

The attempt to cover such a wide range and evolution of medical knowledge and its visual counterparts over the past five centuries is a herculean undertaking and, though admirably done, naturally means that pockets of history, culture and visual media are left unexplored. The essays centre on the eighteenth, nineteenth and early twentieth centuries, with nods to Rembrandt and contemporary (post 2010) art and medicine. This means that the medical world of the Renaissance is only occasionally referenced, and no authors address the role of medical images in such fascinating and influential time periods as the post-World War II evolution of social health care, or the more recent digitisation of clinical encounters.

Perhaps as a result of focusing on the eighteenth to the early twentieth century, the essays are also predominantly concerned with the medical history of continental Europe, with America and Britain referenced only occasionally. The notable exception is Carolyn Lau's insightful chapter on the blending of Chinese and Western medical portraiture in the work of Chinese artist Lam Qua. Another highlight is Birgit Lang's chapter on the underappreciated contribution of forensic photography to the artistic and cultural reality of sexually motivated murder in the Weimar Republic. Both offer insight into less familiar areas of medical and visual history and suggest a trajectory for future study in this otherwise well-developed area of research. Artist stef lenk presents her artwork alongside an explanatory essay detailing her process artistically representing her own depression and anxiety. The inclusion of lenk's artwork is an intriguing and admirable stab at diversifying the academic perspective of the book, but so personal a reflection inevitably adds less to the historical insights presented in the other essays.

Overall, *Anatomy of the Medical Image* relies on its range of perspectives to stand out in the sea of literature. This diversity of perspectives and histories is commendable and further demonstrates the established interplay between medical knowledge and visual media, but it also means that depth has, to an extent, been sacrificed for breadth. Scholars with interests in a particular era or culture may find this book of only limited interest. Still, the broad base of research means that there are some new archives, artists and individual works or collections considered that expand the existing pool of knowledge.

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Neeraja Sankaran, *A Tale of Two Viruses, Parallels in the Research Trajectories of Tumor and Bacterial Viruses* (Pittsburgh, PA: University of Pittsburgh Press, 2021), pp. 296, \$55, hardcover, ISBN: 9780822946304.

Inspired in its title by Dickens' moving *A Tale of Two Cities* and in its subtitle by Plutarch's classic (Parallel) *Lives of Noble Grecians and Romans*, *A Tale of Two Viruses* is a clever attempt to approach the history of viruses in a more interesting way than that presumably afforded by focusing on a single virus, virologist or viral disease, as other books often do. Indeed, this dual, inevitably comparative and timely history of two viruses – a tumour virus and a bacterial virus or phage – greatly enriches our understanding of viruses as model organisms, which are uniquely positioned to illuminate the long intriguing boundaries between living and non-living, health and disease or benign and malignant tumours.

Chapter 1, 'Called or Recalled to Life, Discoveries and Conceptions', introduces the two viruses which form the subject matter of this book: the Rous Sarcoma Virus, discovered in 1910 by Peyton Rous in New York City, and the bacterial virus or bacteriophage, discovered in 1915 and 1917, by Frederick W. Twort in London and Felix d'Herelle in Paris, respectively. The chapter situates the discoveries of the two viruses in the context of the research done at the time by their respective discoverers. Rous, a pathologist newly hired to study cancer, focused on a tumour of the connective tissue in chicken. Twort, a British medical officer, was concerned with the impact of infectious diseases upon the fighting capacity of British soldiers in World War I. d'Herelle, a microbiologist tasked to clarify the cycle of bacterial dysentery, an infectious disease of the gut, was also concerned with rapidly curing French soldiers in World War I. The chapter highlights the complete confidence Rous and d'Herelle, who became

eponymically associated with the new disease-causing agents they discovered and characterized as viruses, had in their discoveries, despite the resistance they encountered (see below).

Chapter 2, 'Epochs of Incredulity and Belief, Reception and Ripples', the title of which is, much as that of Chapter 1, also adapted from Dickens' *A Tale of Two Cities*, focuses on the reception of the two discoveries by the scientific community, with both facing a mixed reception. The chapter contrasts the supreme confidence of the discoverers in the correctness of their discoveries despite being disputed by equally or more illustrious colleagues. In both cases, such disputes focused on the interpretations offered by the discoverers, this being yet another reason for justifying the parallel discussion of these discoveries. Although the author is aware of the leading role of the Pasteur and the Rockefeller Institutes in biomedical research, in Paris and New York City where d'Herelle and Rous were based, respectively, the chapter says a little about how these discoveries may relate to the specific subcultures of these world famous institutions, their leaders, the discoverers' mentors (Simon Flexner for Rous and George Bertillon for d'Herelle) or other colleagues of consequence, which abounded in both institutions. Rous' confidence is attributed to his 'open-mindedness', whereas d'Herelle's is inferred from his diverse prior experience in microbiology.

