

PENICILLIN, VENEREAL DISEASE, AND THE RELATIONSHIP BETWEEN
SCIENCE AND THE STATE IN AMERICA, 1930-1950

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ABSTRACT

This thesis discusses the development of penicillin during World War II, made possible by a complex relationship between private industry, academic researchers, and government research facilities and funding. It also examines the media response to the emergence of penicillin, the wide-spread war-time preoccupation with venereal disease, and the discovery of the potency of penicillin in treating such illnesses. It argues that the societal importance of penicillin was leveraged by policy makers in the post-war period to expand government funding for medical research and the role of the US Public Health Service. This was part of an overall trend of post-war expansion in government.

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LIST OF ACRONYMS USED IN TEXT

Organization	Acronym
1. Committee on Medical Research.....	CMR
2. Office of Scientific Research and Development.....	OSRD
3. Committee on Chemotherapeutics and Other Agents.....	COC
4. War Production Board.....	WPB
5. Civilian Production Administration.....	CPA
6. United States Public Health Service.....	USPHS or PHS

CHAPTER 1

INTRODUCTION

In January 1943, the *Los Angeles Times* reported the story of Leonor Freilich, who lay in a hospital bed with a 107 degree fever, fighting for her life. Leonor had fallen ill with a “post-childbirth” infection that was, at the time, an almost certain death sentence. Perhaps Leonor’s story resonated with the public because she was a young mother, perhaps more so because her husband was a Corporal in the US Army and the nation was at war. But the underlying connection that most Americans felt with Leonor’s plight was the gripping fear of bacterial infections in a world where penicillin was scarce and other treatment methods were often both painful and inefficient.¹

Penicillin, the “wonder drug” as the media often called it, had been discovered only a little over a decade before. Only within the last few years had it been tested in fighting bacterial infections in humans. Had Leonor fallen ill with the same disease just a few short years before, her prognosis would have been even more grim. Still, supplies of penicillin were insufficient for all those who sought its aid. What little existed was tightly regulated by government control boards. Desperate, Leonor and her husband sent their urgent plea to First Lady Eleanor Roosevelt. Miraculously, a reply came from the First lady that she would “try to do what can be done from this end.” Within a few days Leonor was being treated with the precious drug. This particular story might seem sensational, even unique, but the fear of deadly infections in pre-penicillin America was

¹ Story related from news article: “First Lady and Penicillin Save New Mother’s Life,” *Los Angeles Times*, Jan. 12, 1944, A

not.² And in Leonor's choice to reach out to the First Lady for help was one small example of the tacit connection between government and penicillin that permeates the story of the drug's success.

This work will trace three interconnected stories. First, the development of the "wonder drug" from the birth of the penicillin program in the 1930's, the impressive research efforts undertaken by scientists during World War II, and the plans for continued post-war efforts. Secondly, and an equally important part of the story, the eventual implications penicillin had for the treatment of venereal disease. Third among the concerns of this thesis is the influential role that public demands and media response played in the way post-war scientific research and public-health policy was handled by the government. Examining the penicillin program in the context of government expansion, I intend to explore the ways in which scientific and medical research was situated and functioned within wartime American society. I will also survey the ways in which the highly visible and successful development of penicillin was used as a shining example of government involvement in science. This paper will show that the promise and power of penicillin in defeating venereal disease was used by government agencies and champions of the expanding post-war government's role in science. Penicillin became a powerful rhetorical tool for those defending the expansion of government funding for medical research and public health policy. Before any clever person ever

² The following are just a few exemplary news articles of the press coverage given to bacterial infections that were or may have been treated with penicillin and demonstrate the grave mood of the idea of bacterial infections at the time: "First Lady and Penicillin Save New Mother's Life," *Los Angeles Times*, Jan. 12, 1944, A; "Penicillin Use Fails," *New York Times*, Aug 30, 1943,17; "Deadly Heart Malady Cured by Penicillin Use" *Los Angeles Times*, Dec 23, 1945, A1; and "Refuse 2nd Plea For Penicillin To Save Girl, 20," *Chicago Daily Tribune*, Aug 18, 1943, 13

articulated a war on drugs, or a war on crime, or even a war on poverty, there was a war on disease.

The relationship between science and society has been explored in historical scholarship from a variety of angles. Historians have raised questions about the ethical and political implications of research being organized and funded by government organizations. This included the possibility of government-funded science falling victim to “appropriation for ideological purposes.”³ In a similar vein, some historians have analyzed the history of medicine during the time of the penicillin program in relation to ideas of public health and citizenship. These scholars have emphasized the importance of medicine and science to politics in wartime America, and have shown how war-like rhetoric pervaded the conversations about disease and society. The wartime efforts of the government in scientific research have also been incorporated into the larger narrative of the expansion of government that coincided with and followed World War II. Scholars have investigated the significance of this expansion and its results for both science and society, often discussing the expansion in terms of the burgeoning relationship between science industry and the government during the Cold War. Numerous policy studies have explored the way postwar restructuring and expansion of the federal government would come to shape public health care policy of the nation. All of these approaches offer valuable insights into understanding the research and development of penicillin in America.

³James Kloppenberg, “Why History Matters to Political Theory,” in *Scientific Authority and Twentieth Century America*, Ronald Walters, ed. (Baltimore: John Hopkins University Press, 1997)

CHAPTER 2

THE HISTORIOGRAPHY OF SCIENCE AND SOCIETY

The penicillin program can be understood and historicized in a number of ways. History of science scholarship has been vibrant since the 1960s, investigating the ways that science functions within society. The more recent scholarship in the field has continued to explore the political and moral implications of science. Also important in this discussion of penicillin is scholarly work on the history of medicine in the US, and the social influences that have affected American medicine. Several other studies have explored the particulars of the penicillin program itself, and the governmental bodies responsible for its implementation and funding.

No paper attempting to engage with the history of science can ignore the emergence of the critical analysis of science that began with Thomas Kuhn's *The Structure of Scientific Revolutions*. Published in 1962, Kuhn's volume was, if not the first, one of the most widely read and influential works on the history of science. Kuhn called for the discipline to study "both these successive increments [in scientific knowledge] and the obstacles that have inhibited their accumulation."⁴ This was to help understand the ways in which scientific knowledge functioned in society. Kuhn's major contribution with the book was his conceptualization of scientific thought in the framework of changing paradigms. These paradigm shifts "portray[ed] scientific development as a succession of tradition-bound periods punctuated by non-cumulative

⁴ Kuhn, *The Structure of Scientific Revolutions*, 2

breaks.”⁵ This began a tradition of scientific history that lead away from the grand sweeping narrative of progressive Western science, but rather situated scientific research and innovation among its societal and political timeframes.

Kuhn’s book laid the groundwork for scholarly examination of the ways that science functions in society, and soon many other scholars were picking up where he left off. Solly Zuckerman’s *Beyond the Ivory Tower: The Frontiers of Public and Private Science* was published in 1970 less than a decade after Kuhn’s influential work. It continued in the tradition of examining the interplay between science and society. Zuckerman argued for a more intricate examination of the way private scientific endeavors and public science, the sort of research activities which have a large and overarching application to society, have historically interacted. Zuckerman explored many important themes in his work, including the “influence science and technology have had on the nature of war” and “the relation of science to public affairs, and of scientists to the machine of government.”⁶ Zuckerman also examined the more delicate issues surrounding scientific research in the field of medicine. He noted that “nowhere is the interaction of private and social innovation more pronounced than it is in the field of health.”⁷ Historical writing on science began to push away from broad and philosophical questions and focus on the ways in which politics, the government, and public health influence scientific research and endeavors.

⁵ Ibid, 208

⁶ Zuckerman, *Beyond the Ivory Tower: The Frontiers of Public and Private Science*, vii, 1

⁷ Ibid, 169

Thoughtful analysis of the way in which the government influences the practice of scientific research was beginning to gain popularity in the early 1970s. Yet not all were convinced that the relationship was either as well developed as some would state, or that it should imply some sort of negative aspect of scientific practice. Owen Chamberlain, in his chapter “Government Funding” in a 1971 edited volume, *The Social Responsibility of The Scientist*, argues that there has been an increase in government attention and funding to academic research since the end of World War II. Academic researchers are “so dependent on federal funds that even a small decrease raises havoc” and with that, the “tendency to have a kind of indirect political interference in people’s lives through government support” exists.⁸ However, while Chamberlain’s essay is an example of the way in which government influence on science was getting more attention, he falls short of a critical analysis of what the outcome of such involvement means.

