“Unfit for Human Consumption”: Tuberculosis and the Problem of Infected Meat in Late Victorian Britain

KEIR WADDINGTON

SUMMARY: By the 1890s, questions about tuberculous meat in Britain served to transform the issue of infected meat from an ill-defined to a concrete threat. Veterinarians, building on European inoculation (or transmission) experiments, played a prominent part in constructing the debate, with medical officers of health following. With the emergence of bacteriology in the 1880s, a consensus emerged about the dangers of tuberculous meat: Robert Koch’s identification of the tubercle bacillus in 1882, and the connection he saw between bovine tuberculosis and the disease in man, provided confirmation of the disease’s danger to man. It was from this point that veterinary and public health interests diverged. Whereas a general agreement had been reached, the extent of the problem remained open to doubt. Confusion revolved around two issues: the localization of infection, and the question of cooking. The latter was thought to make tuberculous meat “safe,” as attention shifted to the problem of milk; whereas the former frustrated efforts to combat the sale of meat showing signs of infection.

KEYWORDS: bovine tuberculosis, tuberculosis, meat, public health, food safety

The idea that unwholesome meat should be a public health concern emerged in Britain in the 1850s, when attention shifted from the question of “pure” food free from adulteration to the problem of “clean” food. As evidence mounted about the evils of the meat trade, interest

I would like to thank Peter Atkins, Roger Cooter, Anne Hardy, Jennifer Haynes, Elsbeth Heaman, Pat Hudson, the late Roy Porter, Abigail Woods, and Michael Worboys for their comments, and of course my anonymous referees, whose suggestions have proved invaluable. Thanks are also due to the London Metropolitan Archive for permitting me to consult the records of the London County Council. An earlier version of this article was presented to the conference “Perspectives on the History of Food Safety,” Wellcome Trust Centre for the History of Medicine, University College London, 18 May 2001, and I would like to thank the participants for their useful advice and comments.

broadened from anxiety about the sale of rotten meat to cover the sale of flesh from diseased livestock, and to the role played by meat in the transmission of disease.¹ By the 1880s, the problem of unwholesome meat centered on what the British Medical Journal referred to as “the question of tuberculosis meat.”² A decade later, bovine tuberculosis had become the paradigm zoonosis, and in the process had transformed diseased meat from an ill-defined to a concrete threat as notions that tuberculosis was contagious gained acceptance. It helped that the sale of tuberculous meat was believed to be widespread. Here was a serious cause for concern. Contemporaries feared that tuberculosis of bovine origin was common, particularly in children, at a time when meat consumption per head was rising (it doubled between the 1860s and the 1890s).³ Lesions were commonest in the cheapest cuts, but with the middle classes consuming more meat, and with children believed to be susceptible, attention transcended paternalistic concerns for the poor and fused with already mounting concern about child health. The British Medical Journal was clear that the “poison of tuberculosis” was a “terrible danger to the community.”⁴

Whereas public health approaches to controlling the transmission of pulmonary tuberculosis did not begin in earnest until the 1890s, efforts to combat bovine tuberculosis were made from the 1870s onward and occurred within traditional public health and contagionist practices that sought to break the train of transmission.⁵ Existing sanitarian measures to identify the sale of unwholesome meat were adapted, and faith was placed in better meat inspection and the creation of public slaughterhouses to limit infection. However, concern peaked in 1898 with the report of the second royal commission on tuberculosis.⁶ Less than ten years later, milk had replaced meat as the bête noire of public health

officials. Evidence that tuberculous milk represented a greater threat to human health ensured that meat was sidelined as an issue, and discussions about how to prevent the sale of tuberculous meat became mired in proposals to establish public slaughterhouses.

Whereas the story of milk and tuberculosis is a familiar one, the debates generated by tuberculous meat are less well known. However, for contemporaries the links between bovine tuberculosis, meat, and infection were all too clear. As Michael Worboys has recently recognized, anxieties about tuberculous meat initially concentrated attention on bovine tuberculosis in the 1880s and 1890s. Fears about tuberculous meat became a central part of mainstream debates about food safety and about tuberculosis that reflected anxiety within the veterinary and medical professions, and at a local government level. This unease was symbolized by a series of “Dead Meat dramas” when local authorities tried to prosecute butchers and traders for selling carcasses displaying signs of tuberculosis. The most famous of these occurred in Glasgow in 1889, when the local authority successfully prosecuted a meat trader and a wholesale butcher for sending tuberculous cattle to a slaughterhouse, prompting a debate that led to the appointment of a royal commission to investigate the danger of bovine tuberculosis to the public. Whereas the trial encouraged an increase in prosecutions against those selling diseased meat, and the royal commissions helped to mold a British paradigm that bovine tuberculosis was a threat to the public’s health, these need to be seen as part of a longer chronology of interest in “the nature of the poison of [bovine] tuberculosis.” In this article I investigate the development of these concerns about bovine tuberculosis from the 1860s; the questions this raises about ideas of contagion and food safety; and the


9. The term “Dead Meat drama” was first used by the Veterinary Record to describe events in Glasgow: Vet. Rec., 1888–89, 1: 307.


respective roles of the medical, public health, and veterinary professions. In doing so, I seek to move the narrative away from questions of tuberculosis and the politics of milk consumption to explore how tuberculous meat became a public health issue.

The Question of Transmission

Calls were made in the 1850s for a “more extended enquiry into the laws of health governing the health and diseases of man as affected by the health and diseases of animals.” However, relatively little was known about the transmission of disease from animals to man. Although local action against unwholesome meat was a part of wider anxieties about nuisances, studies in the nineteenth century only gradually focused on the association between tuberculosis in cattle and the disease in man. Part of the explanation rests with the underdeveloped nature of the veterinary profession, as highlighted by Lise Wilkinson and Worboys. It did not help that comparative pathology had attracted little attention in Britain until the 1880s, having become marginalized in medical education in the early nineteenth century. Attention was further deflected by tensions between physicians and veterinarians, and by the poor position of experimental research, which was compounded by a largely empirical, anatomical approach rooted in morbid anatomy. It was only following epidemic outbreaks of rinderpest (or the cattle plague) in the 1860s that attempts were made to investigate suspected links between bovine and human tuberculosis. During this decade, as meat consumption per head rose, bovine tuberculosis emerged as a “new” disease capable of being transmitted from animals to man.