Chapter 3, 'What Was a Virus?' is one of two interludes (the other being Chapter 6) which interrupt the research flow by delving into the past prior to the two discoveries. It provides a historical background of the first virus to be discovered late in the nineteenth century: a plant virus known as the tobacco mosaic virus. The filtration criteria developed to identify the earliest viruses are situated in the context of microbiological techniques and then the contrasting features of bacteria and viruses as disease agents.

Chapters 4 and 5, 'Romancing the Phage' and 'Reawakenings: The Viral Etiology of Tumors' describe follow-up research on the two viruses in the interwar era. A subheading in Chapter 4, 'Rousing van Winkle', relating Peyton Rous' reawakening to the popular tale of the sleepy Rip van Winkle, reflects the author's quest for linguistic playfulness. Chapter 4 focuses on the extensive phage research of Frank M. Burnet in London and Melbourne, as well as that of Eugen and Elisabeth Wolman at the Pasteur Institute in Paris. These researchers concluded correctly that bacterial viruses or phages constitute cases of genetic continuity, but did not continue such research into the post-Second World War era when the molecular-genetic nature of these viruses was clarified by others (see below on Chapter 7). Burnet shifted his interests to immunological tolerance in the late 1930s, eventually sharing the 1960 Nobel Prize for his contributions in this area. By contrast, the Wollmans' careers and lives were brought to a premature end by the Nazi occupation of Paris in WW2, their deportation to Auschwitz and subsequent death in that most infamous concentration camp.

Chapter 4 rescues Burnet, the Wollmans, and M. Schlesinger (a scientist from Germany who pioneered the study of phages' chemical composition but found his status as a refugee in London too unbearable and took his own life) from oblivion, an oblivion imposed by leading post-Second World War research groups, such as the American Phage Group. The chapter makes a contribution to revising the historiography embodied in *Phage and the Origins of Molecular Biology*, a 'winner take all' collection of autobiographical essays which projected phage research in the United States during and after World War II as starting from scratch.¹ It is thus strange that despite its good intentions and extensive bibliography (the entire book has more than 30 pages of bibliography), the chapter missed a pertinent critique of the American Phage Group, as well as its comparison with its French counterpart, the microbial physiology 'attic' at the Pasteur Institute.² Not only is such a comparative perspective pertinent to this book's emphasis upon two parallel research trajectories (those of tumour and bacterial viruses), but that critique's deconstruction of the public memory of discoveries and discoverers as outcomes filtered by social and political interests of a later vintage is highly relevant to *A Tale of Two Viruses'* goal to rescue forgotten scientists.

¹J. Cairns, G.S. Stent and J.D. Watson (eds), *Phage and the Origins of Molecular Biology* (New York: Cold Spring Harbour Laboratory, 1966).

²Pnina G. Abir-Am, 'The First American and French Commemorations in Molecular Biology: From Collective Memory to Comparative History', *Osiris*, 14 (1999), 324–72.

Chapter 6, 'What Viruses Became: New Visions from New Tools' covers the technical and conceptual developments in research on viruses in the period between the 1940s and the 1960s. The emphasis here is on new instruments such as the ultracentrifuge, and the electron microscope, among others, which provided scientists with a better grasp of the size, shape and composition of viruses, eventually revealing that the genetic continuity of a virus is carried by a single type of nucleic acid, DNA or RNA.

The last chapter (Chapter 7), 'Knitting Done: Lysogeny as Linchpin', concludes the mutual illumination of two kinds of viruses, tumour and bacteria, examined in this book. After half a century or so (1910–70) of parallel but separate research trajectories, the new molecular biology finally clarified commonalities in the mechanisms of operation of these two viruses. Chapter 7 is the finale that justifies, albeit retrospectively, the author's initial hunch that the story of these two viruses is best told jointly. Chapter 7 integrates the formerly distinct trajectories of the two viruses in the discovery of the molecular interpretation of lysogeny by Andre Lwoff at the Pasteur Institute in Paris in the 1950s, and that of reverse transcriptase by Howard Temin at the University of Wisconsin in Madison in the 1960s.

Much as in Chapter 4 beforehand, which focused on the interwar era, Chapter 7 rescues from oblivion innovative scientists whose original contributions tended to be obscured by younger and flashier colleagues: Jacques Monod, Francois Jacob and their operon model of genetic regulation in the case of Andre Lwoff, who became better known as their mentor than as the discoverer of the molecular meaning of lysogeny, as well as the author of *Physiological Evolution*, a major book which is strangely not mentioned.³ Along these lines, the chapter highlights Howard Temin, who tended to be overshadowed by his co-discoverer colleague, turned star scientist and protagonist of public and ethical affairs of science, David Baltimore.

The *Afterword* recapitulates the benefits of examining these two viruses in parallel. It reiterates the book's comparative explanation of the initial rejection of these discoveries, their alleged phases of dormancy and reawakening and their eventual integration in the seminal discovery of how the two viruses manage to integrate their genetic material in their hosts' genomes and produce the far reaching effects of disease or death of those hosts. Those effects led to the discovery of these two viruses in the first place.

