiratory organs.”⁷⁸ Formed in 1884—two years *after* the announcement of Koch’s discovery—by “forty-two prominent doctors,” the ACA published a yearly academic journal for half a century, sponsored annual conferences, and generally studied and promoted the idea that change of climate could have a beneficial effect on the course of many diseases, including consumption.⁷⁹

During the nineteenth century, medical knowledge and discourse underwent a period of fundamental transformation, yet the pathological revolution of the early part of the century posed as many questions regarding the etiology of disease as it answered. This was especially true in regard to phthisis: the findings of the early pathologists established that pulmonary phthisis was one disease caused by the presence of tubercles in the lungs, yet the question of how and why pulmonary tubercles developed in the first place remained unanswered. Based on clinical observation and theory, the diathetic and miasmatic theories of disease constituted the two dominant explanations of the etiology of consumption, and the latter allowed physicians to offer therapeutic advice to consumptive patients. In the decades after 1882, however, both theories would be gradually replaced by the germ theory of disease, which would likewise pose as many questions about the etiology of tuberculosis as it answered.

D. The Bacteriological Revolution and Dr. Koch’s Bacillus

It was the “bacteriological revolution” of the late nineteenth century that yielded a paradigm shift in thinking about the etiology of tuberculosis. The work of Pasteur and Lister on the bacterial causes of disease paved the way. The shift re-

⁷⁴ DORMANDY, *supra* note 40, at 43–44.

⁷⁵ THOMAS BARTLETT, CONSUMPTION: ITS CAUSES, PREVENTION, AND CURE 30 (1855).

⁷⁶ *Id.* at 118.

⁷⁷ See DORMANDY, *supra* note 40, at 147–59; DUBOS & DUBOS, *supra* note 44, at 173–81; BILLY M. JONES, HEALTH-SEEKERS IN THE SOUTHWEST, 1817–1900, at 123–49 (1967); William Blasius, *Some Remarks on the Connection of Meteorology with Health*, 14 PROC. AM. PHIL. SOC’Y 667 (1875).

⁷⁸ *The Constitution and By-Laws of the American Climatological Association*, 11 TRANSACTIONS AM. CLIMATOLOGICAL ASS’N 89 (1884), *quoted in* JONES, *supra* note 77, at 133.

⁷⁹ JONES, *supra* note 77, at 133–34, 126–28.

ceived ineluctable impetus on March 24, 1882, when German physician Robert Koch announced in Berlin that he had solved the age-old puzzle of how and why tubercles form by isolating a bacillus, *Mycobacterium tuberculosis*, that satisfied three key conditions, now known as Koch's postulates, demonstrating that it was the cause of tuberculosis: It was present in all tuberculous lesions, it could be cultivated pure outside the body for several generations, and upon re-introduction into laboratory animals, it could produce the original disease.⁸⁰ In light of these three facts, Koch concluded, the bacillus was the cause both of the tubercles first connected to consumption by Sylvius and Morton, and of the disease tuberculosis. News of Koch's discovery traveled fast: The *Berliner klinische Wochenschrift* (Berlin Clinical Weekly) published Koch's paper on April 10, the *Times* of London published an English language summary thereof (prepared by the eminent British physicist John Tyndall and titled "The Etiology of Tubercular Disease") on April 22, and the *New York Times* re-published Tyndall's summary on May 3.⁸¹ Word of Koch's work had traveled four thousand miles in five weeks, but it would take much longer than that for its full import to be felt and understood.

Though Koch's discovery of the bacillus is now rightly considered a historical watershed, his conclusions were met with considerable skepticism, especially in the United States. First, Timothy Alborn has pointed out that extensive "hospital experience and faith in hereditary diathesis" led doctors working as medical advisors for British life insurance companies "to hold firm against the implications of Koch's discovery during the decade after 1882" and into the 20th century.⁸² Notably, these were the leading British experts on consumption, many of whom were on staff at London's prestigious Brompton Hospital for Consumption.⁸³

Second, Koch damaged his own reputation and thus the credibility of his etiological claims regarding his bacillus. In August 1890, at the Tenth International Congress of Medicine in Berlin and in a November 1890 paper published in the *Deutsche Medizinische Wochenschrift*, Koch announced that he had made an astonishing leap forward in the effort to develop an effective treatment for tuberculosis.⁸⁴ Using the traditional term for the disease, Koch wrote that "phthisis in the beginning can be cured with certainty by this remedy."⁸⁵ Not surprisingly, excitement about a possible cure for the leading killer of the age spread wide and deep: imagine the effect an announcement of a cure for cancer would have today. The *Medical*

⁸⁰ DORMANDY, *supra* note 40, at 129–34; DUBOS & DUBOS, *supra* note 44, at 101–03.

