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Robin W. Scheffler, *A Contagious Cause: The American Hunt for Cancer Viruses and the Rise of Molecular Medicine* (Chicago, IL, and London: University of Chicago Press 2019), pp. 379, \$40.00, paperback, ISBN: 9780226628370.

This book discusses a remarkable episode in the century-long American effort to find a cure for cancer, the second leading cause of death in the country, by focusing on the governmental initiative in biomedical policy known as the ‘War on Cancer’ (a legislative Act passed by Congress and ratified by the US president in December 1971 which provided approximately \$100 million in new funding and a reorganisation of the National Cancer Institute). The search or ‘hunt’ for cancer viruses was central to this policy, which developed in the shadow of the spectacular success with vaccines against the polio virus in the 1950s. However, the War on Cancer ended up in a spectacular failure, as a ‘medical Vietnam’ (p. 204), being disbanded in 1978, or only seven years after its inception. This book not only seeks to clarify the rise and the fall of the War on Cancer in the 1970s, but also labours to persuade us that the ‘infrastructure’ created by the War on Cancer at great cost (or a cost which came at the expense of other, possibly more efficient, approaches to combat cancer, such as refining new clinical approaches and uncovering possible environmental causal factors) was not in vain. Rather, the book argues that ‘infrastructure’ (i.e. the ensemble of objects and actors mobilised by the War on Cancer in the form of large-scale, coordinated programmes involving scientists, administrators, labs, lab animals, materials, supplies and conferences) helped speed the response to the discovery of oncogenes (genes that can cause cancer if activated) in the 1980s. This series of discoveries, but especially the oncoproteins which were also discovered as part of this paradigm, were seen as both a ‘biological revolution’ and a new, more successful, molecular approach to cure cancer, for example by manipulating such oncoproteins. Since molecular medicine is the most recent and most promising approach to many diseases, including cancer, the book seeks to counteract the public memory of the War on Cancer as a spectacular failure (its hunt for cancer viruses ended without finding any target) by crediting it with the rise of molecular medicine in the 1980s and the 1990s.

Inspired by earlier governmental programmes such as NASA’s Apollo mission, and its success with landing on the moon in 1969 (the initial public image of the War of Cancer in 1971 was a ‘medical Apollo’), the War of Cancer is portrayed as the source of an ‘infrastructure’ which led to the rise of molecular medicine (p. 198, 184).

Other related derivatives of the War on Cancer that the book claims were: better preparedness for the sudden challenge of AIDS in the 1980s, as well as providing a foundation for the Human Genome Project in the 1990s. However, these interesting claims, adduced in the Conclusions, are alluded to rather than developed, to the effect that the argument of redemption rests primarily on the success of the oncogene ‘bandwagon’ or ‘infrastructure’. As argued earlier by Joan Fujimura, this packaging of social and material resources, whose origins this book traces to the War of Cancer, improved the fortunes of molecular biology more clearly than those of molecular medicine.

The Introduction traces the book’s origins to the paradox that ‘American investment in the hunt for a cancer vaccine peaked long before any human cancer viruses were identified in the laboratory’ (p. 4). Therefore, the goal was to find how viruses figured in American society’s response to cancer: ‘the promise of a cancer vaccine created the largest and most ambitious federal infrastructure for peacetime biological research seen in the 20th Century’ (p. 5).

The book is organised in three major parts: the first part (chs 1–3) examines how viruses figured in the definition of the cancer problem, from its initial perception as a contagious

disease (ch. 1) to the belief in the first half of the twentieth century that viruses, as extensions of germ theory, could become targets of vaccination (ch. 2). The role of medical philanthropists in framing the cancer problem, most notably Mary Lasker, namesake of the award which remains one of the leading predictors of the Nobel Prize, is discussed in ch. 3.

The second and key part of the book (chs 4–6) follows the hunt for human cancer viruses as enabled by the post-World War Two ‘biomedical settlement’ of the 1950s and 1960s. This term is used to refer to an informal accord between ‘social welfare activists, scientists, doctors, administrators, and legislators’ that the Federal government would foster health by supporting basic research into illness on an unprecedented scale. This was to compensate for the US lacking national health insurance, which most advanced countries offered their citizens after WW2 (such a plan proposed by President Truman did not pass, with the American Medical Association mobilising against it). Following an articulation of the government’s adoption of a goal of finding a cure for cancer, (ch. 4) two key programmes are described: the Special Leukemia Virus Program (SLVP) and Cancer Virus Research (chs 5 and 6, respectively).

The third and last part of the book (chs 7–10) deals with how the pursuit of cancer viruses led to the rise of molecular medicine by providing a bridge through which molecular biologists ‘migrated’ from microbial or simpler organisms to higher ones such as animals and humans. The War on Cancer, it is argued, also provided an ‘infrastructure’ which could be adapted to other goals, once the War on Cancer was terminated. Chapters 7 and 8 focus on the resistance of molecular biologists to the government’s War on Cancer, while chs 9 and 10 focus on how the infrastructure created by the government’s War on Cancer aided the expansion of molecular medicine in the context of the oncogene paradigm as well as in the context of the AIDS crisis, both in the 1980s.