European studies (particularly in France and Germany) proved crucial in defining the disease and in promoting the view that bovine tuberculosis was contagious. With bovine tuberculosis endemic in European herds, and with France and Germany offering a medical and university environment in which pathological study could flourish, this European dimension was hardly surprising. Studies by Jean-Antoine Villemin, a physician in the French cavalry, were particularly influential. According to his biographers, he had become interested in tuberculosis

13. Lise Wilkinson, Animals and Disease: An Introduction to the History of Comparative Medicine (Cambridge: Cambridge University Press, 1992); Worboys, Spreading Germs (n. 8).
after observing its spread among guards sharing barrack rooms. He had also noticed similarities between the disease and the cases of glanders he had encountered while growing up on his father’s farm. After a series of experimental studies in which tuberculous matter from consumptive soldiers was injected into animals, Villemin pointed to the common identity of tuberculosis in animals and man, and he implied that tubercles were essentially uniform in structure. Villemin’s methods were not new; they were based on the accepted methodology of inoculating infected matter into cows and other animals to determine if a disease was contagious. However, his findings created a stir. His work threatened notions of tubercular diathesis as a predisposing condition, and in doing so it challenged existing treatments.

Villemin’s conclusions about the relationship between bovine and human tuberculosis were reaffirmed by further experimental and microscopic studies, and questions started to be asked across Europe about whether bovine tuberculosis represented a threat to human health. Of these, the most influential studies were by Andreas Gerlach, director of the Berlin veterinary school; by the German pathologist Edwin Klebs; and by Julius Cohnheim, a German physician and student of Rudolf Virchow. Their inoculation experiments were considered more exacting than those performed by Villemin, and all agreed that bovine tuberculosis was a “contagious malady.” They also demonstrated that “tuber-


culous matter derived from man will produce Pulmonary Phthisis in animals, and this inoculated Phthisis may be transmitted . . . to other animals”—pointing to the disease’s ability to cross the species barrier. 21 Such conclusions asserted a model of tuberculosis as infectious.

To determine the veracity of these European studies, many of the experiments, in particular those by Villemin, were repeated in England (though not always with success). 22 This was encouraged by the veterinarian and reformer John Gamgee and given official support by John Simon, medical officer to the Privy Council. 23 Simon’s brand of state medicine and investigations into the “minute pathology of contagion” in the wake of rinderpest aimed to provide persuasive scientific research to support public health work. 24 Simon was also receptive to the idea that tuberculosis might be contagious. 25 Against this background, and with mounting concern about “meat unfit for food,” these studies point to growing unease about the contagious nature of bovine tuberculosis and its zoonotic properties. In his 1867 Gulstonian lecture, Reginald Southey, physician at the City of London Hospital for Diseases of the Chest, argued that the bovine form of tuberculosis in “rabbits and guinea-pigs” presented morbid appearances “which somewhat closely resemble Tubercle of man”; although he and “other pathologists” in Britain agreed that the common identity of the disease remained “anything but proved,” a number of veterinarians and medical officers of health from the late 1860s used the evidence from the inoculation experiments to claim that tuberculosis in cattle presented a threat to the public. 26 Here they were

1880); Charles Creighton, Bovine Tuberculosis in Man: An Account of the Pathology of Suspected Cases (London: Macmillan, 1881), pp. 22–25.


aided by growing confusion about the nature of tuberculosis generated by arguments that it was a communicable disease, a view stressed by the epidemiologist William Budd and later by Cohnheim.\textsuperscript{27}

With general and medical texts concentrating on pulmonary tuberculosis and notions of predisposition and “atmospheric stagnation,” it was veterinary surgeons who led the way—not, as Worboys has hinted, medical officers of health.\textsuperscript{28} Many physicians were initially skeptical. Ideas about the contagious nature of tuberculosis remained vague and contradictory throughout the 1870s, and many disputed Villemin’s findings;\textsuperscript{29} they interpreted them in a purely pathological sense and argued that what he had produced was “artificial tuberculosis” in a laboratory procedure.\textsuperscript{30} Veterinarians were more easily convinced, revealing differences in the way in which they conceived disease. Despite a general reticence regarding experimental research, they were quicker to draw practical implications from Villemain’s work. Confident about the value of observation, they built on the growing number of European studies and reports stating that the virus for tuberculosis had been identified and suggesting that tuberculosis was contagious and could cross the species barrier.\textsuperscript{31}

Like physicians, a number of veterinarians traveled to Europe to observe these experiments. For those who did not, the studies were extensively reported in the British veterinary and medical press, in part because of their controversial nature. Gerlach’s experiments, where apparently healthy cattle contracted tuberculosis after being fed infected matter, were crucial: they appeared “to remove all doubt that [bovine tuberculosis] . . . was identical with Phthisis in mankind.”\textsuperscript{32} Evidence from inoculation experiments in France and Germany was supported by evidence from British epidemiologists proposing that the consumption of diseased meat increased the danger of “tubercular disposition.”\textsuperscript{33}

Interest in bovine tuberculosis in the British veterinary profession was spearheaded by George Fleming, veterinary surgeon to the Royal Engi-
neers and editor of the *Veterinary Journal*. Won over by theories of contamination and interested in epizootics, Fleming increasingly pointed to specific germs as responsible for outbreaks of disease, convinced as he was by the value of “the experimental method.” An advocate of hygiene and of trained meat inspectors, he believed that a sanitary response was the best way to combat epizootic and zoonotic disease. Here, he was motivated by a desire to prevent a recurrence of events that had characterized early responses to the cattle plague, and by the Chadwickian ethos that continued to have widespread resonance in public health circles. As such, he saw an intimate connection between veterinary medicine and public health. Fleming was convinced by experimental and observational evidence that bovine tuberculosis was not limited to cattle, and he saw the danger posed to the public as obvious. He first voiced his concern in 1874 in the *British and Foreign Medico-Chirurgical Review*. In the following year, in his *Manual of Veterinary Sanitary Science and Police*, he asserted the contagious nature of bovine tuberculosis and argued that “any organ or texture in which tubercle is deposited, as well as tubercular matter of any description, should not be considered fit for food.” Over time, Fleming became more forthright, drawing ever clearer connections between tuberculosis in cattle and the disease in man.