⁸¹ DORMANDY, *supra* note 40, at 134. Although Dormandy indicates that the *New York Times* republished Tyndall's summary on April 25, review supports a date of May 3. See John Tyndall, *Tyndall on Koch's Work*, N.Y. TIMES, May 3, 1882, at 2.

⁸² Timothy Alborn, *Insurance against Germ Theory: Commerce and Conservatism in Late-Victorian Medicine*, 75 BULL. HIST. MED. 406, 418–22 (2001).

⁸³ *Id.* at 413–16.

⁸⁴ DORMANDY, *supra* note 40, at 139–44 (due to a typographical error, Dormandy's book states an erroneous date of 1900); DUBOS & DUBOS, *supra* note 44, at 104–07; GEORGINA FELDBERG, DISEASE AND CLASS: TUBERCULOSIS AND THE SHAPING OF MODERN NORTHERN AMERICAN SOCIETY 57 (1995).

⁸⁵ *The Foe of Tuberculosis*, N.Y. TIMES, Nov. 15, 1890, at 1 (setting forth an "exact translation" of Koch's paper in the *Deutsche Medizinische Wochenschrift*).

News of Philadelphia, one of the leading medical journals of the day, published a special edition setting forth a translation of Koch's paper and opined that it "contains, in all probability, the seed of a discovery, the extent of whose fruit cannot be grasped by the human mind, and which bids fair to surpass the triumph of Jenner in his warfare against smallpox."⁸⁶ Professor Carl W.H. Nothnagel of the University of Vienna, one of Europe's most eminent physicians, stated that Koch's discovery was "one of the greatest intellectual achievements in the province of medicine for centuries past" and also compared Koch favorably to Jenner.⁸⁷ The University of Pennsylvania sent a member of its medical faculty to Berlin to study the cure; he joined some fifteen hundred other physicians from around the world who made the trip.⁸⁸ Enthusiasm was particularly pronounced in the United States, where, Georgina Feldberg notes, in 1891 "tuberculin seemed to be under study and in use in virtually every state of the Union."⁸⁹ Unfortunately, Koch's announcement proved premature, as the substance, now known as "Old Tuberculin," turned out to kill as many patients as it helped, though a later version is still used to test for exposure to the tuberculosis bacillus.⁹⁰ According to Michael Teller, this episode "damaged Koch's reputation and delayed the acceptance of his views by the medical profession" in the United States.⁹¹

Third, American medical researchers found it difficult, and often impossible, to replicate Koch's clinical results, often failing to find evidence of the bacillus in the sputum or lesions of tubercular patients. For example, T. Mitchell Prudden, the director of New York City's pathology lab who earned his M.D. from Yale and pursued advanced studies at Berlin and Heidelberg, attempted to follow Koch's method to the letter yet concluded that "tubercular lesions can exist without the presence of tubercle bacilli in them."⁹² Likewise, George Sternberg, according to Feldberg a "renowned bacteriologist who later became surgeon general of the Army," reported that he too was unable to replicate Koch's results.⁹³ The prominent Philadelphia physician H.F. Formad pointed out that "only a few microscopists have recorded examinations of tubercle tissues for bacilli, and among these there *was not one* who did not meet with a case or a certain number of cases in which tubercle bacilli were either totally absent in the tissues, or only present in some of the tubercles."⁹⁴ Since it is a basic premise of the scientific method that the validity of experimental results depends on their replicability, the inability of

⁸⁶ *Id.* (quoting *Medical News*). Dr. Edward Jenner (1749–1823) developed the smallpox vaccine.

⁸⁷ *Koch's Great Triumph*, N.Y. TIMES, Nov. 16, 1890, at 1.

⁸⁸ *To Study the New Remedy*, N.Y. TIMES, Nov. 16, 1890, at 1; *Koch's Curative Lymph*, N.Y. TIMES, Nov. 17, 1890, at 5.

