of his life and after his death, Banneker was frequently invoked as an example of racial equality and as justification for the abolition of slavery. Thomas Jefferson responded to Banneker's first almanac (1791) by declaring that he had given proof "that nature has given to our black brethren talents equal to those of the other colors of men, and that the appearance of a want of them is owing merely to the degraded condition of their existence, both in Africa and America."

In the many years since Banneker's death, the retelling of his feats has led to what the author terms "erroneous exaggerations." The image of Banneker created in the last century and a half led Bedini to reexamine the few documents from Banneker's life which still remain and to attempt to put the early American scientist into the context of his own times. This life of Banneker is convincing and, unless substantial new material appears, definitive.

Traditional historical methods, such as using every ingenuity to uncover extant records, have been well employed, but the author's major contribution is the close examination of Banneker's mathematical notebooks which has permitted for the first time a solid determination of Banneker's place among his contemporaries. From this study, the author concludes that Banneker was "a man of modest ability and performance, who, by means of his efforts, contributed a tangible bit to the fabric of science in America."

Perhaps the most impressive features of Banneker's life were not his almanacs but his self-education and establishment of a dignified life in a society which surrounded him with legal sanctions because of his race. He lived alone on a farm; he was harassed by neighbors and even renters of his land. He grew to meet the approaches of others with a wariness and distance, but to those he trusted he showed generous hospitality. At several crucial moments in his life he was befriended by the Ellicott family, who served as his link with the American scientific community, such as it then was. His existence, in spite of his work and productivity, was always precarious.

Some of the information the author has gathered suggests that the psychological elements of Banneker's life might be worthy of further examination. A key person for him was his maternal grandmother, an indentured Scotswoman who, when freed, bought a farm which she worked. Later she added two slaves, but eventually freed them and married one of them. She taught her grandson to read, helped him with simple arithmetic, and gave him encouragement. His own isolated life was similar in many ways to the one she had led, although he never married. His family's experiences, its compromises with white society, may have been the reason his outlook never lost an underlying pessimism. It is no longer necessary to exaggerate Banneker's efforts in order to vindicate his life.

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Origins of Medical Cytology

Addison and the White Corpuscles. An Aspect of Nineteenth-Century Biology. L. J. RATHER. University of California Press, Berkeley, 1972. x, 236 pp. + plates. $8.50. Publications of the Wellcome Institute of the History of Medicine, new series, vol. 22.

Early efforts to understand white blood cells were clouded by doubt and debate. Historian Rather ably analyzes these efforts from their early-19th-century beginnings to the discovery of phagocytosis in 1883. This book gives an intimate and accurate insight into the struggle of a science (medical cytology) to be born.

At the time when the drama began, inflammation was regarded by many as a special form of nutrition—and nutrition theory itself was a battleground of opinions. According to an older idea, certain "globules" are separated from the blood and become intercalated into the fibers then thought to constitute tissue. A newer view, espoused especially by Schwann, held that what leaves the blood is a fluid in which, when it reaches the tissues, new cells arise (by processes which Schwann compared to crystallization).

In the midst of the debate, in 1842, William Addison, the central figure in Rather's account, proposed that neither globules nor cell-forming fluids separate from the blood. Instead, white blood cells (which Addison wrongly derived from red blood cells) leave the bloodstream. In nutrition, he said, these add themselves to the tissues (which were by now supposed, because of Schwann's work, to be built in large part of cells). Addison saw the extruded white cells as likewise able to participate in pus- and tubercle-formation, coagulation, and the like.

Rather details the antecedents and inception of Addison's partly correct idea, the many mistakes it contained, the reactions it evoked when published, the alternatives suggested by others, the impact upon it of the rapidly developing cell theory and the theory of the microcirculation, and finally the liberating discoveries of Recklinghausen (migration of "pus-cells," 1863), Cohnheim (diapedesis, 1867 [also described by Waller in an unnoticed paper of 1846]), and Metchnikoff (phagocytosis, 1883).

Rather's narrative is packed with details; it would not have been adequate without them. A mass of added information is wisely relegated to notes. The indexing of the book is complete, the documentation superb. This reviewer wishes that Rather had chosen inflammation—rather than the semi-meritorious William Addison (no relation to Thomas)—as the hero of the tale. But the book as it stands is an outstanding case study in early and middle 19th-century biology.

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Principles and Devices

Topics in Solid State and Quantum Electronics. Papers from a lecture series, Mar. 1970. W. D. HERSHBERGER, Ed. Wiley, New York, 1972. xvi, 506 pp., illus. $23.50. University of California Engineering and Physical Sciences Extension Series.

The federal government and industry provide support for research in solid state and quantum electronic phenomena. The research leads to a multitude of new electronic devices, exploiting solid state and quantum phenomena often complex and outside the experience of electronics engineers and technologists. University extension services attempt to repair the knowledge gap with extension courses and lecture series (perhaps a hopeless task). The collected lectures by assembled experts make a book, like this one. If the topics are carefully chosen and the author-lecturers conscientious about their work, the book can be a useful outcome, as is the case here.

The topics covered here ranged over