
Preface

I have several reasons for telling the story of penicillin. Not the least of them is that through forty years of penicillin research, I came to know some of the greatest scientists of our time. Abraham, Bachmann, Barton, Bose, Chain, Clarke, Fleming, Florey, Folkers, Foster, Hodgkin, Keefer, Robinson, Tishler, du Vigneaud, Wintersteiner, Woodward, and many others. Although the story I am about to tell is about the chemical synthesis of penicillin from simple raw materials, it is more generally about the growth of industrial and academic science during the years of World War II and immediately after. These were years during which science came to occupy a central position in American life and polity. The penicillin project was one of the signal events of that history.

Moreover, the complete story of penicillin has not yet been told. There is far more to the penicillin story than Fleming's master stroke in 1928. There is more to the story than the important work done by Sir Howard Florey, Dr. Ernst B. Chain, Dr. E. P. Abraham, and Dr. N. G. Heatley during the 1930s and 1940s. The story that has been told, to date, is predominantly the story of the British contribution to penicillin. There is an important American side to that same story.

Government, university, and commercial interests cooperated in producing the naturally fermented penicillins and worked together toward the possible synthesis. All participants in this project waived their rights to patents until, at

the end of the war, government agencies would oversee the equitable distribution of patent rights. How this industrial arrangement was created is a story as complex as that of the penicillin synthesis itself. Until now that story has remained locked in the private files of the Office of Scientific Research and Development (OSRD) and its Committee on Medical Research (CMR). Other records remained in the archives of the National Academy of Sciences and its Committee on Chemotherapeutic and Other Agents. These two groups in particular had prime responsibility for developing naturally fermented penicillins and for governing the research toward the synthesis of a penicillin.

The documents are marked SECRET and have remained so since the close of World War II. They reveal a story of cooperation between government and private industry, aided by the academic scientific community, that could not be repeated today. Laws have changed, customs are different, and the United States is no longer the small country it was before World War II. The club that organized and directed the penicillin program no longer exists. This book, therefore, tells the story of one of the final chapters in the history of that club.

All was not sweetness and light. The agreement to cooperate was difficult to forge and, once the agreement was sketched, it was difficult to enforce. Throughout the complex and trying period of the penicillin project, dissent threatened to upset major parts of the program. Patent claims were critical issues even in the earliest years of the penicillin program. They have remained so. Great sums of money have changed hands in the buying and selling of penicillin, in the open market and in the black market. The story of the wonder drug, consequently, also involves the story of proprietary rights and royalties, dollars and the promise of dollars. In my own case, after having successfully synthesized penicillin in 1957, the patent situation was not

cleared up until April 1980, after twenty-three years of contention.

I am telling the story of penicillin, too, because I have witnessed most of the major developments over the past forty years and have participated in many of them.

One secret intelligence report dispatched from the United States to Great Britain during World War II commented, "Penicillin is surging upwards and is going to have a tremendous vogue here. I am hearing about it from many people" (J. H. Burn, *Newsletter* No. 28, May 31, 1943). In particular, the interest of military medical men in treating battle injuries and combating the rampant venereal disease that accompanies any army promoted interest in the wonder drug. With "lightning rapidity," according to the popular press at the time, penicillin "shot into the front ranks of therapeutic agents," displacing the sulfa drugs from their "exalted position" (*New Republic* 109(1943):20-21).

Penicillin was endowed with almost magical powers. And, as is the case with any incantation, the spell must be pronounced properly. On October 25, 1943, "a group of scientists voting on the pronunciation of the term" decided by a margin of 70 to 30 percent that penicillin should be pronounced peniCILLin and not penICillin (*Drug Trade News* 18(1943):28). As Moses could look down from Mount Pisgah, so Americans congratulated themselves on their discovery of "a new promised land in medicine" (*New York Times*, September 10, 1943) in which all pathological germs would be destroyed by the new "life-saving weapon."

Penicillin was a technical triumph that captured the imagination of a public far beyond the boundaries of the laboratory and the hospital. The magic of the substance endowed the people associated with it with glamor. Scientists studying penicillin became popular heroes; doctors who administered it became holy men; and, at least during the war years when penicillin was in desperately short supply, the man who controlled its distribution became a god.

Here is the story of that drug—the efforts to develop Fleming's discovery and the scientific program to develop penicillin into an effective and commercially successful chemotherapeutic agent.