More recent scholarship continues to focus on the relationship between the government and scientific research in an “effort to foster, not foreclose, the debate over the place of science in shaping democratic society.”⁹ JoAnne Brown’s chapter in *Scientific Authority in Twentieth Century America*, “Crime, Commerce, and Contagion” argues that warlike rhetoric pervaded both popular and professional health literature at the same time as politicians began to actively promote American military power in the early twentieth century. Brown ties medicine and public health to ideas of citizenship, and demonstrates the link between science and politics in America during the time of

⁸ Owen Chamberlain, “Government Funding” in *The Social Responsibility of The Scientist*, ed Martin Brown. (New York: The Free Press, 1971), 40,43,45

⁹ Ronald Walters, ed. *Scientific Authority and Twentieth Century America* (Baltimore: John Hopkins University Press, 1997), 3

World War II.¹⁰ A particularly critical view of science in society is taken by James T. Kloppenberg in his chapter in the volume, “Why History Matters to Political Theory.” He argues that scientific research and its “application to social problems [was] shown to be grounded in questionable application and susceptible to appropriation for ideological purposes antithetical to the scientific ideal of value neutrality.”¹¹ Such negative views of the complex relationship between politics, government, and science are a prominent part of most of the history of science literature. A similarly critical article by Larry Owens on the history of the federal government’s Office of Scientific Research and Development (the parent agency of the coordinating body that would oversee penicillin research,) shows the “new relationship between science and government that helped shape Cold War America.”¹² Owens argues that the contractual system of funding from the government to private industry and academic researchers “helped fuel the engine by which the Cold War state became dependent on private contractors, small businesses became increasingly dependent on government, and, overall, federal money encouraged the concentration of economic power in large corporations.”¹³

But it is not just the history of science which eschews these ideas, the history of American medicine is important in contextualizing the story of penicillin as well. Paul Starr’s *The Social Transformation of American Medicine* is the most synthetic work on

¹⁰ JoAnne Brown, “Crime, Commerce, and Contagion: The Political Languages of Public Health and the Popularization of Germ Theory in the United States, 1870-1950” in *Scientific Authority and Twentieth Century America*, ed Ronald Walters. (Baltimore: John Hopkins University Press, 1997), 74

¹¹ Kloppenberg, “Why History Matters to Political Theory”, 185

¹² Owens, “The Counterproductive Management of Science in the Second World War”, 563

¹³ Ibid.

this subject.¹⁴ Starr's book is expansive, and deals with almost every aspect of the medical profession. In the first part of the book he traces the struggles for legitimization in the medical profession in America, and in the second part he describes the growth of the medical profession into a politically influenced industry. Starr describes the development of penicillin during World War II as "paradigmatic of wartime medical research."¹⁵ Starr also shows how during World War II, Americans "gave science unprecedented recognition as a national asset," and the postwar "movement toward incorporating medicine into the state" was important in forging medicine with industry.¹⁶

The scholarly work on the history of science can be understood as progressing from ideas that were largely philosophical, to the more recent studies engaging with more specific subjects. These recent works raise questions about the role played by government funding and political ideology in science and society. In fact, several works have dealt specifically on the history of the penicillin program, including *The Enchanted Ring* by John C. Sheehan, and *Penicillin: Triumph and Tragedy* by Robert Bud, the two most comprehensive histories of the development of penicillin in the United States.¹⁷ These books, however, deserve a few words of caution. The first is written by a scientist who worked on the penicillin program, who may be biased as a result of his first-hand experience. The second book, while valuable, is not a history book, since the author is equally as interested in penicillin's chemical structure and medical marketing as a brand.

¹⁴ Paul Starr, *The Social Transformation of American Medicine* (New York: Basic Books, 1982)

¹⁵ Starr, *The Social Transformation of American Medicine*, 341

¹⁶ Starr, *The Social Transformation of American Medicine*, 335, 337

¹⁷ John C. Sheehan, *The Enchanted Ring: The Untold Story of Penicillin* (Cambridge: MIT Press, 1982), and Robert Bud, *Penicillin: Triumph and Tragedy* (New York: Oxford University Press, 2007)

This thesis contributes to the existing scholarship by following several of the recent trends in the historiography, but it also addresses an issue that needs more attention. My research advances the idea of political influence in the formation of government funded science. By specifically studying the development of penicillin during World War II and its influence in facilitating expanded government funding, this thesis will use a case study to explain larger trends in government expansion in the post-war years. Important to the argument and analysis of this paper is an investigation into social anxieties about venereal disease and how this played out in the media coverage of penicillin and its use in treating venereal disease (or VD as it was popularly known.) While other scholars have studied the history of penicillin development, social anxiety about venereal disease, and the expansion of governmental funding to science after World War II, I believe that all three are critical and interdependent parts of the story of penicillin.

CHAPTER 3

PENICILLIN AND THE COMMITTEE ON MEDICAL RESEARCH

Discovered in 1929 by Scottish-born Sir Alexander Fleming, penicillin proved to be one of the most exciting and widely lauded scientific discoveries of the twentieth century. In fact, Fleming would go on to win the Nobel Prize for his brilliant discovery. Research stalled in the early years, but finally began to flourish as the probability of war in Europe intensified in the late 1930s. Short on supplies and funds for the implementation of a large-scale penicillin research program, British researchers turned to the US for help. In 1941 the leading British penicillin researcher, Dr. Howard Florey, and a colleague visited several research facilities in the US. Shortly thereafter they began negotiations with US governmental agencies to set up and fund a massive research and development effort, one that would hopefully allow the full potential of penicillin to be discovered and harnessed.¹⁸

Over the course of the early war years the American government, working with academic researchers and private industrial manufacturers, made the large-scale production of penicillin possible. Countless hours of clinical testing by scientists and doctors led to unimaginable advances in the use of penicillin to treat a myriad of often fearsome diseases. By the time Leonor Freilich lay dying in that hospital bed, the promise of penicillin was well known. What allowed the penicillin program to be such a model of success for scientific research was the unique and complex relationship that sprung up between government agencies, private corporations, and academic researchers. The

¹⁸ For comprehensive histories of penicillin, ranging from its discovery, to its chemical structure, to its marketing see: Sheehan, *The Enchanted Ring*, and Bud, *Penicillin: Triumph and Tragedy*

Committee on Medical Research (CMR), one such government agency, was tasked with coordinating research between private corporations, academic institutions, the armed services, and government research centers, as well as controlling clinical trials and the flow of information and materials.¹⁹

The CMR was created in 1941 out of wartime necessity. Part of the Office of Emergency Management, the CMR was tasked with coordinating medical research leading up to and during World War II. Housed as a subcommittee in the Office of Scientific Research and Development, the CMR was led by director Dr. A.N. Richards. Dr. Richards, and his civilian colleagues on the board, were appointed by the president, along with appointees from the medical corps of both the Army and Navy. The work to be undertaken by the CMR was largely to be confidential in nature. Fortunately the professional papers of the director, Dr. Richards, survive and form the basis of the primary source analysis for this thesis. The efforts of the men involved in the Committee were lauded by journalists as a “highly important national service.”²⁰ A service that would bring science and medicine to the fight that was beginning to boil up in Europe and around the world.

¹⁹ Ibid.

²⁰ “Editorial, British Medical Journal” Alfred Newton Richards Papers (hereafter, ANR Papers), University Archives and Records Center, University of Pennsylvania, Philadelphia PA: UPT 50 R514, Box 12, FF 1 and Vannevar Bush, *Dr. Vannevar Bush to Dr. Alfred Richards, Mar 10, 41*. Letter. ANR Papers, Box 12, FF 1