Fleming’s was not the only voice. Speaking at a veterinary meeting in Glasgow in 1871, Thomas Walley, future principal of the Royal Veterinary College in Edinburgh, maintained that bovine tuberculosis “was capable of being propagated from animals to man.” Other veterinarians had come to similar conclusions and had started to act. For example, James McCall, a veterinarian and sanitary inspector in Glasgow, had, since the 1860s, condemned carcasses with signs of tuberculosis as “unfit for human consumption.” Encouraged by Fleming, Walley, and others, the veterinary press pointed to the “grave suspicion . . . with regard to Tuberculosis being capable of transmission” from cattle to man. Leading veterinary manuals in the 1870s argued that similarities existed


between tuberculosis in man and the condition in cattle.39 As the Veterinary Journal explained in 1879: “That the Tuberculosis of cattle is a transmissible disease, and can be conveyed not only to animals of the same, but also to those of other species in various ways, is now an established fact.”40

Why were veterinarians convinced by these ideas? In part, they were swayed by the experiences of rinderpest, glanders, and pleuropneumonia. The epidemics of rinderpest in the 1860s had helped convert them to the idea that epizootics were contagious, spread by some form of disease matter.41 Already convinced that rinderpest and pleuropneumonia were contagious, they quickly drew implications from European inoculation experiments that the virus responsible for tuberculosis had been isolated.42 In addition, bovine tuberculosis and pleuropneumonia seemed to be worryingly similar and displayed the same degree of infection. Based on this work, and their own observations of diseased cattle, they concluded that bovine tuberculosis was also communicable. This stance was supported by observational experience that other animals (notably pigs) could contract bovine tuberculosis, and by a growing body of European studies that supported the view that bovine tuberculosis among cattle was a “contagious malady.”43 It helped that such germ theories merged with existing pathological models of parasitic and dietetic disease and with notions of how to control epizootics, highlighted by fears about pleuropneumonia and outbreaks of anthrax and foot-and-mouth disease.44

Because tuberculosis was difficult to trace in cattle, veterinarians were more willing to embrace a model of contagion based on sanitary ideas about hygiene. Bovine tuberculosis also seemed to display the same history and pathology as consumption in man: both diseases were considered to be influenced by heredity and bad hygienic conditions, were slow to spread, and shared a structural mimicry in their pathological symptoms. These observations encouraged veterinarians to accept the view that the two diseases were related. Won over by these arguments, and

41. Worboys, Spreading Germs (n. 8), pp. 43–72.
42. “Tuberculosis as a Contagious Disease” (n. 31); Cullimore, Consumption (n. 20); Joseph Coats, Discussions on the Pathology of Phthisis Pulmonalis (Glasgow: A. MacDonald, 1881).
44. Worboys, Spreading Germs (n. 8), p. 61.
anxious about the ability of the disease to infect other animals, veterinarians vocalized concern about the implications for human health. In doing so, they borrowed a medical and administrative language that had parallels with the public health movement, using it to argue for an extension of policing and administrative controls that would strengthen their professional position.

A growing number of physicians were swayed by these arguments, and were later to claim that the medical profession had first identified the danger. Following outbreaks of rinderpest, foot-and-mouth disease, and pleuropneumonia, apprehension about animal diseases and their ability to infect man had grown throughout the 1870s. A renewed enthusiasm for comparative pathology helped stimulate interest in animal diseases. Investigations into rinderpest had involved the medical profession, advancing the standing of contagionism in medicine and in public discussions. This interest in animal diseases and the pathology of contagion fed into a rich vein of investigation into the causes of tuberculosis. The idea that tuberculosis was a communicable disease had also attracted growing attention, particularly after the publication in 1880 of Cohnheim’s pamphlet *Tuberculosis as an Infectious Disease.* Bovine tuberculosis fitted well with these debates. It also raised other issues connected to spheres of influence, as physicians attacked what they saw as veterinarians’ lack of learning and competence and resisted any encroachment into human medicine.

Interest in medical circles was further encouraged by the pathological work of Charles Creighton. Creighton was a demonstrator of anatomy at Cambridge and was determined to explain those “unaccountable and mysterious cases” of tuberculosis that previously had been ignored or dismissed. Following a series of postmortems of patients dying from tuberculosis at Addenbrooke’s Hospital in 1880, Creighton started to compare the pathological “material” with the histological evidence of different types of tuberculosis. From this microscopic study, he concluded that his sample of cases (twelve in all) had all died from bovine tuberculosis—based upon what he saw as the common morphological identity and “structural mimicry” of the disease in animals and in man.
Using this pathological evidence he argued, through a series of articles and lectures in 1881, that some cases of tuberculosis in man had been “communicated” from cows. In doing so, he pointed to the readiness with which bovine tuberculosis may be transmitted. Medical journals saw this as important, helping physicians (as Creighton hoped) to understand “many cases of human tuberculosis hitherto insufficient[ly] explained.”

