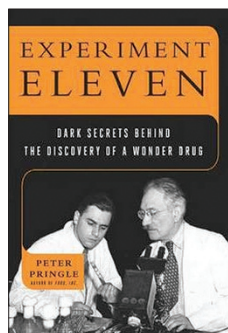


Assigning proper credit



Experiment Eleven

Peter Pringle

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Reviewed by Martin J Blaser

Who gets the credit when there is a groundbreaking discovery in a laboratory? The advisor or the student who did the research? How often is the assignment of credit just? Since history rewards the victors, can we ever discover the real truth? And, as in the film *Rashomon*, is the truth distorted by each protagonist's point of view?

In this context, it is enlightening to read Peter Pringle's history about the discovery of streptomycin. It is a big story about the first effective drug to treat tuberculosis and covers its discovery, early successes and incorporation into life-saving regimens, as well as the awarding of the 1952 Nobel Prize in Physiology or Medicine solely to Dr. Selman Waksman for its discovery. But, as not known by most, Waksman had a student, Albert Schatz, who claimed that he was the key discoverer. After assigning his patent rights to a Rutgers University foundation, as did Waksman, he sued Waksman and Rutgers for a share of the royalties. In 1950, Schatz and Rutgers settled the lawsuit on terms that provided support for Schatz, decreased Waksman's share and rewarded others in the department.

The book opens with Schatz "striding briskly" across the campus. It is not hard to see where the author is going with this story. But is telling the story from Schatz's point of view justified? Pringle marshals substantial evidence favoring Schatz's position, and the book reads well, with exciting narrative flow. In its pages, Waksman is metaphorically indicted, convicted and doomed to jail for life and beyond because, in part, this book examines his legacy as both a scientist and a person.

Pringle's book begins with the dedication "To the researchers in science who did the hard work, and never reaped the glory." This is a noble ideal, but the author's view on the controversy is never in doubt. He uses charged words such as "treacherous" and "concocted." His strong viewpoint inhibits readers from reaching their own conclusions. Pringle even criticizes Waksman for helping Schatz get a job.

Even so, Pringle has done outstanding sleuthing and (with minor repetition) tells an excellent story, interweaving contemporary events like the 1946 atomic bomb testing at Bikini atoll. Nevertheless, his outrage detracts from the book's potential to inform. Pringle also takes license in putting us into the mind of one of the protagonists when he writes that Waksman

"must have been relieved," and he serves as the omniscient chorus, writing that "he [Schatz] knew that truth was on his side."

The case of Schatz and Waksman raises two questions: First, who discovered streptomycin, or, rather, what were the relative contributions of the two men? Second, did Waksman treat Schatz fairly after the discovery? The second question may be the smaller of the two. Pringle produces strong evidence that Waksman indeed treated Schatz shabbily. The bigger question is how to allocate credit for a discovery when the discoverers are a senior established scientist and a new student he supervises. Was Schatz merely a pair of hands, lucky that the professor had given him a particular assignment, as Waksman claims? Or did Schatz, through his own hard work, good luck and skilled eye, make an observation that another student might have missed? We will never know the answer. Pringle clearly believes that Schatz made the discovery. Yet Waksman's team had previously discovered actinomycin and streptothricin by similar processes and had already been working with Merck and Co., an industrial pioneer in antibiotics, testing these agents in experimental animals.

The two conflicts between Schatz and Waksman—about scientific credit and money—were closely related, but not identical. The record that Pringle presents portrays Waksman in an unflattering light *vis-à-vis* the financial rewards for the discovery. Still, this has only indirect bearing on the question of relative scientific contributions, and other issues should be considered. For example, Merck was substantially involved in obtaining enough streptomycin for testing. Mayo Clinic investigators tested streptomycin in experimental animal models of tuberculosis and conducted the first clinical trials in humans. Thus, the development and validation of an important new drug was complex.

Others have written about this subject in particular (including Wainwright (*Hist. Phil. Life Sci.* 13, 97–124, 1991) and Peter Lawrence (*Nature* 415, 835–836, 2001)) and about scientific credit in general. Wainwright quoted Schatz's contemporaries as saying in 1950 that "Schatz did not make any unique contribution to the discovery of streptomycin." He also cited Schatz's statements in 1946 that others in the lab made contributions fully equal in importance to his own and that "since Waksman had closely supervised every step of the work he could have ensured that he was the senior author on the first streptomycin paper." Pringle negates the importance of these statements, but, like the magistrate in *Rashomon*, I am less certain. In 2004, William Kingston (*J. Hist. Med. Allied Sci.* 59, 441–462), arguing for Waksman, considered the roles of the "lucky student" and Big Pharma in the discovery. Certainly, the financial opportunities that came from the discovery gave Waksman motives to strengthen his case.

Should the disappointment of the student who did not receive the world's adulation sully the reputation of the eminent scientist? Can we dissociate scientific and financial conduct? Pringle clearly believes the answer to the latter question is "no." Readers: you decide, and use this vignette to guide your own conduct, not only in the short term but also to withstand the test of time. Nevertheless, by bringing the important issues again to attention, Pringle confirms the need for equity in science and makes clear the power of historical analysis to evaluate the legacy of a scientist. Pringle's impassioned book raises issues crucial to the ethical conduct of science.

COMPETING FINANCIAL INTERESTS

The author declares no competing financial interests.

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