OSRD Organizational Structure, May 1945

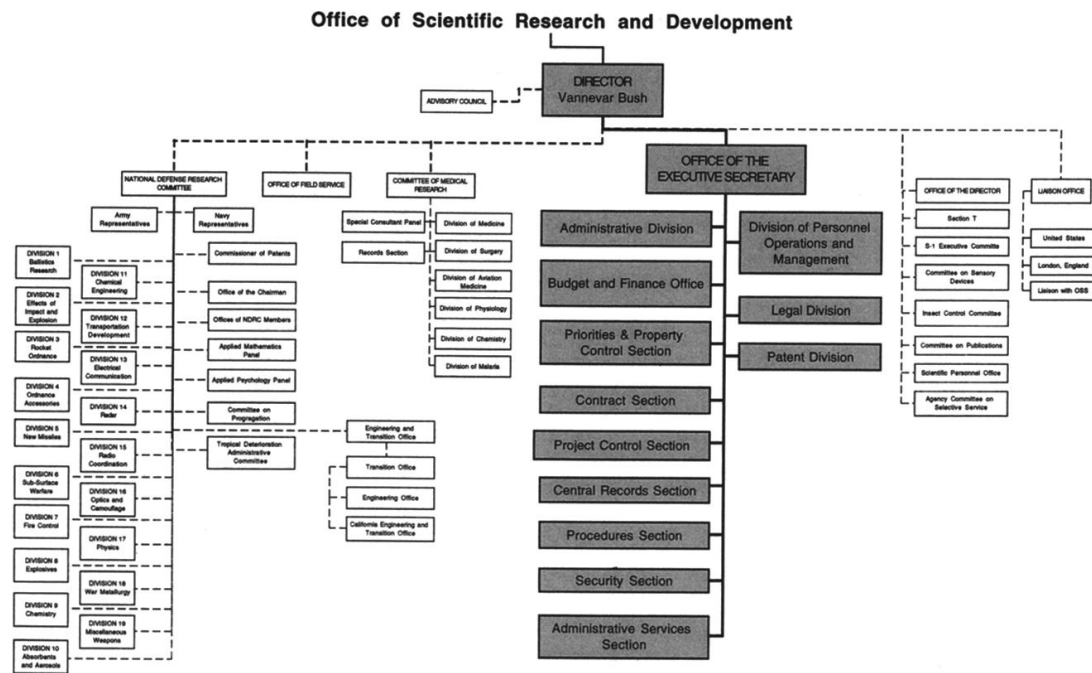


Figure 1. Organizational Chart of the CMR. Flow chart showing the placement of the CMR within the OSRD.²¹

In the beginning, the CMR was envisioned by its members as a body that would both coordinate and review work that was being done in various fields of medical research. No effort was initially made by the agency to either “define the limitations of the term ‘medical research,’” nor to be the type of committee that would be initiating new research as part of its efforts for the war.²² So the CMR was from its inception a loosely focused committee that would merely oversee the progress and results of ongoing medical research, and would work to facilitate those efforts through funding and

²¹ This figure is taken from Owens, “The Counterproductive Management of Science in the Second World War”, 528. In his own image caption, Owens cites the source of the image as: “Based on a chart in the Bush Papers, box 90, folder 2010, Library of Congress.”

²² “Annex 1” *Committee on Medical Research; Meeting Minutes, July 31, 1941*. ANR Papers, Box 12, FF 21

guidance. Tasked with using the pre-existing Federal agencies that were available to facilitate and carry out medical research, in the beginning the scope and importance of the Committee seemed both wide-open and limited at the same time.²³ Research agendas and goals for the CMR were never formally established. Although the Committee was not initially intended to dictate wide fields of research, it eventually would do just that with the penicillin program.

The CMR did function efficiently however, and soon had set up a system of contract work that would be the model for its interactions with government laboratories, academic researchers, and private companies. The contracts that the CMR oversaw were particularly well regulated and included several conditions that sought to ensure both the interests of the government and national and military security. Guidelines and regulations for how patent rights would or could be distributed on work done under government contracts, and the eventual decisions of the CMR pertaining to patents were protected from the start. Also of concern to members of the Committee's board was the flow of information regarding the work being overseen by the CMR. The prerogative of the CMR to decide what information would be made public and what other should remain confidential was well protected.²⁴

The work of the CMR was important in many regards, and business began to boom as the war effort intensified through the early 1940s. By 1943, the CMR was overseeing 299 contracts and the efforts of close to 1600 workers. The Committee even

²³ Ibid; and *Committee on Medical Research; Meeting Minutes, August 7, 1941*. ANR Papers, Box 12, FF 22

²⁴ Ibid; and "Annex 2" *Memorandum of Agreement*. ANR Papers, Box 12, FF 21

extended its hand into matters of the Selective Service, making provisions so that its contracted employees who were “essential” to specific research programs could be kept out of military service, whether it be voluntary or involuntary.²⁵ It was not just the bureaucratic structure of the Committee that was expanding and developing; the scientific and research oriented concerns of the CMR were growing as well. From an initial outreach to four private industrial firms about the possibility of starting up a program for production of penicillin, the number of firms engaged in research had grown to nineteen. Ten had begun producing the drug, and nine more were equipping their laboratories and production facilities in the hopes of contributing to the supply of penicillin that was being built for the war effort.²⁶

The motives of the pharmaceutical companies were not completely altruistic, however. Production of penicillin was expected to be booming business and offered many pharmaceutical companies the opportunity to cement their relationships with growing government bureaucracies that supplied contracts. Among the companies producing penicillin were Pfizer and Merck, and the astronomical success of both companies “can be directly attributed” to their involvement with penicillin development.²⁷ Dr. Richards received a personal message from George W. Merck, just days after his appointment as director of the CMR, to let him know that Merck was “delighted” to hear of his appointment. Merck also did not miss the opportunity to point out that his company was

²⁵ *Selective Service Memoranda*. ANR Papers, Box 12, FF 11

²⁶ Alfred Richards, *Speech to National Academy of Sciences, November 22, 1943*. ANR Papers, Box 12, FF 48

²⁷ Robert Bud, “Upheaval in the Moral Economy of Science? Patenting, Teamwork and the World War II Experience of Penicillin,” *History and Technology* 24 (2008): 175.

more than willing to “cooperate in any way” with the needs of Richards and the new committee.²⁸

²⁸ George W. Merck to Dr. Richards, Western Union Telegram, July 17, 1941. ANR Papers, Box 12, FF 1

CHAPTER 4

PENICILLIN AND THE GOVERNMENT: EXPANSION AND POST-WAR PLANS

The penicillin program was one of the first and most important research efforts organized by the CMR. When Florey came to the US in search of funding, supplies, and manpower to begin the research and development process for penicillin, the program required a certain organizational structure to operate at a functional level. To begin with, the CMR was tasked with liaising between government facilities working on penicillin, various private chemical and pharmaceutical companies, and academic researchers working in fields that would be helpful to the effort. This coordination required the distribution of money, securing contracts for workers and labs, and controlling the flow of information between the various parties and to the media and public. Over time as research progressed, new indications for the medicine were discovered (such as an alternate, and much more effective, treatment for venereal disease-- which will be discussed in greater depth later on.) Clinical trials among the wounded allied forces, as well as civilians, were conducted by doctors under the supervision and regulation of the CMR.²⁹

The research effort, however, did not immediately take off at the exponential pace it would experience during the war years. The beginning of penicillin research would be slow going for a while, until issues with the production method of the drug were resolved. Debate over the practicality and efficiency of several growth methods for the mold that produced the drug, as well as the calculated risk of investing in synthetic

²⁹ Chester Keefer, *"The Story of Penicillin," Speech read before the National Academy of Sciences, November 16, 1944.* ANR Papers, Box 12, FF 50

penicillin production, plagued the earliest days of the penicillin program under the guidance of the CMR. There were issues of information sharing between private (otherwise strictly competitive) commercial drug companies, as well as a somewhat bristly relationship between several government agencies exchanging, or sometimes being cut out of, communication. Slowly, however, the production of penicillin began to expand dramatically, and as stores of the drug began to be built up, the attention of the CMR turned to clinical trials of penicillin.³⁰

In June of 1942 the CMR, working with the National Research Council, set up the first clinical trials of penicillin, run out of Boston under the supervision of Dr. Chester Keefer. Dr. Keefer headed up the Committee on Chemotherapeutic and Other Agents, commonly known as the Committee on Chemotherapy (COC), another bureaucratic arm of the CMR.³¹ These trials allowed doctors to begin to administer the small provisions of penicillin that were available at that time to civilians to treat certain bacterial infections. Yet supplies were still scarce and precious, and it was often difficult for doctors to get enough penicillin to run large-scale or long-term trials. Simultaneously and under separate authority, but still supervised by the CMR, the physicians of the armed forces began their own clinical trials. Penicillin showed a huge amount of promise to treat a number of combat related infections, and was considered one of the greatest life-saving advantages that the US and the allied forces could leverage over their adversaries. As funding and penicillin continued to be channelled through the CMR from the government

³⁰ Sheehan, *The Enchanted Ring* and Bud, *Penicillin*

³¹ For more on the COC and, interestingly, appeals like that of the Freiliches to the Roosevelts for help in procuring penicillin, see: David P. Adams, "Wartime Bureaucracy and Penicillin Allocation: The Committee on Chemotherapeutic and Other Agents, 1942-1944," *Journal of the History of Medicine and Allied Sciences* 44 (1989): 196-217

to academic and private researchers, problems began to arise. By July of 1943 allocation of all penicillin, both that reserved for the armed forces and the supply that was available to treat the general population was eventually taken over by the War Production Board (WPB.)³² The WPB was another wartime government agency that worked closely with the CMR.