Some medical officers of health and veterinary surgeons had already acted, reflecting a growing interest in unwholesome and diseased meat as meat consumption rose. The 1855 Nuisances Removal and Disease Prevention Act had referred to the duty of inspecting articles intended for sale as food. However, provisions under the 1875 Public Health Act, and the Sale of Food and Drugs Act of the same year, allowed local authorities to destroy food deemed “unfit for human consumption” as a nuisance. By interpreting tubercular matter as a contaminant, the acts gave public health officials a framework for action. Under the acts, the number of prosecutions for the sale of unsound meat rose, although meat inspection was by no means uniform. Penalties could be harsh; magistrates did not “appear to construe that Statute in the most lenient sense.” In the same year that Cohnheim published his pamphlet, Dr. Jabez Hogg informed the annual meeting of the British Medical Association that “officers of health” had a “duty” to “prevent the sale” of tuberculous food. The attention drawn to the communicable nature of tuberculosis by European studies and by veterinarians, the relatively high levels of meat consumption in Britain, and mounting evidence of the unwholesome nature of the meat trade served to focus concern.

Despite growing support in veterinary and public health circles for the idea that tuberculosis was intercommunicable, the claim in 1882 by Robert Koch, the pioneering German bacteriologist, that bovine and human tuberculosis were caused by the same organism was felt to offer conclusive proof. Koch made his claim as part of his announcement of the identification of the agent responsible for tuberculosis, and in subsequent papers he supported the unitary nature of the disease.

49. Ibid., pp. 1–3, 10.
50. Ibid., pp. 100–102.
53. “Discussion on the Question of What Diseases are Communicable to Man” (n. 45), p. 474.
porary reactions to his claim were mixed, with some seeing it as revolution.

While many have seen Koch’s achievement as considerable, and he has come to occupy a dominant place in the history of germ theories, Worboys has suggested that Koch’s statements about tuberculosis should not be seen as a “major discontinuity in ‘theories’ of consumption.” Koch himself admitted that his views on the infectious properties of tuberculosis “scarcely offers anything new.” The same was true about his statements on bovine tuberculosis, despite the significance that some historians have attributed to them.

Although Koch provided clear and compelling evidence, by the 1890s his role was being downplayed, and contemporary writers identified the experimental work of either Villemin or Gerlach as the major contribution. As the *Lancet* explained, the idea that bovine tuberculosis was “the analogue in the bovine species of tuberculosis in the human” had “long been admitted” before 1881; and the *British Medical Journal* reported in 1880 that “experimental research leaves little reason to doubt that the consumption of tuberculous meat is extremely likely to produce . . . tuberculous disease.”

Koch’s identification of the tubercle bacillus asserted the value of bacteriology and the idea of contagion in medical discourse, but inoculation experiments and pathological observations in Europe and Britain had already pointed to the “suggestive likeness” between tuberculosis in man and cattle. These findings had been widely reported, and they received international coverage in 1883 at the international veterinary congress. Here Koch’s statements were placed in context. The same stance was adopted the following year by the British National Veterinary Association.

However, given his status and earlier work on anthrax, Koch did bring an “unanswerable confirmation to the theory of the unit of tuberculosis,

---


and of the communicability of the disease from animals to man.” He gave authority to studies made by veterinarians, and made the ideas embedded in them more palatable to physicians. Several factors aided this process. Koch published his findings during a period of experimental interest in bovine tuberculosis, and, as Worboys has argued, his ideas “arrived at a time when the identification of possible causative agents of contagious, infectious and other diseases was becoming routine”; they were bolstered by a growing acceptance, following work on rabies, glanders, and anthrax, that “many diseases, common to man and the lower animals are communicable from one to the other.”

As discussions in medicine focused on specific points of passage, studies rooted primarily in experimental pathology, rather than in bacteriologic investigation, were undertaken to support Koch’s findings. As one contemporary commented, a large number of these experiments never appeared “in literature because, being simply confirmatory of Koch’s results, their communications were considered unnecessary.” With the bacillus out in the open, and once the initial shock of Koch’s claims had been assimilated, the main forum for investigation into bovine tuberculosis shifted from the veterinary to the medical arena. Interest was not limited to a small group of medical officers of health: with the tubercle bacillus promoting “bacterial germ theory,” medical journals played an active role in disseminating ideas about bovine tuberculosis as part of a growing outpouring of scientific papers. These ideas could be accepted because they could embrace wider efforts to prevent the spread of tuberculosis and existing approaches to the problem of unsound meat. Investigators with medical or pathological backgrounds came to dominate, reflecting the continued low status of veterinary medicine and veterinarians’ resistance to experimental research. Physicians became keen to defend their role, dismissing contributions from veterinarians.

By the mid-1880s, a growing number of veterinarians, bacteriologists, physicians, and medical officers of health were prepared to endorse experimental work into bovine tuberculosis. Building on mounting anxiety about zoonotic diseases and food safety, they merged a bacteriological interpretation with earlier ideas about constitutional disposition.

63. Worboys, Spreading Germs (n. 8), p. 211.
Although disagreements arose over the morphological nature of the disease in animals and in man, consensus about the pathogenic nature of bovine tuberculosis grew as the label “diseased meat” came to be synonymous with tuberculous meat. As McCall told the National Veterinary Association in 1884: where “general opinion [once held] that bovine and human tuberculosis were entirely distinct affections,” the “conciliation [sic] of opinion is now, I think, in favour of there being one and the same disease.”

This view was adopted by the Privy Council, which took an official interest in bovine tuberculosis in 1888. The council was motivated to act after petitions were received by the Board of Agriculture and the Local Government Board (LGB) from butchers and meat traders. Whereas many butchers and meat traders admitted the danger posed to humans by bovine tuberculosis, they felt aggrieved by what they interpreted as the inequitable provisions to condemn diseased carcasses and offer compensation. In response, the Privy Council extended the concern of a departmental committee established to investigate pleuroneumonia to include bovine tuberculosis. The committee endorsed the view that bovine tuberculosis was dangerous to man and suggested that the disease was responsible for 10–14 percent of “deaths among human beings.”