⁸⁹ FELDBERG, *supra* note 84, at 58.

⁹⁰ DORMANDY, *supra* note 40, at 139–44; DUBOS & DUBOS, *supra* note 44, at 104–07.

⁹¹ TELLER, *supra* note 54, at 19.

⁹² T. Mitchell Prudden, *On the Occurrence of the Bacillus Tuberculosis in Tuberculous Lesions*, 23 MED. REC. 400 (1883) (New York); *see* FELDBERG, *supra* note 84, at 40–41.

⁹³ FELDBERG, *supra* note 84, at 41.

⁹⁴ H. F. Formad, *The Bacillus Tuberculosis and the Aetiology of Tuberculosis—Is Consumption Contagious?*, 2 J. AM. MED. ASS'N 449, 451 (1884).

Prudden, Sternberg, and others to do so cast a pall of doubt over Koch's findings and claims, at least in the United States.

Fourth, and perhaps most important, was the fact that tuberculin testing yielded positive results in nearly every case. To clinicians of the era, this meant that nearly everyone had been infected by the tuberculosis bacillus, yet the incidence of the disease indicated that it was not nearly so widespread. Physicians asked how this could be so if the bacillus were the sole cause of the disease. In 1883, Dr. Ezra Hunt, president of the American Public Health Association, developed a suitable metaphor for the emerging American view on the etiology of tuberculosis, that of the seed and the soil:

It cannot be said of any disease proven to be dependent upon or associated with a specific infective particle that its presence or virulence is independent of person or surroundings. Even where the seed is not indigenous and the sower who goes forth to sow is unseen, yet if it falls by the beaten wayside, or where there is no depth of earth, in the unfriendly soil of a pure life or pure dwelling place it perishes as an invading army perishes without its commissariat.⁹⁵

In short, Hunt argued that the diathetic and environmental factors theretofore emphasized by medicine did indeed play an important role in determining who, among those infected with the tuberculosis microbe, would go on to develop tuberculosis disease. The bacillus might be a necessary cause of tuberculosis infection, but not a sufficient cause of tuberculosis disease.⁹⁶

The bakers, factory inspectors, and reformers echoed these views. They believed that working conditions in the cellar bakeries were leading workers to “consumptives graves.” Notwithstanding Koch's original reports, the nineteenth-century understanding of pulmonary consumption, influenced by the miasmatic theory of disease, made the bakers' concerns manifestly reasonable. Authoritative medical opinion continued to believe that bad air, worsened by temperature extremes, caused consumption: Morton had said as much in 1694, and the miasmatic theory of disease made broader sense of this belief and contributed greatly to public health by promoting sanitary reforms that saved countless lives during the nineteenth century. No one disputed that the air in cellar bakeries was filled with flour dust, smoke and humidity; it was only natural to conclude that consumption was a likely result.

Nor did Koch's germ theory overturn this belief. As the wide extent of tuberculosis infection became known, it became clear that factors other than mere exposure to the bacillus were associated with the onset of tuberculosis disease. The tuberculosis seed had to fall upon fertile soil, and lack of ventilation, breathing

⁹⁵ Ezra Hunt, *Hygiene and Its Scope, Its Progress and Its Leading Aims, Presidential Address at the Eleventh Annual Meeting of the American Public Health Association*, in 9 PUB. HEALTH 1, 16 (1883). Hunt's analogy appears to have been inspired by the parable of the sower in the synoptic gospels of the New Testament. See *Matthew* 13:1–13:23; *Mark* 4:1–4:20; *Luke* 8:1–8:15.

⁹⁶ It is now known that approximately ninety percent of those infected with the bacillus never develop the disease. See Donald A. Enarson et al., *Global Epidemiology of Tuberculosis*, in TUBERCULOSIS 17 (William N. Rom & Stuart M. Garay eds., 2004).