At the same time that funding and supplies began to flow more efficiently and steadily through the WPB, an important discovery was being made about the versatility of penicillin in treating infections. In 1943 Dr. John Mahoney and his research team discovered the effectiveness of penicillin in the treatment of venereal disease, namely gonorrhea and syphilis.³³ This development was welcome news to the doctors of the armed services who were “anxious to procure penicillin” for the treatment of venereal disease among the men in their care.³⁴ Many men had either contracted a disease while serving, or had tested positive for one upon routine physical screening when they enter the services. This exciting development came with considerable funding for Mahoney. The CMR spent more than \$45,000 on a contract with Mahoney and the US Public Health Service for the year of July 1943- June 1944 alone; it was one of the largest sums of money that the CMR would allocate for any project that year.³⁵

³² Alfred Richards, “*Timeline of Research and Development of Penicillin in the US*,” October 1956. ANR Papers, Box 24, FF 28

³³ For more on Dr. Mahoney’s research and breakthrough see: John Parascandola, “John Mahoney and the Introduction of Penicillin to Treat Syphilis,” *Pharmacy in History* 43 (2001): 3-13

³⁴ Chester Keefer, *Dr. Chester Keefer to Dr. Alfred Richards, May 11 1943*. Letter. ANR Papers, Box 24 FF 15

³⁵ Alfred Richards, *Statement given to the Subcommittee of the Senate Committee on Health and Education Hearing, December 20, 1944*. ANR Papers, Box 12, FF 48 and “*Project Summaries on Venereal Disease*.” ANR Papers, Box 13, FF 9

Extensive funding for venereal disease research was just one example of how the penicillin program and the CMR in general were expanding as the war was progressing. By the end of 1944 the Committee had made almost 500 contracts with 120 different groups, including private corporations and academic institutions. In its first year of operation (1941-1942) the CMR's total expenditures was approximately \$2.3 million; by its third year (1943-1944) it was spending almost \$8 million.³⁶ In all, the OSRD would spend a quarter of that budget, or \$2 million, on developing penicillin.³⁷ What began as a self described "reviewing and effectuating committee" had developed into a busy and important government agency that was highly involved in the war effort.³⁸ The expansion was not limited to just the CMR. As the director, Dr. Richards explained in a Senate Hearing in 1944:

"there were 7 main committees and 32 subcommittees of the NCR [National Research Council] in existence at the time of the creation of the CMR whose purpose it was to advise the Surgeons General of Army, Navy and the Public Health Service. By 1944 there were 13 committees and 43 subcommittees."

The bureaucratic organization of government funded and regulated science was growing just as much as the body of scientific and medical knowledge that researchers were producing was expanding.

This expansion wasn't just confined to the largest bureaucracies. A 1944 article in the *New York Times* detailed how a small penicillin research committee at Penn State University was growing as well. The committee, started by the War Production Board

³⁶ Alfred Richards, *Statement given to the Subcommittee of the Senate Committee on Health and Education Hearing, December 20, 1944*. ANR Papers, Box 12, FF 48

³⁷ Allan M. Brandt, *No Magic Bullet: A Social History of Venereal Disease in the United States Since 1880* (New York: Oxford University Press, 1985), 172

³⁸ *Committee on Medical Research; Meeting Minutes, August 7, 1941*. ANR Papers, Box 12, FF 22

with “a staff of eight men and women” had inflated to a team of “thirty-eight chemists, bacteriologists, chemical engineers, and other specialists” in less than six months time. According to the article the burgeoning team was kept busy “seven days a week” with their work evaluating the yield of penicillin and “pass[ing] findings on to commercial firms through the WPB.”³⁹ By the end of the war, when the time came to dismantle the CMR and other wartime government structures, a discussion would take place on how to facilitate continued research in such an effective manner in peace time.⁴⁰

When the war drew to a close in 1945, first in the European theatre, and then in the Pacific, the demand for penicillin by the military to treat combat related wounds subsided. With it, ended the specific necessity of government involvement in science that was championed as mobilization, or part of the war effort. While the CMR, and even its overseeing entity the Office of Scientific Research and Development, would be dissolved shortly after the end of the war, that did not mean that the influence of the CMR would be gone. The system of contract work to academic, private, and governmental researchers in both the matter of penicillin research and the other work that was overseen by the CMR and was pioneered by the OSRD would be preserved in the post-war years.⁴¹

Even before the end of the war, discussions were taking place among bureaucrats and legislators about the future of government funded science. Dr. Richards, in December of 1944, gave a statement before a Senate Subcommittee on Health and Education about the responsibilities, role, and successes of the CMR. When asked to speak to the idea that

³⁹ “Research on Penicillin Keeps College Staff Busy” *New York Times*, May 28, 1944, E9

⁴⁰ Alfred Richards, *Statement given to the Subcommittee of the Senate Committee on Health and Education Hearing, December 20, 1944*. ANR Papers, Box 12, FF 48

⁴¹ Owens, “The Counterproductive Management of Science in the Second World War”, 563

OSRD was, in essence, responsible for the organization of wartime science research, Richards made the case that “without the OSRD or its equivalent few or none of the investigations... would have been carried out with the same degree of thoroughness and speed.”⁴² Citing the success of the penicillin program, and other OSRD research initiatives of both medical and military importance, Richards sang the praises of scientific research conducted with government funds. When referencing the significance of the strides made by the penicillin program, Richards noted how “remarkable” it is that penicillin could be used to treat two common venereal diseases. Tying the issue of VD to the need for continued government involvement in medical research was an effective avenue. With the level of public desire to see penicillin continue the “war on disease” so high, Richards arguments made it seem like a given that expanded government funding was necessary. Stating that it was an “inescapable conclusion” that continued efforts by scientists would only reach similar levels of value with funding coming from government sources, Richards in particular spoke of his vision that the future of government-funded medical research was in university labs.⁴³

The following year, in October of 1945, Richards again spoke before a Senate committee, this time to discuss in particular the creation of a “post-war program for scientific research.”⁴⁴ Richards’ words once again reflected his belief that the penicillin program, among others facilitated by the CMR, was of “enormous peace-time

⁴² Alfred Richards, *Statement given to the Subcommittee of the Senate Committee on Health and Education Hearing, December 20, 1944*. ANR Papers, Box 12, FF 48

⁴³ Ibid

⁴⁴ Alfred Richards, *Statement given at joint hearings held by Subcommittees of the Senate Committee on Military Affairs Concerning a Post-War Program for Scientific Research, October 22, 1945*. ANR Papers, Box 12, FF 49

significance” and was a shining example of the way government organized science could rise to the occasion to meet the needs of war and society.⁴⁵ And he continued to echo the ideas that the relevance and importance of penicillin should be seen in relation to its use in treating VD. However, when detailing specifics about his opinions on the role of a governmental organization that would oversee scientific research in peace time, he had some grave predictions. Noting that any effort that did not account for the individual and independent nature of scientific research, or was organized by those who did not understand this tenet of scientific inquiry, would “surely fail.”⁴⁶

In July 1945, Vannevar Bush, the Director of the Office of Scientific Research and Development published what became known as the Bush Report.⁴⁷ This report was researched and drawn up in response to a personal appeal by President Roosevelt to Bush in late 1944, inquiring as to what “with particular reference to the war of science against disease” could be done to facilitate the continued efforts and government funding of scientists.⁴⁸ Roosevelt expressed hope that “the lessons to be found in this [war-time effort could] be profitably employed in times of peace.” Roosevelt acknowledged the importance of OSRD programs as “a unique experiment of team-work and cooperation in coordinating scientific research and in applying existing scientific knowledge to the

⁴⁵ Ibid

⁴⁶ Ibid

⁴⁷ The entire “Bush Report”, including the letters of correspondence between Roosevelt, Bush, and Truman, can be found online at: <http://www.nsf.gov/about/history/vbush1945.htm>, and was accessed by the author on March 5th, 2012. One can assume that with any reference to the “Bush Report” the author is Vannevar Bush, unless otherwise stated. However, in the introductory letter from Bush to Truman, Bush qualifies his authorship: “Although the report which I submit herewith is my own, the facts, conclusions, and recommendations are based on the findings of the committees which have studied these questions” and includes appendices with further information.

⁴⁸ Ibid.

solution of the technical problems paramount in war.”⁴⁹ His desire was to learn from Bush, the most accomplished administrator in the field, how to use this momentum moving forward into times of peace.