The same stance was adopted by the first royal commission on tuberculosis appointed in 1890, following the furore created by the Glasgow trial, to settle the question of tuberculosis and food safety. The commission did much to dispel confusion. It revealed alarming evidence of the extent of bovine tuberculosis in the national herd. After interviewing sixteen “expert” witnesses and conducting a lengthy program of inoculation and feeding experiments, it corroborated the view that tuberculosis “was the same disease in man and in the food-animals.” Even before the commission had been appointed, the Meat Trades’ Journal and Cattle Salesman’s Gazette was adamant that “there is now practical unanimity among scientific, medical, [and] veterinary experts that a tuberculous animal is dangerous”; for the journal, this was supported by “an overwhelming majority of experimentalists, investigators and scientific men.”

69. For the work of the royal commission, see Waddington, “Science of Cows” (n. 11).
By the mid-1890s, the belief that bovine tuberculosis was pathogenic for man had been incorporated into manuals directed at veterinarians, meat inspectors, and medical officers of health.

The Danger of Meat

As interest in bovine tuberculosis increased, the idea grew that disease could be transmitted through eating meat. In the 1860s, during his early work on tuberculosis, Klebs had already hypothesized that tuberculosis entered the body “in the great majority of cases by way of the digestive tract.” It was a view that meshed with notions that tuberculosis was a poison. The medical and veterinary communities drew similar conclusions from the experiments conducted by Villemin and Gerlach. Later pronouncements supported this stance, and by 1876 veterinarians were warned that “the use of the flesh” from tuberculous animals “should be carefully watched.” Evidence that other diseases, notably anthrax and scarlet fever, could be spread by products from cows seemed only to confirm suspicions about bovine tuberculosis.

Even before the Glasgow trial, the idea that bovine tuberculosis was transmissible through meat was accepted by a growing section of the veterinary and public health communities. This stance was bolstered by experimental studies conducted in Britain. In 1880, Creighton identified “juices and particles of the tainted animal” as the vehicle of “contagion.” Four years later, in a series of experiments for the LGB at the Brown Institution, Edward Klein, “the father of bacteriology” in Britain, demonstrated that giving food containing tubercle bacilli to susceptible animals produced the identical disease. Other bacteriologists were equally convinced that the disease was introduced through food and spread through “the digestive tract.” Evidence suggests that physicians


were swayed by these ideas. One general practitioner writing to the 
*Lancet* in 1886 noted that he recognized “(especially since the reports of . . . Klein and Heneage Gibbes’ experiments) that the consumption of tubercular flesh involves a risk to which the public ought not to be exposed.”78 This stance was upheld in 1888 by the Privy Council’s departmental committee. The high incidence of tuberculosis in cattle slaughtered under “pleuro-orders” pointed to the “regular trade in stock infected with tuberculosis.”79 With this in mind, the departmental committee supported the notion that “swallowing [infected meat] into the alimentary or digestive system” could transmit bovine tuberculosis.80 The *Lancet* added that broad agreement now existed “as to the transmissibility of tuberculous disease by means of food.”81 It was a view endorsed by the 1889 international veterinary congress in Paris, with only three dissenters.82 Meat inspectors were advised to look for tubercles; veterinarians were warned of the “serious dangers” of meat from tuberculous cattle.83 The *Lancet* worried that “it seems not unlikely that a greater amount of harm is done to public health by the ingestion of diseased meat than either the public or the profession have any idea of.”84

Although the central authorities vacillated under pressure from the meat trade, local measures were put forward to prevent the sale of diseased meat. With many local authorities dominated by business interests, and reluctant to implement public health legislation (in part from concerns about the expense), the extent of their interest in bovine tuberculosis points to the general level of concern about infected meat. Local authorities applied pressure on the LGB and the Privy Council to bring tuberculosis under the Contagious Diseases (Animals) Act passed in 1869 in response to the cattle plague. Efforts were also made to improve the inspection of slaughterhouses and butchers.

However, many local authorities remained constrained by public and commercial opinion, which was reluctant to see radical measures implemented. Those authorities that did act had to rely on medical officers of health, often poorly trained sanitary inspectors, and, in a few cases, local

---

80. Ibid.
82. Ibid.
veterinarians, using existing public health legislation to condemn meat from tuberculous cattle as unfit. For Gibson Bott, chairman of the London County Council’s public control committee, the problem was a grim one, for “there is reason to fear” that tubercular meat “finds its way into the market, and is sold largely amongst the poor.”\textsuperscript{85} Despite the inadequate provision of and poor quality of training for inspectors, butchers and traders were prosecuted throughout the 1880s and 1890s with increasing frequency. By 1895, “seizures of meat are made every day by inspectors.”\textsuperscript{86} In Glasgow, the meat inspector routinely condemned carcasses showing signs of tuberculosis, calling on a medical expert only when “the owner is not pleased.”\textsuperscript{87}

Interestingly, local authorities did not always meet with resistance: in many areas, they were aided by butchers and meat traders’ associations and by individuals keen to stamp out the sale of tuberculous meat. Even in the Glasgow case, the cattle dealer in question had informed the police about the diseased nature of the carcass in question.\textsuperscript{88} Such practices were not uncommon, but problems did repeatedly occur over the identification of infected cattle. Here medical officers of health came into conflict with butchers and meat traders, with the latter claiming that with their extensive experience they were the real experts on the look and smell of diseased meat. To clear up doubts, medical officers of health or nuisance inspectors either relied on seeking further evidence in front of local magistrates or sent contested carcasses for sampling and microscopic analysis. In Birkenhead, for example, questionable cases were sent to Alfredo A. Kanthack, pathologist at University College, Liverpool.\textsuperscript{89} Such cases, and the growing number of prosecutions, were widely reported in the press as local medical and veterinarian associations called for further action.