Chapter 5 charts top National Cancer Institute (NCI) administrator Charles Baker’s planning of the large-scale cancer research SLVP. He introduced management methods and system thinking used by the Defense Department during the Cold War. The discussion is particularly useful in understanding how human cancer viruses, treated as ‘administrative objects’, came to underlie a new ‘infrastructure’ in biomedicine. This process is further illustrated by three case studies: the creation of ‘new industries’ for the study of leukaemia viruses in the US; by epidemiological searches overseas, especially in decolonising Africa; and by the development of the oncogene theory which would shift the research to the molecular level.

Chapter 7, ‘Viruses as a Central Front in the War on Cancer’, shows how the NCI adapted systems of command and control from defence planning during the Cold War to guide cancer virus research. It includes a fascinating satire about cancer advocacy by some scientists who were said to have isolated the ‘nobelitis’ virus while under contract from the NCI.

Chapter 8 deals with the ‘Molecular Biology’s Resistance to the War on Cancer’, focusing largely on the Norton Zinder Report, which proved decisive in blocking the scientists’ cooperation with the government’s plans for ‘big biology’. Though this chapter and the preceding one refer to half a dozen molecular biologists or so, most of whom are quoted in passing only (in alphabetical order, David Baltimore, Paul Berg, Arthur Kornberg, Arthur Pardee, Sol Spiegelman, Howard Temin, James Watson and Charles Yanofsky), its argument on their communitarian spirit misses their struggle at the time over molecular biology’s diverse identities and origins in biochemistry (Berg, Pardee and Kornberg), genetics (Watson and Zinder) or virology (Baltimore and Temin).

Despite the highlighting of the role of management theories in organising large-scale research, there is no discussion of the contradiction between the scientists’ stance in objecting to government-run big science yet running their own research empires

(e.g. Baltimore's directorship of the Whitehead Institute in Cambridge, MA, or Watson's directorship of the Cold Spring Harbor Laboratory). One also wonders why the possible impact of the War on Cancer on various ethical debacles in which its scientist protagonists were involved is not noticed, let alone problematised. (Baltimore, Berg, Gallo, Watson, among others, figured in major scandals related to misconduct in situations of conflict of interest.) Perhaps this is also a legacy of the War on Cancer?

Along these lines, the sections on molecular biology conflate the contingent of scientists who began to work on cancer viruses, often as a result of the availability of significant funding provided by the War on Cancer, with the discipline as a whole. Some molecular biologists 'migrated' to neuroscience (e.g. Seymour Benzer), while others remained in the microbial or plant worlds. Furthermore, part of molecular biology has always been structural or three-dimensional with no relation to cancer research.

The concluding section, discussing the impact of the memory of the War on Cancer as a failure on future programmes in later decades, is well taken, as is the decision to focus on the War on Cancer as a failure grounded in mid-century American politics and policy. A rich bibliography, some of it included in extensive notes, testifies to the wide horizons of this book. It is, however, sad to notice for a book that focuses quite well on examining American politics and policy in the 1970s that the affirmative action legislation's (1972) impact on the entry of women in science is entirely missed. After all, one of the discoverers of the first retrovirus, Charlotte Friend, had a remarkable career in a domain at the centre of this book. Similarly, NIH Director Bernardine Healy, who fired J. D. Watson for non-disclosure of conflict of interest, and NSF Director Rita Colwell, among other women administrators and scientists, are invisible. The book is populated by the same kind of 'heroes', arrogant male scientists whose hunger for power and publicity and all-consuming rivalries, are glossed over rather than examined as an obstacle to responsible leadership in science and society.

Some unfortunate errors crept into an otherwise well written study of the politics and policy of cancer research: the Nobel Prize of Baltimore and Temin, two key figures in cancer virus research, in 1975 is given twice as 1976; the publisher of *Commemorative Practices in Science* (University of Chicago Press, or the same as the reviewed book), which is a key reference for the argument on the impact of memory in the Conclusions, is mistakenly given as Department of STS, Cornell University. Robert Gallo is referred to as co-discoverer of the HIV (the AIDS virus), even though by now only Françoise Barre-Sinoussi and Luc Montagnier, who shared the 2008 Nobel Prize for this achievement, are considered its co-discoverers – Gallo is now believed to have appropriated the French virus.

It would have been of interest to compare more systematically the molecular biologists' opposition to the War on Cancer in the 1970s with their co-optation into another large-scale government sponsored programme, the Human Genome Project, in the 1990s, especially since the infrastructure of the War on Cancer is said to have prepared the ground for the large-scale Human Genome Project in the 1990s, a project which came to signify the molecular approach to medicine including cancer. Perhaps more such comparative undertakings will follow this most remarkable story.

Pnina Geraldine Abir-Am
Brandeis University, USA