In Bush’s summary of the report, he laid out what he thought were the most pressing issues that his report could help address. He wrote of how “scientific progress [was] essential” in winning the “war against disease”, for protecting “our national security,” and for “public welfare.”⁵⁰ He also acknowledged that increased scientific research would stimulate industry, create jobs, and was “essential to the achievement of our goal of full employment” following the war. Bush urged that “the Government should accept new responsibilities for promoting the flow of new scientific knowledge and the development of scientific talent in our youth.”⁵¹ Bush called for an extension and expansion of the research efforts begun during the war. He laid out the importance of continued funding to academic researchers, private research institutes, and military research efforts. He boldly pointed out that “if the colleges, universities, and research institutes are to meet the rapidly increasing demands of industry and Government for new scientific knowledge, their basic research should be strengthened by use of public funds.”⁵²

As Bush developed his argument further he turned to specifics. The first example of scientific progress he invoked? Penicillin. “We all know how much the new drug,

⁴⁹ Franklin D. Roosevelt, *President Franklin Roosevelt to Dr. Vannevar Bush*, Nov. 17, 1944. Letter. Bush Report, <http://www.nsf.gov/about/history/vbush1945.htm>

⁵⁰ Vannevar Bush, *Bush Report*, Summary of the Report

⁵¹ *Ibid.*

⁵² *Ibid.*

penicillin, has meant to our grievously wounded men on the grim battlefronts of this war” Bush wrote, “the countless lives it has saved - the incalculable suffering which its use has prevented. Science and the great practical genius of this nation made this achievement possible.” Bush argued that science was the new frontier of America, and that with frontier came expansion. Something that the Government was compelled to fund and oversee:

It has been basic United States policy that Government should foster the opening of new frontiers. It opened the seas to clipper ships and furnished land for pioneers. Although these frontiers have more or less disappeared, the frontier of science remains. It is in keeping with the American tradition - one which has made the United States great - that new frontiers shall be made accessible for development by all American citizens. Moreover, since health, well-being, and security are proper concerns of Government, scientific progress is, and must be, of vital interest to Government. Without scientific progress the national health would deteriorate; without scientific progress we could not hope for improvement in our standard of living or for an increased number of jobs for our citizens; and without scientific progress we could not have maintained our liberties against tyranny.⁵³

Bush was painting scientific research with the brush of traditionalism, and in so tying it to the grand narrative of American expansion into the frontier. This strong association that Bush nurtured between traditional American values and his views for the future of scientific research made opposition almost impossible. Perhaps Bush made this connection at a time when he was anticipating political objections to this widespread expansion and spending at the end of the war. Whatever his motivations, many as there must have been, Bush tied together the necessity of scientific research to public health, moral triumph, and the duty of the American government and policy makers to address these concerns through science.

⁵³ Vannevar Bush, Bush Report, Chapter 1

Bush concluded his report with recommendations for President Truman to consider. He suggested that “the effective discharge of these new responsibilities [of the government to fund and foster research] will require the full attention of some over-all agency devoted to that purpose.” He recommended that the governmental agency that filled such a place “should be composed of persons of broad interest and experience, having an understanding of the peculiarities of scientific research and scientific education. It should have stability of funds so that long-range programs may be undertaken.” And he added that the agency should be responsible to the President and to Congress. Bush also recommended “that the national interest in scientific research and scientific education can best be promoted by the creation of a National Research Foundation.” He saw the purview of such a foundation as “develop[ing] and promot[ing] a national policy for scientific research and scientific education, ...support[ing] basic research in nonprofit organizations, ...develop[ing] scientific talent in American youth by means of scholarships and fellowships, ...contract[ing] and otherwise support[ing] long-range research on military matters.”⁵⁴

In the year following the end of the war, and the publication of the Bush Report, President Truman passed Executive Order 9791 in October of 1946. Reasoning that “national security and the development of the domestic economy depend upon the extension of fundamental scientific knowledge,” the order created a Presidential Research Board. This bureaucratic board would function to report on both Federal and non-Federal research in the country. Its aim was to answer the question of how the “vast reservoir of

⁵⁴ Ibid, Chapter 6

war-accelerated technological development” could be “applied speedily and effectively to the problems of peace.”⁵⁵ This new governmental body was a peace-time extension of a war-time endeavor. The example of penicillin, always used as proof of the success of government organization and funding of science, as a “war-accelerated” technology, was at the foundation of this and other government expansion efforts.⁵⁶

There seemed to be little doubt that some sort of government funding to scientific research after the war would continue. In fact, strides had already been made at the highest levels of government to make sure that this happened. However with the looming public anxiety about VD and the fervor that it stirred among people to continue the spirit of war-time triumph over the ills of society was important in the way government would come to shape its role in research. Appeals to continue the expanded, bureaucratic nature of government regulation and funding of research, which the CMR was such a good example of, were powerful and successful. The US Public Health Service, among other governmental research groups, was fueled by government funds, and expanded to take on the role that the CMR had played during the war. This expansion of funding for medical science coincided with a huge upswing in funding for public health services, as an increase in knowledge lead to an increased need for professionals and facilities to treat the sick.⁵⁷

⁵⁵ “*Statement by the President,*” October 17, 1946. ANR Papers, Box 12, FF 12

⁵⁶ Alfred Richards, *Dr. Richards to The Honorable Tracy Vorhees, September 1, 1948.* Letter. ANR Papers, Box 23, FF 47

⁵⁷ William Shonick, *Government and Health Services: Government's Role in the Development of U.S. Health Services, 1930-1980* (New York: Oxford University Press, 1995), 413

Bureaucratic organizations were also becoming important, with the creation of such groups as the Civilian Production Administration (CPA) and the Presidential Research Board. The power of penicillin to facilitate this level of post-war governmental expansion in both funding for research and public health policy is noteworthy. In all fairness, the penicillin program was remarkable for any number of reasons. It was a successful example of collaboration among otherwise extremely competitive private companies in the name of the war effort. It was a triumph of chemistry and engineering that American scientists were able to overcome the low yield of the mold so that sufficient amounts could be produced in a matter of years. Yet, the story that was successful in conveying the importance of penicillin was its ability to tackle venereal disease. That issue, with its importance to the military, and its ability to captivate the attention of the public, could be used as an effective tool to aid in the process of government expansion.

CHAPTER 5

PENICILLIN AND VENEREAL DISEASE

Dr. Mahoney's discovery of penicillin's effectiveness in treating gonorrhea and syphilis was a scientifically important and socially soothing discovery. This was especially true because at the time, anxiety over venereal disease was running high. Physicians serving in the military were overwhelmed by cases of the disease, with often painful, time consuming, and less than effective treatments limiting their options for treating patients. Not only were Army and Navy doctors concerned with the way to treat venereal disease among enlisted men, but doctors treating the general public were also experiencing record numbers of VD cases. All were anxious to find more effective ways to treat these dangerous diseases. The possibility that a single drug could treat multiple venereal diseases, in a shorter amount of time than previous remedies, and with a higher chance of curing the diseases, made the promise of penicillin incalculable.

The awareness of venereal disease among the American public had been particularly high in the United States since World War I, during which a huge campaign against VD was launched by public health officials. But long standing associations between military activity and venereal disease pre-dated the Great War. Whether that of troops concentrated at military bases, relocated masses of war-industry workers, or troops in occupation of other countries, it seemed that wherever military presence took servicemen, the dangers of syphilis, gonorrhea, and other issues of "social hygiene" seemed to follow. In his book, *No Magic Bullet: A Social History of Venereal Disease in the United States Since 1880*, Allan M. Brandt illuminates both the medical and cultural

components of VD in America. He argues that “in the charged atmosphere of world war, venereal disease threatened military efficiency and health, and equally importantly, symbolized moral failure and social decay.”⁵⁸ Brandt shows how in the mobilization for the Great War, venereal disease became a metaphor for the evil that the war was supposed to be combating.⁵⁹ The same pervasive attitudes that people held about the relationship of VD and war persisted into the time of World War II.⁶⁰

Increased attention to the issue of venereal disease coincided with the age of New Deal reform and the expanded role of the government in administering social welfare. Discussing infected and disabled men in terms of “man-power,” which was particularly appealing in a time that was fixated on the viability of the capitalist marketplace, “men became machines; venereal disease [then became] a deadly, but more importantly, a costly corrosive.”⁶¹ The campaign of public health officials to raise awareness and deal with the dangers of VD had partially succeeded by 1938, when Congress passed the National Venereal Disease Control Act. Brandt persuasively argues that this Act must be understood in the larger context of government expansion that was already starting to take place under New Deal legislation. The VD Act was a part of this expansion. Passing the legislation in 1938, Congress

made explicit the relation between the unprecedented activities during World War I and the New Deal. Just as the war had demanded the expansion of the federal government, so now the crisis of the depression had brought forth the need for a more powerful centralized State... [and an]

⁵⁸ Brandt, *No Magic Bullet*, 46

⁵⁹ *Ibid*, 86

⁶⁰ *Ibid*, 163

⁶¹ *Ibid*, 132

expansion of the Federal government to provide new services and attack issues heretofore viewed as within the domain of the states.⁶²

What Brandt shows convincingly is that a pattern of governmental expansion to deal with issues of public health had a long tradition, even before it was evoked by politicians as a reason to continue government funding for scientific research following World War II. This expansion narrative is echoed in Beth Bailey's *Sex in the Heartland* which contends that during and after World War II, the federal government began to expand its role in multiple areas of American life. Bailey demonstrates how "institutions such as public health departments and public universities (increasingly funded by the federal government) were critical parts of the nationalizing process."⁶³ The arguments of these historians tie together the issues of federal expansion and funding that are particularly important factors in explaining the post-war organization of medical research, which in turn was deeply affected by the promise and success of the penicillin program.