The first royal commission on tuberculosis came to similar conclusions about the dangers of meat showing signs of tuberculosis. The commissioners based their conclusions on the extensive studies conducted for them by Sidney Martin, assistant physician at University College hospital and at the Brompton Hospital, and by German Sims Woodhead, physician and superintendent of the newly established joint board laboratory. After a series of experiments, in which diseased

\textsuperscript{85} London County Council (LCC), Minutes, 3 February 1893, p. 137, London Metropolitan Archive (LMA), London, England.
\textsuperscript{86} “Our Parliamentary Programme,” MTJCSG, 31 January 1895, p. 674.
\textsuperscript{87} Ibid., 6 April 1889, p. 8.
\textsuperscript{88} “Diseased Meat Question in Glasgow,” MTJCSG, 15 June 1889, pp. 4–5, on p. 5.
\textsuperscript{89} “Experimental Observations on Tuberculous Meat,” Public Health, 1892/93, 5: 331–32.
matter was inoculated into or ingested by cattle and other animals, they confirmed that meat represented a hazard—although they admitted that the extent of the danger depended on the “degree of tuberculosis of the cow.” Meat traders giving evidence to the commission agreed, for they were keen to protect the public (and business) from unscrupulous butchers. Using evidence from Martin and Woodhead’s experiments, the commissioners went on to suggest that contamination from diseased organs through sloppy butchering practices equally carried a risk. This argument was used to explain why meat could become infected when only the organs were seen to exhibit signs of the tubercle.

Given the commission’s findings, writers in the journal Public Health in 1898 expressed confidence that the flesh of animals affected with bovine tuberculosis was dangerous and could not be denied. This view was confirmed by the general literature on tuberculosis, by public health manuals, by guides for meat inspectors, and by the press. Local papers like the Citizen in London highlighted the sale of diseased meat, and butchers were branded as “poisoner[s] of the people.” For the Times, “the consumption of meat obtained from animals suffering from tuberculosis” was “one of the most serious risks to which man is subject.” Who was to be compensated, how, and to what extent, were questions that were more difficult to resolve.

Encouraged by the royal commission’s findings, and worried that inspection was not as systematic as desired, local authorities moved to improve their system of meat inspection. The number of carcasses seized subsequently increased by 25 percent. At a local level, proposals for public slaughterhouses and for the appointment of veterinary officers of health were put forward, and pressure was applied on the Royal Sanitary Institute to improve the system of training for inspectors of nuisances.

94. Citizen, 8 June 1895, p. 4.
97. Considerable effort was made in London. See LCC, Public Health and Housing Committee, 14 April 1895, fo. 634, LCC/MIN/9994; Licensing of Slaughterhouses and Cowhouses, LCC/PH/REG/2/37; LCC, Public Health and Housing Committee, 23 January 1896, fo. 55, LCC/MIN/9995, all in LMA.
These actions were supported by a wide range of voluntary organizations, including the National Health Society, the Popular Labour League, and the newly formed Association to Prevent Consumption. They hoped, as one medical officer of health commented, that “if difficulty is put in the way of the sale” of tuberculous meat “it cannot be doubted that stock owners will see the necessity in their own interests of making every effort to eliminate tuberculosis from their herds.” Voluntary eradication and better inspection were to be the key.

Questioning the Degree of Danger

However, room remained for debate, and this complicated efforts to control the sale of diseased meat. Although a sanitary understanding of the implications of bovine tuberculosis for human health was adopted, the extent of the danger posed by infected carcasses was problematic. If many could accept the idea that bovine tuberculosis was a zoonosis, erratic sanitary practices and conflicting views in court highlighted the problem of determining just how dangerous meat was. Some suggested that butchers and meat traders had legitimate grounds for complaint: “Meat which, after inspection, is pronounced fit for sale in one market” was “liable to seizure in another because the inspecting authority happens to differ in opinion as to the extent of tuberculosis which may be dangerous.”

Alfred Swann, medical officer of health for Batley in Yorkshire, summed up the confusion in 1894 when he wondered: “Was it perfectly just to condemn an entire carcase as unfit for human food, because tuberculosis had been discovered in one joint?” There were important economic implications, especially for the meat trade, which was at best reluctant to condemn all flesh from diseased cattle for fear of financial ruin. As the Board of Agriculture recognized: “as to the amount and distribution of tubercular disease which justifies the seizure and condemnation of a carcass as unfit for human food, the widest discrepancy prevails in opinion and practice.”

98. Shirley Murphy, “Inspection of Milk and Meat,” November 1898, p. 7, LCC/MIN/10031, LMA.
“affects the question of the use of tubercular meat as food.”\textsuperscript{102} Whereas a consensus existed between veterinarians and medical officers of health about the dangers of bovine tuberculosis, it was over the localization of the disease that divisions appeared, frustrating attempts to eradicate bovine tuberculosis. What was at stake was more than a simple empirical question of whether naked-eye examinations were adequate or not, since here were different ways of conceiving bovine tuberculosis.

There were two schools of thought. Veterinary opinion held that in diseased animals, “if there are no naked eye signs of tuberculosis in the carcass the condition of the viscera may be set aside, and this constitutes ‘localized’ tuberculosis.”\textsuperscript{103} William Williams, a stalwart of the veterinary community, was clear that if tubercles were removed, “the flesh is perfectly good, fit for any man’s table”; he felt that “it is a pity to destroy valuable and nutritious human food because the term tuberculosis has been applied.”\textsuperscript{104} This view reflected veterinarians’ concern with the “health of the livestock economy” and an approach that stressed the value of practical observation; it also meshed with a British model of tuberculosis that cast the disease as a form of localized inflammation.\textsuperscript{105} It seemed that many veterinarians, although they recognized that bovine tuberculosis was a zoonosis, supported the notion that infection was concentrated in the organs affected. By thinking of the disease in these terms, they limited the role of meat inspection to the identification and removal of diseased organs. Butchers were keen to agree, seeing localization as a means to protect themselves. Although these ideas were by no means uniform, evidence suggests that they did shape veterinary practice. Henry Middlehurst and William Welsby, veterinary surgeons in Birkenhead, for example, both confidently told a court hearing on a diseased carcass that bovine tuberculosis should be “looked upon as a local disorder.”\textsuperscript{106} In adopting this view, serious and advanced cases could be seized while the majority of meat from tuberculous cattle remained safe. As Fleming noted, although this was a relaxation of a “sanitary point of view,” it was essential in order to prevent “serious economic sacrifice.”\textsuperscript{107}

