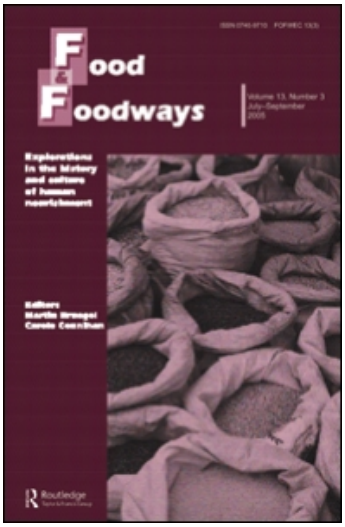

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A Review of "Garlic and Other Alliums: The Lore and the science"

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The Refinement of America: Persons, Houses, Cities. Eden also reminds us of the centrality of the Atlantic Ocean to the transmission of ideas in the early Atlantic world.

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GARLIC AND OTHER ALLIUMS: THE LORE AND THE SCIENCE, by Eric Block. Cambridge, UK: Royal Society of Chemistry Publishing, 2010. 454 pp.

"There is no such thing as a little garlic," author Eric Block quotes Arthur Baer in *Garlic and Other Alliums: The Lore and the Science.* A flip through this 454-page book on the chemistry of garlic, onions, leeks, and other related plants proves Baer's point. The book is divided into six chapters which essentially stand alone, each covering a different facet of the history, chemistry, botany, and cultural impact of plants of the genus *Allium*.

The book begins with the history and botany of Alliums, naming the many species of onion, garlic, leek, ramp, etc. grown worldwide since ancient times. It then provides a compendium of Alliums in the arts, literature, and culture. Interestingly, this section addresses some cultural class issues related to onions and garlic. In many cultures, garlic consumption was seen as a sign of low social standing. Brahmins of early India, for example, were forbidden to touch it.

The story mainly revolves around the discovery and unique, interesting properties of the molecule allicin. Allicin, as Block says, is "the essence of garlic." It is unstable and highly reactive, yet it is the source of many of the characteristics of garlic, from its antimicrobial activity (hypothesized to be due to the binding of cysteine groups in important cellular enzymes) to persistent garlic breath (caused by the breakdown of allicin into allyl sulfides). When garlic cloves are crushed or cut, a precursor molecule known as alliin is acted upon by the enzyme alliinase, forming allicin and all the aroma and flavor molecules it creates. This is why a clove of garlic does not smell until cut, and why crushed garlic can have a more pungent aroma than cut garlic (greater damage to cell walls releases more enzymes). A molecule similar to alliin, found in onions and known as isoalliin, when acted on by alliinase, becomes a precursor for onion lachrymatory factor—that is, the molecule that makes one tear up when cutting onions.

The depth to which chapters 3 ("Allium Chemistry 101") and 4 ("Chemistry in the Salad Bowl") cover the organic chemistry of allium compounds is staggering. This area is where Block has made many important contributions to the understanding of the formation and degradation of sulfur-containing

compounds in Allium species. Block relates the story of the discovery of allicin and other thiosulfinates in garlic and onions and the effects of their consumption (e.g., the mechanism of garlic breath). In addition, the reader gets a view of the chemical changes that onions and garlic undergo when cooked.

Along with the descriptions of the chemical discoveries relating to alliums, Block also introduces the reader to many of the methodologies of chemical analysis, including the unique challenges of analysis of volatile products. Techniques introduced include high-pressure liquid chromatography (HPLC), mass spectrometry, flash vacuum pyrolysis, desorption electrospray ionization, and many others.

Garlic and onion chemistry also has applications in the biotechnology industry. For example, Block tells of the use of RNA interference, or "silencing," to block the enzyme that produces onion lachrymatory factor, thus genetically engineering a "tearless" onion. Furthermore, alliin has been used in conjunction with antibody-directed enzyme prodrug therapy for targeted delivery of toxic allicin to cancerous cells.

The author strives to explain many of the tougher chemical equations and syntheses in approachable terms, making an effort to relate complex issues back to everyday problems (e.g., relating the pungency of garlic to activation of nociceptors by allicin). However, readers with little chemistry background may be quickly overwhelmed by reactions, molecular structures, nuclear magnetic resonance spectra, HPLC readouts, and other bits of raw data. Fortunately, full understanding of the "hardcore" chemistry sections is not necessary to enjoy the book as a whole.

The latter third of the book encompasses the medicinal effects of Alliums and the relationship of the Alliums with their environment. Garlic has been used in folk and traditional medicine since ancient times. In the modern day, many clinical studies have been performed to determine the efficacy of garlic for treatment or prevention of diabetes, cancer, heart disease, and other ailments. Unfortunately, while the compounds of garlic display antibiotic, antioxidant, and anti-cancer activity *in vitro*, long-term studies of garlic consumption show little evidence of clinical effectiveness.

In spite of the findings of clinical trials, a plethora of herbal garlic supplements exist on the market today. Again, deftly using the garlic context to relate scientific methodologies, Block explains how the inconsistency of herbal preparations and the lack of evidence of efficacy must give pause to those who would consider using such supplements. As one of the many relevant quotations that start each section of the book notes, "the plural of anecdote is not data." Indeed, the author explains the disastrous examples of some herbal supplements that had to be pulled from the market and "home remedies" including creative but dangerous uses of garlic cloves that led to chemical burns.

The last chapter describes the interactions of Alliums and their organic sulfur compounds with the natural world. Block discusses the evolution of pungent sulfur compounds as natural defenses against plant predators. In addition, release of compounds by insect damage can attract natural predators of the feasting insect, a sort of cry for reinforcements from the plant. Allium extracts have also been put to use as industrial bird repellents.

The book is exquisitely and painstakingly referenced, featuring a bibliography which spans about 70 pages. Throughout the book, among the polished if slightly technical language, the reader finds a dazzling array of full-color photographs and rare historical illustrations of Allium plants.

Those with a strong background in chemistry will enjoy this book the most, and those with a little chemistry interest will find it a good primer in the organic chemistry of sulfur. However, enjoyment of this book should not be limited to scientists. The book is a virtual encyclopedia of garlic and onion facts, and while it may make a necessary addition to the food chemist's library, it is something that any foodie, especially a garlic lover, can enjoy.

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HOG AND HOMINY: SOUL FOOD FROM AFRICA TO AMERICA, by Frederick Douglass Opie. New York: Columbia University Press, 2008. 256 pp.

Since the publication of Doris Witt's influential book *Black Hunger: Food and the Politics of U.S. Identity* (Oxford University Press, 1999, and then re-released on University of Minnesota Press, 2004), there have been a handful of book-length works on African American eating practices: Andrew Warnes's *Hunger Overcome: Food and Resistance in Twentieth Century African American Life* (University of Georgia Press, 2004), Psyche Williams-Forson's *Building Houses Out of Chicken Legs: Black Women, Food, & Power* (University of North Carolina Press, 2006), and Anne L. Bower's edited volume *African American Foodways: Explorations of History & Culture* (University of Illinois Press, 2007).

In this newest work, *Hog and Hominy*, historian Frederick Douglass Opie builds upon these works in two directions. First Opie goes "back to Africa," as it were, to think through the roots of African American cuisine in the food practices of Africans prior to the onset of the Atlantic slave trade. Importantly, Opie does not posit that one can trace a direct link between the culinary practices of the past and the present, but instead argues that what remains among those of African descent (including both the U.S. South