The National Venereal Disease Act was a start; but leading into the war, bad press about the preparedness of the military played into pervasive fears about the ability of VD to derail the war effort. As a result, in 1941 President Roosevelt requested "a full report on venereal incidence in the Army and Navy", just as the mobilization effort was beginning to speed up.⁶⁴ Venereal disease was a real concern for both administrators of the Army and Navy and those responsible for the medical care of the armed services. With long and often painful treatment schedules for venereal disease prior to the advent

⁶² Ibid, 141

⁶³ Beth L. Bailey, *Sex in the Heartland*. (Cambridge, MA: Harvard University Press, 1999), 3

⁶⁴ Brandt, *No Magic Bullet*, 162

of penicillin, the concern about wasted man power and medical resources was a pressing issue, especially for troops on the front lines of the war, who needed to be in top form. Discussing syphilis and gonorrhea as “diseases of military importance,” doctors serving in the armed services were eager to get their hands on penicillin. The “wonder drug” might make their fight against venereal disease a worry of the past.⁶⁵ Army doctors set up their own clinical trials in 6 hospitals in 1943 to investigate the use of penicillin in the treatment of venereal disease.⁶⁶ The army got a limited supply of the drug from the WPB. The choice to use it to explore the treatment of venereal disease, when important research on combat related wounds and infections was also taking place, speaks to the fact that eradicating (or at the very least effectively treating,) venereal disease was a priority in the war effort.

With the military importance of venereal disease well established, the language surrounding venereal disease reinforced the idea that a large-scale societal anxiety about the spread and treatment of venereal disease existed. The efforts of civilian doctors, the US Public Health Service, and the American public to address and rectify the issues of venereal disease was frequently referred to in the press as the “war on venereal disease.” The language used to describe measures targeted at addressing the issue of venereal disease began to mimic the language that addressed the actual war being waged by the military. The ideas of “joining forces” against, “declaring total war on,” “combating,” and “waging war on” venereal disease permeated the media coverage of the development

⁶⁵ Chester Keefer, “*The Story of Penicillin*,” *Speech read before the National Academy of Sciences, November 16, 1944*. ANR Papers, Box 12, FF 50

⁶⁶ Alfred Richards, “*Notes, December 1, 1945*” ANR Papers, Box 13, FF 14

and use of penicillin. Penicillin was the “wonder drug,” the “precious yellow powder,” and the “supreme weapon for man” with almost mythical qualities in some news reports.⁶⁷

A huge concern to a large number of American citizens, this “war on disease” tied ideas of wartime success to moral triumph over the ills of society. Predictions that penicillin would erase syphilis from human concern were made by some, but other, more practical voices urged that when the war was over, the fight against venereal disease should continue, full steam ahead, at home.⁶⁸ The success of penicillin in treating VD “seemed to be the answer to the search for a magic bullet” that public health officials and both civilian and military physicians had been looking for.⁶⁹ Whether or not penicillin could live up to those expectations was another story. What was recognized by the public and the government alike was an increased need for the Public Health Service to continue the research begun during the war, and for a more important role for the PHS in the post-war years.

Although Brandt and Bailey’s analyses are helpful in explaining this story, another historian who draws an even stronger parallel between the “war on disease” and the expansion of the Public Health Service is Alexandra Lord. In her recent study, *Condom Nation: The US Government’s Sex Education Campaign from World War II to the Internet*, Lord details the history of government involvement in the fight against venereal

⁶⁷ “Health Groups Join Forces for War on Venereal Disease,” *Los Angeles Times*, Feb 1, 1947, A3; “Women Declare 'Total War' on Venereal Disease,” *The Washington Post*, Jul 17, 1942, 16 and “Fleming, Pioneer in Penicillin, Dies,” *New York Times*, Mar 12, 1955, 19

⁶⁸ “War Over, But Venereal Disease Fight Must Continue In Nation,” *Atlanta Daily World*, Mar 31, 1946, 2

⁶⁹ *Ibid*, 159

disease, as well as other aspects of sex education. She argues that “the active intervention of the state in protecting its citizens’ health has been central to American history. Shaped by Enlightenment ideals that championed science, the nation’s founders saw a strong link between the country’s economic prosperity and the health and well-being of its citizens.”⁷⁰ Lord also highlights the discussion that was taking place among Americans about the “declining sexual morality” of the time, as evidenced by the alarmingly high rates of venereal disease. She explains that “in the early twentieth century several factors [such as an influx of immigrants and a rise in prostitution] seemed to indicate that this was an issue of special urgency for Americans.”⁷¹ This reference to both Enlightenment reasoning and special concerns of the realities of twentieth century American life reinforces the connection between health and citizenship. Lord shows that the preoccupation of the government during World War II with quashing venereal disease and expanding the scope and reach of the Public Health Service was part of a long history of government intervention.

Adamant that public health and education could only benefit from honest and accurate discussion of venereal disease, Surgeon General Thomas Parran, Jr. (a career public health official) addressed the issue of venereal disease openly in the media. In 1937 he published both a surprisingly candid article in *The Ladies Home Journal*, and a book detailing the devastation of syphilis, *Shadow on the Land*, which became a best seller.⁷² If a campaign for earnest discussion of VD was already underway, however, the

⁷⁰ Alexandra Lord, *Condom Nation: The US Government’s Sex Education Campaign from World War II to the Internet* (Baltimore: John Hopkins University Press, 2010), 5

⁷¹ *Ibid*, 15

⁷² *Ibid*, 50-56

United States entrance into World War II “radically altered the federal government’s own smaller war on venereal disease.” An intense education campaign was waged at home; “the federal government aggressively funded private organizations, providing them with grants and assistance in creating materials that could be distributed both nationally and locally” to address the dangers of venereal disease.⁷³ Another part of the campaign was the increased funding for research, made possible by the CMR, and benefitting the PHS. However, Lord contends that although “to some degree the growth of the PHS reflected the overall expansion of the government that occurred during [World War II and the post-war years]... it also reflected an increasing public confidence in the ability of science to conquer and control diseases.”⁷⁴ The source of this confidence? Highly visible successes such as penicillin.

The success of penicillin in treating venereal disease was championed as one of the greatest examples of wartime ingenuity. “The discovery of penicillin would change not only treatment protocols but the significance of venereal disease,” and what it would mean to the wartime effort.⁷⁵ Touted in the press as one of the greatest advances in modern medicine, the CMR was proud of its part in this accomplishment as well. Articulated time and again by Dr. Richards, Dr. Bush, and others, penicillin was favorite example to discuss the success of government-funded research. Once the use of penicillin for VD became widespread, “it appeared that venereal diseases would join a host of other infectious diseases from polio to tuberculosis, now under the command of modern

⁷³ Ibid, 78

⁷⁴ Ibid, 9

⁷⁵ Bailey, *Sex in the Heartland*, 17

medicine.”⁷⁶ Predictions about how penicillin would make VD a concern of the past would not be realized, however, as completely treatable and preventable venereal diseases still plague society. At the time, however, claims implying just that held considerable weight among officials and ordinary Americans. There was a well-founded fear of VD among ordinary Americans, military medical staff, and public health officials. All had a collective desire to see modern medicine triumph over the socially and physically uncomfortable diseases. As a result, the unparalleled success of the research efforts of the US Public Health Service and the CMR contractors could be used effectively to advocate for continued funding for medical research and an expanded role for the PHS.

⁷⁶ Brandt, *No Magic Bullet*, 174

CHAPTER 6

PENICILLIN AND THE MEDIA

American newspapers in the early 1940s were full of reports detailing the war effort, and the penicillin program was an important part of those stories. It was also one that it seemed the public was clamoring to learn more about. Little was said, or indeed could be said, in the press about the actual development of penicillin from a scientific, industrial standpoint. Regulations and rules invoked by the CMR limited what could be released about the research efforts to synthesize penicillin. Most of the story of scientific innovation by chemical and pharmaceutical companies was never told in the press during the war.⁷⁷ But that wasn't the story that would sell anyways, and there were far fewer regulations on the stories that could be told about the promise of penicillin as a disease-fighting drug. People were eager to hear about the ways penicillin could be used to treat the sick, how the drug was being regulated and used in clinical tests, and when the stock of penicillin would be sufficient for troops and civilians. The newspapers sold stories of hope that the "miracle drug" would soon alleviate the suffering of wounded soldiers at war, and also those who were sick and dying at home.

