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Aya Homei and Michael Worboys, *Fungal Disease in Britain and the United States, 1850-2000: Mycoses and Modernity*. Basingstoke, UK, Palgrave Macmillan, 2013. Xiii, 225 pp., illus. \$23,00.

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Whether in the worlds of medical practice and healthcare or in historical scholarship, fungi have not been fashionable. Despite the ubiquity of fungal infections in Western civilization, what we now consider to be an entire biological Kingdom has been systematically neglected in histories of medicine and biomedical science (before Robert Whittaker proposed a separate Kingdom for fungi in 1969 they were formally classified as plants). In *Fungal Disease*, Aya Homei and Michael Worboys set out to redress this imbalance and move the focus away from the higher-profile disease-causing agents – bacteria, viruses, prions – which have dominated our understanding of the historical relationship between animal hosts and agents of pathological occupation.

Underpinning their enterprise is a reanimation of the “seed-and-soil” metaphor employed by Jean and Rene Dubos in their 1952 history of pulmonary tuberculosis (*The White Plague: Tuberculosis, Man and Society*. London, Victor Gollancz, 1952; cited in the footnotes, curiously absent from the bibliography). In this case, their “seeds” are fungal pathogens in whatever form they took whilst “soil” covers, it seems, nearly everything else, including ‘the human body, social relations and structures, and the medical, material and technological environment.’ (p. 4) Through a series of five Anglo-American case studies from the mid-nineteenth century to the turn of the twenty-first, the book outlines and interrogates links between fungi themselves, their manifestation as human infections and their bio-social consequences. Chapters 1 and 2 focus on ringworm and so-called “athlete’s” foot (both caused by an overlapping pantheon of species, including *Trichophyton*, *Epidermophyton*, and *Microsporum*), Chapter 3 on the thrush-causing genus *Candida*, Chapter 4 a series of ‘endemic mycoses and allergies’, whilst Chapter 5 takes as its object the recent manifestation of invasive aspergillosis.

The authors begin with ringworm, framed as a disease of mass education and the school environment, which attracted a substantial degree of stigma amongst sufferers. Fashionable treatments were aligned closely with emerging medical technologies, such as X-rays from the early twentieth century, whose pattern of use was by the 1930s highly variable across England and Wales (in 1933 in the Counties just 6.8% of cases were treated in this way, compared with nearly 90% in London, p. 41). Drawing on published medical reports of ringworm outbreaks in schools, the authors reconstruct the epidemiology of the disease, which was only classified as a fungal condition from the 1850s. The passing of the Education Act 1870 and the resulting expansion of large-scale schools necessitated this increased focus on the spread of infectious diseases amongst groups of pupils.

Caused by a similar constellation of organisms as ringworm, athlete's foot was a hot topic within the American public consciousness in the 1930s, at the same time as institutionalized, hygienic programmes of exercise and physical education gained considerable traction. Perhaps most striking are the parallels which Homei and Worboys draw between public health campaigns designed to warn of the hidden danger of athlete's foot and similar narratives of sexually-transmitted infections.

*Candida* is a ubiquitous fungal infection in the Western world, yet we learn in Chapter 3 that its elevation to this status was closely linked with the rise in antibiotic use through the twentieth century. Patterns of incidence changed dramatically over the century, with the infection shifting around the human body and lifecourse; from a disease of weak or immunocompromised children it came to occupy a near-universal position as an infection of the genitals, especially in women. This was paralleled with the refinement of new classes of antibiotics which were effective against fungi.

Whilst *Candida* has little geographical specificity, the more spatially-bound infections of Chapter 4, including the less well-known coccidioidomycosis, blastomycosis and histoplasmosis, had distinct spheres of activity. Coccidioidomycosis, for example, was seemingly far more prevalent in certain areas of the southern and south-western United States, particularly around Tucson and

Phoenix, Arizona, and the San Joaquin Valley, California. The second half of the chapter concentrates on a form of occupational fungal infection – “Farmer’s lung” – in the British context and allergic bronchopulmonary aspergillosis (fungus-induced asthma).

In the final chapter Homei and Worboys consider aspergillosis more widely; the infection posed an increasing threat to human health in the late twentieth century and their account brings to an end the chronological emergence of multiple fungal infections which were recognised periodically since the 1850s. A literal space for aspergillosis – a ‘disease of the diseased’ (p. 119) – was opened by new medical technologies associated with transplantation and cancer treatment. Forms of intentional immunosuppression enabled so-called “invasive” aspergillosis to gain a foothold in already-vulnerable patients. It is, as the authors argue, an ‘exemplary iatrogenic condition.’ (p. 136)

The social stigmas associated with fungal infection – particularly shifting perceptions of the uncleanliness and insanitary habits of sufferers – emerge especially strongly across the case studies. Homei and Worboys have opened a field which deserves significantly more attention from historians of science, technology and medicine. Their appropriated “seed-and-soil” metaphor – popular in the nineteenth century and beyond – as well as the links between fungi and modernity itself feel a little underexplored. However, taking this work further we might usefully look to historical accounts of the so-called “good” fungi, harnessed by humans and pressed into service as everything from biological pesticides and enablers of brewing and viticulture to synthesizers of antibiotics. The visual cultures of fungi, viruses and bacteria, taken together, might also be fruitful, as would a comparative study across disease-causing agents (bacteria and viruses are, self-consciously and understandably, almost entirely absent from this book) and a consideration of the commercial environment operating around fungal infections. As *Fungal Disease* highlights, however, we can learn much from examining the remarkably close connections between human civilization and these agents which cause chronic impairment and morbidity, though only rarely prove fatal. It is indeed this lack of visibility – resulting in fewer encounters with fungal disease in a formal medical context – which

Homei and Worboys posit as the principal reason for such neglect. They have gone a considerable distance to rectifying this error; historians of medicine, science and technology should seize the moment to go further.