The idea of selecting and examining in parallel the trajectories of two different viruses, especially viruses that served as model organisms for elucidating basic biological processes of parasitism and reproduction, is interesting and productive. At the same time, the impact of viruses in clinical medicine could have been expanded further. This would have provided an entry into impacts on major viral epidemics such as those associated with the flu after World War I, the polio scare of the 1950s, the HIV challenge to sexuality in the 1980s and even Covid-19, which evolved into a global pandemic at the time this book's proofs were ready in late 2020 (pp. 5, 195 and 197). Such a potential expansion was easily doable, given the number of sources perused by this book (around 50 pages of notes).

Along these lines, the personal, social, institutional, micropolitical and epistemological contexts of discovery could have been further articulated. Although it is important to highlight long obscured scientists, such as Rous, d'Herelle, Burnet, Lwoff and Temin, among others (most of whom became Nobel Laureates, often belatedly), the book's string of white, male scientists at elite biomedical institutions inevitably raises the question of the social dynamics of these scientists' research groups, the role of woman, junior and foreign scientists in innovative research and the eventual appropriation of scientific credit by those in power, eg. lab directors and chairmen of departments. Given the relative prevalence of women in virology, including as co-authors of the scientists mentioned above, the reader is surprised, and dismayed, that no single woman virologist was included among this book's protagonists.

Given the author's resourcefulness, perhaps it would have been more revealing to direct one's investigative acumen at detecting who denounced Mrs. Elisabeth Wollman, a pioneer of lysogeny in bacterial viruses (arrested before her husband), fellow scientists or less elite figures at the Pasteur Institute (after World War II, many French claimed to have been in the Resistance, although in reality

³A. Lwoff, *L'Evolution Physiologique: Etude des Pertes de Fonctions chez les Microorganismes* (Paris: Hermann, 1944).

only 10% were so involved, with many more being Nazi ‘collaborators’, and profiteers from denunciations). Along these lines, it would have been helpful to clarify why no one in the scientific community confronted the leaders of the Phage Group with information on the predecessors they ignored, even though both groups were trained in Europe and must have known each other.

By its own account, this book reflects an ‘internalist’ orientation, seeking sympathy for the underdog. Could it be that there are good reasons for the current status of internalist history of science? Although one can easily accept that both internalist and externalist outlooks are needed, limiting oneself to the research trajectories of dutiful scientists and their strings of discoveries excludes everything that gives discoveries their human passion and wider social resonance, such as overcoming institutional rivalries, authoritarian lab directors, competitive, intransigent colleagues, unstable research funding and ethical norms long tolerant of sexism, racism and a score of other social biases.

Scientific research in its historical and social context is a more complex business than what transpires in this book’s benign quest for the research trajectories of two model viruses. Hopefully, future books on viruses, whether or not inspired by the masterpieces of Dickens and Plutarch, will strive to capture the historically consequential lives of viruses, virologists and the societies which became their hosts in all their devastating complexity.

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Alisha Rankin, *The Poison Trials: Wonder Drugs, Experiment, and the Battle for Authority in Renaissance Science* (Chicago: University of Chicago Press, 2021), pp. 312, \$35, paperback, ISBN: 9780226744858.

Poison is a recurring staple of Renaissance drama for a reason. Pope Clement VII had more reason to fear it than most. For one thing, the pontificate was a game of dead man’s shoes, and ambitious cardinals were notoriously unscrupulous about emptying them. Both of Clement’s immediate predecessors had been autopsied under suspicions of poisoning, which were confirmed in one case and unreassuringly inconclusive in the other. Perhaps more importantly, he had lived through a devastating outbreak of the plague in 1522 and witnessed first-hand the ravages of a disease that was widely believed to have poison at its root. It is not surprising that Clement did not hesitate when, in the summer of 1524, a surgeon named Gregorio Caravita offered him an oil that allegedly worked as an antidote against any poison. He gave his personal physician two criminals condemned to death and instructed him to test Caravita’s oil on them. Both were given marzipan cakes laced with aconite, and Caravita anointed one of them with the oil. While his cellmate died in agony, the test subject was saved by the antidote and had his sentence commuted from death by hanging to lifelong service as a galley slave.

This is the first of a whole spate of sixteenth-century ‘poison trials’. As Alisha Rankin’s engaging and erudite monograph demonstrates, they are a fascinating and hitherto unexplored historical phenomenon. Like all good things in the Renaissance, poison trials were backed up by an intellectual tradition stretching back to antiquity. A useful outline of that genealogy in Chapter 1 explains why poisons and antidotes were seen as uniquely testable: both were understood to work through an occult quality known as a total substance effect, with all-or-nothing outcomes that were easier to observe than most drugs’ complexional effect on an individual’s balance of the four humours. While ancient and medieval texts mentioned poison trials on animals, the use of humans for testing purposes was a Renaissance rediscovery, before petering out again in the seventeenth century. *The Poison Trials* captures a historical moment of ‘experimental thinking’ that has much to teach us about human subjects, knowledge-making and authority in medicine and science.