When Dr. Alfred Richards gave a speech before the National Academy of Sciences on November 22, 1943 on the progress of his committee's research efforts he had to preface his statements on penicillin with the disclaimer that "so much has been printed in the lay press during the last six months that it seems scarcely necessary to

⁷⁷ "Appendix 1" *List of Subjects to be Withheld From Publication, May 12, 1944*. ANR Papers, Box 12, FF 11

describe [to] any audience the virtues of this remarkable substance.”⁷⁸ And indeed he was right; the impressive press coverage on the topic had made the promise of penicillin known to all Americans. Stories ran that sensationalized the results of penicillin research, and earned it the name of “wonder drug.”⁷⁹ A 1943 article in the *Los Angeles Times* summarizing a recent publication in the American Chemical Society’s journal mostly likely would have been, in all respects, a somewhat dull review. Instead it colorfully described how “the latest clue to the nature of the priceless wonder drug penicillin” had been unveiled.⁸⁰ Another article, discussing the promise of penicillin in treating war-related wounds, used evocative language to describe “the remarkable new drug” as “one of the greatest weapons” against blood-poisoning, leading to “triumph” over the frightening condition.⁸¹ Penicillin was discussed in similarly glowing tones in many popular American magazines.⁸² Articles like these highlight the way scientific triumphs were discussed much like the military triumphs being reported next to them in the newspapers, thereby aligning the fate of penicillin with the fate of the nation.

In the six months prior to Richard’s speech however, there had also been news coverage of stories with less triumphant endings. The stories of two gravely ill young women, one just 18 and the other only 20, ran in August of 1943 in both the *New York Times* and the *Chicago Daily Tribune*. Both were stories of desperation, and that tone was

⁷⁸ Alfred Richards, *Speech to National Academy of Sciences, November 22, 1943*. ANR Papers, Box 12, FF 48

⁷⁹ William L. Laurence, “More Penicillin,” *New York Times*, Aug 1, 1943, E7

⁸⁰ “Penicillin May Launch Second Front On Germs,” *Los Angeles Times*, Sept 10, 1943, 14

⁸¹ William Strand, “New Penicillin Healing Told In Battle Reports,” *Chicago Daily Tribune*, Oct 11, 1943, 6

⁸² For more on penicillin in magazines: David P. Adams, “The Penicillin Mystique and the Popular Press,” *Pharmacy in History* 26 (1984): 134-142

present among many of the similar articles that ran in the press at the time. One young woman had her requests for penicillin denied by the government-run control boards that doled out the supply of penicillin, regardless of her appeal (much the same as Leonor Freilich's) to Eleanor Roosevelt.⁸³ The other young woman, at the age of 18, had succumbed to a dangerous blood infection, even after she received treatment with penicillin. The drug had been noted to be helping her condition improve, yet administering the drug to her had made no difference in the end.⁸⁴ These stories and others began to highlight a popular theme in the news coverage of penicillin, the scant amount of the drug that was actually available. While most people now knew what penicillin could do to treat infections, what they did not know is when sufficient quantities of the drug would exist for use by civilians.

One popular angle for stories on penicillin was the discussion of how it was being regulated. News reports told of "increased supplies of the miracle drug" that were supposed to be available for civilians within a year's time. Or they might describe how increased production efforts would be able to "alleviate the present scarcity" of the drug.⁸⁵ Penicillin distribution was controlled by the War Production Board, and once the supplies of the drug were steadily growing the WPB created another advisory board. This board, based in Chicago, was to "release the drug from the monopoly hitherto held by the Army and Navy."⁸⁶ This was not entirely true, because the Army and Navy never had

⁸³ "Refuse 2nd Plea For Penicillin To Save Girl, 20," *Chicago Daily Tribune*, Aug 18, 1943, 13

⁸⁴ "Penicillin Use Fails," *New York Times*, Aug 30, 1943, 17

⁸⁵ Frank Carey, "U.S. Delays Penicillin's Civilian Use," *The Washington Post*, Aug 3, 1943, 3; and "More Penicillin To Be Available," *The Washington Post*, Sep 26, 1943, M5

⁸⁶ "WPB to Allot Penicillin Thru Chicago Office," *Chicago Daily Tribune*, Apr 29, 1944, 1

monopolies on the supply of penicillin. Yet many conflicting reports on who had control of supplies, when the drug might be available, and where it could be accessed ran in the press. This sense of confusion among both the media and the public speaks both to the growing complexity of the control of penicillin supplies, and the desire of the public to know when they might get their hands on the miracle drug. What this preoccupation with the supply chain and distribution of penicillin also reflected was the growing feeling that penicillin was an absolute necessity to ensure the health of the nation.

The public fascination with the allocation of the drug continued well past the end of the war. Jubilant stories about the availability of penicillin for civilians, and the plans of Americans to share the “wonder drug” with less prosperous nations ran in the press.⁸⁷ But even after the war and the military necessity of penicillin to treat combat wounds subsided, the government continued to influence the distribution of the drug. The *New York Times* ran an article in November 1945 claiming that “Penicillin Priorities Set” by the Civilian Production Administration gave second preference to civilian hospitals to obtain the drug. First priority was given to military and emergency orders (presumably coming from governmental bodies), a lingering association between government funding and coordination with penicillin supplies from private companies.⁸⁸

Penicillin wasn't the only hot topic in the media however. As discussed above, there was often very frank discussion in newspapers about the issue of venereal disease as well. Focusing on the dialogue on venereal disease in the press will help locate the voice

⁸⁷ “Penicillin Here for Civilians,” *Los Angeles Times*, Mar 11, 1945, A1; and “Penicillin Shared With All World, Even Nazi Friends,” *The Washington Post*, Oct 12, 1944, 5

⁸⁸ “Penicillin Priorities Set,” *New York Times*, Nov 24, 1945, 23

of the people in this discussion. To do this, I will focus the remaining part of this section on the common concerns and conversations captured in opinion letters written to newspapers. If letters to the editor are any indication, venereal diseases, as well as their societal and moral implications, were on the minds of many citizens. Voicing their opinions on the matters of race and venereal disease, proper sex education, and the necessity of medical care to reach those affected by VD, people from all points of view joined the discussion.⁸⁹ Anxiety and concern about venereal disease during a time of war and government expansion made for colorful discussions about the underlying social and political issues at stake.

Dr. J.W. Shirley, who identified himself as a “colored judge” wrote to the *Philadelphia Tribune* in late 1942 to raise questions about the racial component of venereal disease. He politely “[took] issue” with an editorial in which statements regarding the damage of venereal disease “wreaking havoc with Negro men and women” left Shirley with the impression that the author might mislead readers into believing that African Americans were more susceptible than whites to venereal disease. Shirley sought to clarify the issue by asserting “that Negroes are not more susceptible to venereal disease, or to any other disease than are other races, under identical educational, economic and other predisposing circumstances.” Shirley also offered his medical opinion that “effective measures to cope with this evil must necessarily be preventive and not ‘defensive’” as the editorial had described. Here, Shirley highlighted two common

⁸⁹ The “Letters to the Editor” I will use in the following paragraphs as evidence for my argument are my personal selection of those which I feel best demonstrate my point. But discussion of venereal disease wasn’t limited to arguments about sex education and the role of public health services. Venereal disease was discussed or sometimes only casually mentioned in a wide variety of the opinion letters I came across during my research.

themes among opinion letters. First that venereal disease had social, perhaps even moral, causes rather than racial ones. Second, Shirley emphasized that education about and action against venereal disease should focus on prevention of the disease rather than defense against it.⁹⁰

Not everyone shared the same beliefs on the issues, regardless of race. Pvt. Luther Randolph, writing to *The Chicago Defender* in 1944, described his first hand experience as an African-American witnessing the suffering caused by venereal disease “especially [to] our race.” Randolph offers the idea that “we as Negroes are going to find it very hard to improve our economic and social positions” as long as the incidence of venereal disease in African Americans was “still too high.” While Randolph and Shirley might have had differing ideas about whether venereal disease was caused by social and economic disadvantages or prolonged them, they agreed on the issue of education. Randolph offered his hope that continued discussion of the costs of venereal disease could “help immeasurably in combatting this social evil.”⁹¹ While both men wrote to African American oriented newspapers, the discussion they joined was a popular national call for better sex education among American youth.