\textsuperscript{104} Williams, \textit{Veterinary Medicine} (n. 39), p. 346.
\textsuperscript{105} Worboys, \textit{Spreading Germs} (n. 8), pp. 60, 200.
\textsuperscript{107} Fleming, \textit{Manual} (n. 35), p. 393.
The veterinary understanding was confirmed by Martin in his experiments for the first royal commission. He was influenced by studies for the veterinary department of the Privy Council, and was unprepared to accept what he saw as “egregious irregularities” in his experimental results when flesh from infected cattle gave rise to tuberculosis.\(^{108}\) For Martin, convinced that tuberculosis was “not a disease in which the infective agent . . . is present in all parts of the animal,” this should not have occurred.\(^{109}\) Swayed by an understanding of tuberculosis that owed much to Virchow’s conception of the disease, he adopted the veterinary model of localization and concluded that infection did not depend “on any infective material present in the muscular tissue itself.”\(^{110}\) In his view, muscular tissue rarely showed signs of lesions. Instead, he blamed unhygienic or inadequate butchering techniques—transferring the blame to the meat industry, which had been under scrutiny when the commission was appointed following the Glasgow trial.

Martin’s assessment was accepted by the commissioners as the most convenient, and the one that reinforced their desired outcome. As a result, they asserted that with “sufficient discrimination and care . . . a great deal of meat from [tuberculous cattle] . . . might without danger be consumed.”\(^{111}\) Carcasses showing signs of localized infection were officially pronounced safe, with proper butchering. Advanced cases were still to be condemned. Even for those skeptical about the dangers of meat, the idea that advanced cases had to be condemned was accepted on the “general grounds that the flesh is so deteriorated as to possess no longer the nature, quality and properties of wholesome nutritious meat.”\(^{112}\) Martin’s views were endorsed in 1898 by the second royal commission appointed to put forward recommendations for the control of tuberculous meat and milk.\(^{113}\)

However, not all medical officers of health were convinced, ensuring that meat became a source of conflict not only between butchers, traders, and medical officers of health, but also between veterinary surgeons and physicians. The medical dissenters formed neither a small nor a marginal group and represented a second school of thought that saw all meat from diseased cattle as dangerous. Throughout the 1880s, they grew more

\(^{109}\) Ibid., Part 2, Inquiry 2, Appendix, p. 31.
\(^{110}\) Ibid., p. 9.
\(^{111}\) Ibid., Part 2, Inquiry 2, p. 15.
\(^{113}\) Report of the Royal Commission . . . Administrative Procedures (n. 6).
vocal, in particular at a local level. They doubted whether the interpretation put forward by veterinarians, who were felt to be primarily concerned with the protection of agricultural interests, was really a safe basis for protecting the public’s health. Convinced that tuberculosis was a constitutional disease, they saw bovine tuberculosis in a different way. With the disease not always easy to detect, medical officers of health felt that when tuberculosis had become visible it had probably already spread throughout the body, making the entire carcass potentially dangerous. Microscopy and laboratory evidence added to the unease. Kanthack, in his pathological work for local medical officers of health, suggested that “muscle juice” might “prove a source of infection.” For Klein, the bacilli were distributed through the blood, and this ensured that “there is a danger to the consumer of any part of the flesh of the animal.” Studies for the veterinary department by George Brown, veterinary officer to the Privy Council, and John McFadyean, physician and veterinary, editor of the *Journal of Comparative Pathology and Therapeutics*, and an expert on bacteriology and bovine tuberculosis, pointed to similar findings.

Although doubts continued to be voiced, by the early 1890s a growing number of medical officers of health and those writing on public health and meat inspection appeared convinced that all meat from infected carcasses should be considered dangerous. At a conference of medical officers of health in Chester in 1894, for example, a resolution was passed that “the presence of tubercle at any stage in more than one part or organ . . . is sufficient and proper ground for the condemnation of such carcass as unfit for human food.” This view was confirmed by a number of textbooks aimed at medical students, sanitary inspectors, and medical officers of health. One manual noted: “the safest course is to consider the tubercle always generalized, and to condemn the whole carcase for the slightest tuberculous taint.” Another commented in 1894 that “it is now the judgement of many of the highest authorities . . . to condemn absolutely the entire carcase if evidence of tuberculosis is found in any particular part, no matter how slight in extent or how completely it may appear to be localised.”

embrace a model of generalized infection, and in doing so reflected a
common view that tuberculosis was a constitutional disease. This view
came to underpin action against butchers and wholesalers in the 1890s as
local authorities moved against the sale of tuberculous meat.

Local attempts to control the sale of infected meat were therefore
thrown into confusion by the findings of the first and second royal
commissions, which ran counter to the literature aimed at medical
officers of health. Whereas butchers railed at the lack of compensation, a
number of medical officers of health considered the proposals put
forward by the commissions, which stressed the need for better inspec-
tion and allowed carcases to be deemed healthy unless the disease was
advanced, as inadequate. Although Public Health admitted that the risk of
infection for most people from sound meat from tuberculous animals
was small, it felt that the entire carcass should be condemned so that the
public would not “unwittingly be exposed to . . . risks.”120 John Sykes,
medical officer of health for St. Pancras, having become embroiled in his
own meat drama, could point to the great gap “between the minimum
conditions laid down by the royal commission justifying only the seizure
of particular organs, and the maximum justifying the seizure of an entire
carcass.”121 The same stance was adopted at meetings. At a conference on
tuberculosis held in Glasgow in 1900, a resolution was passed that meat
from “tuberculosed [sic] animals” should be excluded.122 Although prac-
tices continued to vary, a sufficient number of public health officials were
already following the spirit of the Glasgow resolution, promoting com-
plaints from the National Federation of Meat Traders. In 1898, the
federation felt compelled to complain about the “harsh proceedings of
Medical Officers of Health who confiscate in doubtful cases of tuberculo-
sis animals.”123 For the federation, such practices were common. This did
not mean that medical officers of health were successful. Conflicting
views about whether or not the disease was localized complicated legal
proceedings, frustrating attempts to control the sale of diseased meat.