large amounts of dust, and working long hours were thought to be excellent fertilizers capable of rendering the lungs susceptible to tuberculosis disease. Thus, in a 1908 publication, the Federal Bureau of Labor recognized the dangers of exposure to dust—including flour dust—in causing consumption and advocated steps to reduce such exposure.⁹⁷ In a 1912 article endorsing the role of the bacillus in causing consumption, Dr. Henry Mays recommended thirteen steps to prevent the disease, including “avoidance of living in damp, ill-ventilated and overcrowded housing, . . . personal and domestic cleanliness, . . . avoidance of overwork and physical mental strain, . . . hygiene of the workshop and factory, good ventilation and temperature, and avoidance of dust as much as possible.”⁹⁸ Another physician, Dr. George Homan of St. Louis, likewise concluded in 1907 that unsanitary conditions at home and at work, particularly the presence of large amounts of dust, supported the onset of tuberculosis infection.⁹⁹ Even pursuant to the contemporary microbial understanding of the etiology of tuberculosis, working excessive hours in cellar bakeries would enhance the risk of developing the disease, because lack of ventilation greatly increases the risk of being infected by one carrying the bacillus.¹⁰⁰ The bakery employees, far from holding on to outdated medical theories regarding the etiology of tuberculosis, were in fact founding their occupational health arguments in favor of the bakeshop statute on the sound medical opinion of the era.

III. Conclusion: Justice Peckham and His Uncommon “Common Understanding”

A complete analysis of the sources for the majority ruling in *Lochner* is beyond the scope of this essay. Instead, the focus has been on the health aspects of the underlying case, understood in the context of contemporary medical discourse. What, then, are we to make of Justice Peckham’s finding that “to the common understanding the trade of a baker has never been regarded as an unhealthy one”?¹⁰¹ While not all of the medical information set forth above was brought before the Court, much of the information was, in fact, available to it. When the New York Court of Appeals affirmed the statute, the concurring opinion of Judge Irving G. Vann cited twenty-three separate authorities for the proposition that working in an environment such as that of the cellar bakeries increased the risk of pulmonary disease, including tuberculosis.¹⁰² In addition to seven citations to general encyclopedias, Vann’s sources included seven medical journal articles, from journals such as *Lancet* and the *Journal of the American Medical Association*, eight medical treatises,

⁹⁷ Frederick L. Hoffman, *The Mortality from Consumption in Dusty Trades*, in FROM CONSUMPTION TO TUBERCULOSIS: A DOCUMENTARY HISTORY 524–48 (Barbara Gutmann Rosenkrantz ed., 1994).

⁹⁸ Thomas J. Mays, *Effect of Present Prevention on the Spread of Consumption*, 82 MED. REC. 977, 980 (1912).

⁹⁹ George Homan, *The Danger of Dust as a Cause of Tuberculosis*, 48 J. AM. MED. ASS’N 1013 (1907).

¹⁰⁰ See Laurence S. Farer, *Mycobacterium Tuberculosis: Bacteriology, Epidemiology, and Treatment*, in PRINCIPLES AND PRACTICE OF INFECTIOUS DISEASES 1905, 1907–08 (Gerald L. Mandell et al. eds., 1979); R.F. Villard, *Bakeries*, in INTERNATIONAL LABOUR OFFICE, ENCYCLOPAEDIA OF OCCUPATIONAL HEALTH AND SAFETY 152–53 (1972) (citing “the high incidence of pulmonary tuberculosis amongst bakers” as one of the health risks of working in *modern* bakeries).

¹⁰¹ *Lochner v. New York*, 198 U.S. 45, 57 (1905).

¹⁰² *People v. Lochner*, 69 N.E. 373, 382–84 (N.Y. 1904) (Vann, J., concurring), *overruled by id.*

including Osler's *Practice of Medicine* and the Arlige's *Diseases of Occupations*, and government mortality tables.¹⁰³ Justice Harlan, in his dissenting opinion, likewise cited similar authorities.¹⁰⁴ Thus, the contemporary medical literature on the topic, cited extensively by Justice Vann in the New York Court of Appeals, and referenced more briefly by Justice Harlan, contained numerous statements to the effect that environmental conditions, particularly the presence of pulmonary irritants including flour dust, heat, and humidity, were factors in the development of tuberculosis. Moreover, it is now clear that this body of opinion was completely consistent with the contemporary, state-of-the-art understanding regarding the etiology of tuberculosis.