In May 1943, Ray H. Everett, the Executive Secretary of the Social Hygiene Society, wrote to *The Washington Post* to discuss the recent movement to deal with alarmingly high rates of venereal disease (and prostitution) in the nation’s capitol. Everett sought to remind readers “that all the medical and law-enforcement programs in the

⁹⁰ Dr J.W. Shirley, “Physician Urges Prevention First,” *Philadelphia Tribune*, Nov 14, 1942, 4

⁹¹ Pvt Luther Randolph Jr., “Lauds White's Articles On Social Disease,” *The Chicago Defender*, Oct 14, 1944, 12

world” would not be able to tackle the issue of VD. He advocated for a “more aggressive promotion” of “educational and guidance programs of home, school and church [to] get to the roots of the problem.”⁹² Dr. J. Hinrichsen also wrote to *The Washington Post* in May of 1943, expressing his belief that “sex education is one of the most important problems that confront us.” He made a case for a radically expanded place for sex education in American schools, arguing that “sex education should have its beginning in the elementary school.”⁹³ However, and for a variety of reasons, the efforts of politicians and public health educators were unable to answer these calls for improved sex education.

Three years later, another reader of *The Washington Post*, E. Gilbert Barker wrote to complain of the “top-heavy ratio of talk to action” in the fight against venereal disease. Efforts to introduce more effective sex education had been largely unsuccessful. What needed to be done to make an impact? Barker offered his opinion that one possible solution might lie in the “‘VD’ movies” that were part of every military orientation during the war. Barker thought that “in the great majority of cases these motion pictures kept fellows out of trouble” and the same could work in public high schools. Barker ventured that “if some agency with large enough scope to project such a program into all the high schools of America would accept an undertaking of this sort,” the concerns of ignorance to venereal disease and inadequate sex education might be amended. This

⁹² Ray H. Everett, “Social Hygiene,” *The Washington Post*, May 23, 1943, 22

⁹³ J. Hinrichsen, “Sex Education,” *The Washington Post*, May 14, 1943, 10

highlights another common theme among these letters, that the public was asking for better education and health care through some governmental intervention.⁹⁴

In 1941 Massachusetts State Representative Leslie Cutter wrote to the *Daily Boston Globe* to defend and explain a bill he was proposing. Discussing his ‘Pre-Marital Testing’ bill to screen couples for syphilis prior to their marriage, he described syphilis as “public enemy No. 1” and defended the need for such a law. He proudly boasted that, should monetary need keep a couple from getting the tests done by their private physician, dozens of clinics had been set up by the State Department of Local Health or by local hospitals. His letter addressed the need for, and growing association between, government funded health care and venereal disease. Two years later, in another letter to the editor of the *Globe*, Albert Goodman raised the issue of public health care. Goodman wrote that “although the standard of living in this country is high,” Americans were too often afflicted by “rheumatic heart disease, venereal disease, and feeble mindedness.” He too made the connection between health and the war effort, stating that above all “health is an important factor in winning this war.” Goodman found the fault for this plaguing of the country with venereal disease in the US medical system. He thought “the solution [to] this is government aid” to “carry out treatment too expensive” for the average person.⁹⁵ Among such expensive treatments were those for venereal disease.

But newspapers were not the only media source that people could turn to for discussion of VD. As Susan Lederer and John Parascandola argue in their 1998 article, “Screening Syphilis: Dr. Ehrlich's Magic Bullet Meets the Public Health Service,” public

⁹⁴ E. Gilbert Barker, “VD Movies,” *The Washington Post*, May 12, 1946, B4

⁹⁵ Albert Goodman, “U.S. Medical Care,” *Daily Boston Globe*, Mar 31, 1943, 14

interest in medicine, especially in films, had been high since the 1930s.⁹⁶ Detailing the political and social environment in which the film “Dr Erlich’s Magic Bullet” was produced, the authors show how “Warner Brothers [was able] to capitalize on the growing national preoccupation with venereal disease.”⁹⁷ But the benefit wasn’t just to the Hollywood studio, Surgeon General Parran remarked that the film was “excellent both from a dramatic point of view and as powerful propaganda for syphilis control.”⁹⁸ In fact, in 1943 the film would be adapted for use by the PHS, but it functioned also in its ability to speak to the wartime concerns of its audience.⁹⁹ Lederer and Parascandola assert that “certain scenes that had more to do with wartime propaganda than venereal disease education” made their way into the PHS version of the film, and are an example of “the spirit of wartime cooperation” that could be felt between the media and the government.¹⁰⁰ This cooperation must be viewed in the context of Hollywood’s “commit[ment] to the war effort, with studios producing patriotic feature films and educational documentaries and movie stars entertaining troops and promoting the sale of war bonds.”¹⁰¹ It seems that public interest and public opinion were unanimous on the issue of venereal disease. Not only were health officials and concerned citizens

⁹⁶ Susan Lederer and John Parascandola, “Screening Syphilis: Dr. Ehrlich's Magic Bullet Meets the Public Health Service,” *Journal of the History of Medicine* 53 (1988): 345

⁹⁷ *Ibid*, 349

⁹⁸ *Ibid*, 357

⁹⁹ *Ibid*, 367

¹⁰⁰ *Ibid*, 370

¹⁰¹ *Ibid*, 370

discussing the dangers of VD, but the fascination with the diseases completely permeated American popular culture, showing up in Hollywood films.

But what did this public interest in venereal disease mean for the future of penicillin? Obviously, the preoccupations with government control and regulation left a lingering association between penicillin development and the machinery of government bureaucracy. Evocative language and public insistence that venereal disease was a genuine danger, especially in a time of war, made public sentiment clear. At a time when policy formation was often dependent on popular understandings and public opinion, these often-articulated concerns and sentiments about VD and public health, powerfully voiced in letters to the editor, played an important role.¹⁰² Scholars of public health policy have “emphasize[d] the degree to which agenda setting and policy formulation are penetrated by the preferences and understandings of the mass public” and that “the government’s major explicit channel of communication with the public was the media.”¹⁰³ Concern about sex education and the need for expanded public health services coincided with increased government funding to the PHS, a agency well known for its commitment to both of those issues. So by continuing funding for medical research in the footsteps of the penicillin program, and the expanding the PHS to address the practical needs of public health, the government was responding to the concerns of the people. Concerns that had been voiced in the press for years.

¹⁰² Lawrence R. Jacobs, *The Health of Nations: Public Opinion and the Making of American and British Health Policy* (Ithaca: Cornell University Press, 1993), 17, 26

¹⁰³ *Ibid.*, xi, 26

CHAPTER 7

CONCLUSION

Anxieties about venereal disease, the absence of thoughtful and effective sex education, and the necessity of expanded public health care were running high in the years following World War II. These concerns about venereal disease were nothing new, the same worries that had preoccupied military doctors during the war had been priorities for public health officials for decades. The honest discussion of the social and moral causes of venereal disease in the press during the war years speaks to the extent to which it permeated the thoughts of Americans. Language describing venereal disease was militaristic and powerfully charged, to tie the triumph over evil to not just foreign aggressors, but the biological combatants at home. Penicillin, in its ability to quickly and painlessly treat infections, most notably VD, offered the hope that many had been looking for.

The government funded and regulated penicillin program was one of the most successful research projects of World War II. The unique organizational structure of the CMR lent itself to facilitating a particularly cooperative and efficient means of conducting research, as well as sharing information between government labs, private industry, and academic researchers. What started as a committee to make suggestions and oversee the progress of independent research efforts eventually expanded both within its bureaucratic structure and with new implementation and funding of contracted research. At the end of the war, the association was made between the continued need to fund scientific research and the triumph of American ingenuity and its essential quality in the

continued strength of the nation. At a time when postwar concerns about national safety were running high, this association was used to bolster support for expanded government funding and intervention.

Both penicillin's importance in treating venereal disease and the scientific and organizational importance of its development were used to effect change. While wartime necessity dictated that the bureaucratic nature of government funded science should expand, this trend was continued in post-war years by harnessing the power that penicillin had in the minds of the American public. Set as a shining example of what science could accomplish when funded by the government, and aligned with the aims of the state, expanded funding and involvement from the government was championed by many influential bureaucrats. Expansion wasn't limited to pure research either. The US Public Health Service, responsible for much of this newly funded research, would also experience an expansion in its scope and reach in peoples lives. Funding for public health services saw a huge expansion at a time when Americans were calling for a way to deal with public health concerns, such as venereal disease. People were also calling for improved sex education, a long-standing goal of the PHS, and this expansion only furthered its efforts to educate Americans about the dangers of venereal disease, and the "wonder drug" that could help alleviate the suffering VD caused.

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