The Benefits (or Not) of Cooking

Divisions over the relative safety of meat were not limited to the question
of localization. Those who defended the safety of meat, even when from

120. “Condemnation of Tuberculous Meat,” Public Health, 1899/1900, 12: 706–9, quota-
tion on p. 706.
diseased carcasses, could point to the desirable effects of cooking. Cooking had come to be recognized by physicians and writers on domestic hygiene as a means of making unsound meat safe.\textsuperscript{124} In the debate over bovine tuberculosis, cooking came to play the same role. In the Edwardian period, it served to defuse attention as concern came to focus on milk. Cooking was used to alleviate public anxiety and to explain why the incidence of the disease was not higher. Speaking at the police court in Portsmouth in 1891, a local doctor could confidently claim that tuberculous flesh “was wholesome if properly cooked.”\textsuperscript{125} Julius Dreschfeld, professor of pathology at Owens College, Manchester, after carrying out research for the Board of Agriculture, supported this view, noting that after meat was cooked it carried no threat of conveying the live bacilli.\textsuperscript{126}

However, not all were convinced. Although many agreed that “the flesh of tuberculosis animals may be consumed with impunity when properly cooked,” doubts were voiced, echoing earlier views about the role of disposition, seed, and soil.\textsuperscript{127} Some suggested that even if cooking destroyed the tubercles, it often left the “spores” intact; although this might not prove a problem for the fit and healthy, for children and the weak even a few remaining “spores” were felt to represent a danger, explaining why children appeared more susceptible. Such a belief built on existing notions of the importance of heredity and that tuberculosis spread more easily within and into weak bodies. The departmental committee of the Privy Council was aware that “the ordinary methods of cooking are often insufficient to destroy the bacilli buried in the interior of the limbs.”\textsuperscript{128} Manuals directed at public health officials adopted the same tone. “Boiling, roasting, or pickling affords, according to Arthur Whitelegge, medical officer of health and author of \textit{Hygiene and Public Health}, “but imperfect protection.”\textsuperscript{129} There was evidence to support this view. Studies by Charles Cameron, McCall, and other veterinarians claimed that even after boiling for fifteen minutes, juice from infected meat still caused tuberculosis in 35 percent of their experiments with rabbits.\textsuperscript{130} McFadyean was positive that cooking should not be relied upon as a


\textsuperscript{125} “Tuberculized Meat” (n. 106), p. 481.

\textsuperscript{126} Ibid.


\textsuperscript{128} Cited in Behrend, \textit{Cattle Tuberculosis} (n. 102), p. 47.

\textsuperscript{129} Whitelegge, \textit{Hygiene and Public Health} (n. 119), p. 115.

\textsuperscript{130} “Tuberculosis,” \textit{Vet. Rec.}, 11 May 1895, p. 611.
preventative, a view confirmed by witnesses giving evidence to the second royal commission.\textsuperscript{131} For many, the question of whether or not cooking made meat safe was immaterial. Jasper Anderson, medical officer of health for Blackpool, argued that because meat was sold raw, then diseased meat had to be considered a nuisance. Others pointed to the dietary habits of the British, many of whom were felt to prefer their meat underdone.\textsuperscript{132} Although Francis Vacher, medical officer of health for Birkenhead and an expert on “unsound meat,” could claim in court that “if meat were thoroughly cooked through . . . that would probably have the effect of destroying the germs of the disease,” he went on to explain that “in the ordinary way . . . beef was underdone, and if that got in contact it might thereby communicate the disease.”\textsuperscript{133} Woodhead, after all, had told the first royal commission in 1895 that boiling was insufficient and only roasting was safe, although he admitted that most forms of cooking probably reduced the virulence of the bacilli.\textsuperscript{134} By pointing to the deficiencies of cooking, justification was provided for preventive action and measures to curb the sale of diseased meat, something that public health officials and veterinarians sought. At the same time, an insistence on “wholesome if properly cooked” was reassuring to an anxious middle and upper class and supported efforts to reform the culinary and domestic habits of the urban poor, thus harnessing morality to the control of diseased meat. Although disagreements existed on the value of cooking, it served to reduce the danger presented by tuberculous meat as attention shifted in the Edwardian period to the hazards of infected milk.

Conclusion

So well established was the idea that bovine tuberculosis was a zoonosis and an important source of infection that could be eradicated, that Koch’s assertion at the 1901 London congress on tuberculosis that “infection of human beings [from bovine tuberculosis] is but a very rare occurrence” incited a defense of the British paradigm that bovine tuberculosis was dangerous.\textsuperscript{135} Considerable research, not least by a third royal


\textsuperscript{133} “Tuberculized Meat” (n. 106), p. 480.

\textsuperscript{134} Report of the Royal Commission . . . Effect of Food (n. 70), p. 18.

commission on tuberculosis, went into defending the view that the disease was pathogenic for man. Even without this, the LGB was certain in 1899 that there “should be no relaxation . . . in the taking of proper measures for dealing with . . . tuberculous meat which may be intended for the food of man.”

Attempts by the second royal commission to defuse concern by explaining that the danger of infected meat had often been exaggerated did little to dispel anxiety or discourage action. Public Health was clear: “the duty of administrators is not to neglect bovine infection as a source of tuberculosis, but to take every opportunity for securing means for its control.” Others noted that even if the exact danger from tuberculous meat remained open to question, the public had a right to be protected no matter how small the risk. Local authorities acted accordingly, and the number of prosecutions for selling unwholesome meat rose. Although many of the cases were not related to the sale of tuberculous meat, fears about the disease provided the motivating factor for action and for the creation of better systems of inspection.

Practical problems remained, especially when it came to compensation, responsibility, and the destruction of diseased carcasses. Few contemporaries, however, doubted by the 1890s that bovine tuberculosis and tuberculous meat constituted a very real danger to the public’s health. First identified by veterinarians in the 1870s as a cause for concern, bovine tuberculosis had become the paradigm zoonosis.