In the face of this veritable mountain of medical evidence, Justice Peckham cited only to a mortality table attached to the appellant's brief. The Court's heavy reliance on the mortality table—it was the only scientific data cited by Peckham—is highly instructive. First, the occupational mortality data say nothing about the health of bakery employees, because the data are silent as to the morbidity of the employees, *i.e.*, their rates of disease. Mortality data cannot reflect the facts referenced by Vann and Harlan's sources, regarding bakers' suffering ill health due to their working conditions, or their leaving the trade at an early age due to poor health.¹⁰⁵

Second, the data were comparative rather than absolute. The information was computed, not—as mortality rates even then were—in terms of total deaths per hundred thousand population, but instead by establishing “the mortality of all males within the age period 25–65 years . . . as a standard (1000) with which the death rate in the various occupations is compared.”¹⁰⁶ A death rate of 953 was computed for all employed males, while the range ran from 533 (clergymen) to 1829 (dock laborer).¹⁰⁷ Thus, the data tell us only how the mortality rate of bakers compares with those of all English males and with other occupational groups in England, but they do not tell us what the actual mortality rate of English bakers was. The table showed the bakers had a “mortality rate” of 920, or 92% of that of all English males and 96.5% of that of employed English males.¹⁰⁸ As Peckham stated, the mortality table indicated “that the trade of a baker does not appear to be as healthy as some other trades, and is also vastly more healthy than still others.”¹⁰⁹

The choice of relative mortality data to establish an acceptable baseline of occupational health is telling, because in so doing the Court assumed, as a matter

¹⁰³ The JAMA article cited by Vann stated: “The question as to what business had best be carried on by tuberculosis patients is treated of by Ambler. . . . The butchers, he thinks, generally possess an immunity, at least that has been his experience, but bakers are particularly susceptible.” 177 N.Y. at 172 (quoting 37 J. AM. MED. ASS'N. 1068).

¹⁰⁴ *Lochner*, 198 U.S. at 70–73 (Harlan, J., dissenting).

¹⁰⁵ It is also worth noting that the data was from England and thus did not include employees of the cellar bakers of New York City. *Id.*

¹⁰⁶ Brief for Plaintiff in Error at 56, *Lochner v. New York*, 198 U.S. 45 (1905) (05-292), at <http://curiae.law.yale.edu/pdf/198-45/001.pdf> (last accessed Feb. 1, 2005).

¹⁰⁷ *Id.* at 53–56.

¹⁰⁸ *Id.* at 54.

¹⁰⁹ *Id.* at 59.

of Constitutional principle, that the status quo mortality rates set forth in the table constituted a ceiling of occupational health beyond which the State could not legislate. That baseline was itself the product, in part, of law and legislation, yet the Court held that no legislation of a particular type—maximum hours legislation—was permissible. In effect, the data used by the Court skewed the case against the bakers, because the Court assumed that the status quo was acceptable. If bakers were dying at close to the average rate of death, that was enough to pronounce their health beyond the reach of maximum hours legislation, regardless of whether their rates of disease or death were higher than a changing society was willing to tolerate. Thus, the *Lochner* majority in effect denied to the people, through their duly elected representatives, the right to create hours legislation based on aspirations for a higher standard of occupational and public health than the current system of laws supported.

The health evidence overwhelmingly favored the bakers, yet the Court invalidated the hours statute on the basis of, at best, conflicting data. In light of the occupational and medical knowledge of tuberculosis of the era, the hours limitation appears to have constituted a reasonable exercise of the police power, as Justice Harlan found.¹¹⁰ Though it is somewhat out of favor today, the Progressive criticism—that the *Lochner* majority ignored reality in favor of ideology—seems apt, because the medical data and knowledge of the era strongly supported the health claims advanced by the journeyman bakers.¹¹¹ The Court, however, chose to establish the occupational and public health status quo as a Constitutional standard, turned a blind eye to the medical science, and privileged the right to contract over the right to be secure from disease.

¹¹⁰ On the police power generally, see WILLIAM J. NOVAK, *THE PEOPLE'S WELFARE: LAW AND REGULATION IN THE NINETEENTH-CENTURY AMERICA* 12–17 (1996).

¹¹¹ See, e.g., Ernst Freund, *Limitation of Hours of Labor and the Federal Supreme Court*, 17 GREEN BAG 411, 416–17 (1905); Learned Hand, *Due Process of Law and the Eight Hour Day*, 21 HARV. L. REV. 495, 505–08 (1908); Roscoe Pound, *Liberty of Contract*, 18 YALE L.J. 454, 455–57, 479–81 (1909); Roscoe Pound, *Mechanical Jurisprudence*, 8 COLUM. L. REV. 605, 609–10 (1908).