> our purpose [w]as simply to tell the story and highlight what seemed to me the most interesting and important Organic Chemistry worked out in Oxford . . .

For example, R. B. Woodward does not appear in the sections dealing with the structure determinations of either penicillin or strychnine. Woodward and Robinson held opposite views in the penicillin-structure debate, the younger being right, the established leader holding sway and resilient way beyond reasonableness. But then, Robinson was at the height of his powers, being just a few years from receipt of his Nobel, and Woodward was not even 30 (and two decades from his Nobel).

The book ends with a quote from the Oxonian Jeremy Knowles:

> Those of us who were brought up with the D.P.'s unique combination of smells, its extravagantly high ceilings, the staircase that millions of undergraduate feet could never wear away, the horrors of Room 33, and the open drains that made minor explosions in the teaching labs so much more interesting, will be nostalgic but not truly sorry. The Dyson Perrins has served Oxford well, but a bright new era begins. (J. Knowles, "The Dyson Perrins Laboratory at Oxford," *Org. Biomol. Chem.,* **2003**, *1*, 3625-3627.)

Well, there is another major weakness in this book. It is simply too short for my own appetite. And the same goes for the lifespan of the Dyson Perrins Laboratory. *Jeffrey I. Seeman, University of Richmond, Richmond, VA 23173.*

The Invention of Air: A Story of Science, Faith, Revolution, and the Birth of America. Steven Johnson, Riverhead Books, New York, 2008, xvi + 239 pp, ISBN 978-1-59448-852-8, $25.95.

First, what this book is not. It is not a standard biography of a great man. Steven Johnson is not interested in the usual "Life and Times of…" Nor is it a sophisticated analysis of the scientific discovery of oxygen. Johnson is interested in bigger game: understanding the interconnectedness of knowledge. He uses Joseph Priestley as the lever to explore this theme. As the subtitle suggests, Johnson strives to tell "A Story of Science, Faith, Revolution, and the Birth of America." (Curiously, or perhaps revealingly, Priestley's name does not appear in the book's title or subtitle).

Joseph Priestley was a man of many parts: famed scientist credited with discovering oxygen; controversial theologian who helped found the Unitarian Church; notorious – in some quarters – radical political theorist and supporter of the American and French Revolutions; and political activist who played an underappreciated role in early American politics (Priestley the émigré to the young Republic set a precedent of the scientist-exile repeated frequently in American history). A brilliant polymath, Priestley wrote over 500 books and pamphlets and spoke six languages fluently. He knew all the learned men of the age on both sides of the Atlantic: Boswell, Price, Wedgwood, Bolton, Erasmus Darwin (Charles's grandfather), and others in England; Franklin, Adams, Jefferson, and their cohorts of the Revolutionary generation in America.

Dissecting Priestley the natural philosopher allows Johnson to develop his "overarching moral:" that knowledge should not be compartmentalized nor left to the specialists. A subsidiary theme is that politics must be informed by the insights of science, a point often neglected in our recent history.

Johnson employs what he calls the "long zoom" connecting disciplines and knowledge to argue that Priestley's greatest scientific work was not the oxygen experiment of 1774 on "dephlogisticated air," but earlier experiments in which Priestley – with his good friend Franklin – observed that a flame in a glass cylinder in which a plant was placed continued to burn. The conclusion: plants release oxygen into the air. This process we call photosynthesis, a process in which plants also take in carbon dioxide. From this insight on oxygen and carbon dioxide Johnson is off and running on an "Intermezzo" set in the Carboniferous era 300 million years ago, in which vegetation grew to enormous sizes – club mosses reaching 130 feet in height, conifers sprouting three-foot long leaves – leading to an increase in the proportion

of oxygen in the air which didn't last long; but all that vegetation eventually decayed, becoming the energy that fueled the Industrial Revolution (pioneered by some of Priestley's confidants) taking place in the country which sat on top of huge coal fields – "An Island of Coal" Johnson calls it – where Priestley did his initial experiments on oxygen. It *is* all connected, after all.

Johnson is fond of this kind of intellectual flight. Take, for instance, the role of coffee in Priestley's life and work. When the young Priestley first came to London he joined a coterie of natural philosophers who regularly met at the London Coffee House in the shadow of St. Paul's Cathedral (Johnson notes the irony of a group of heretics meeting a stone's throw from the shrine of England's establishment). The coffeehouse – which played a crucial role in 17th- and 18th-century England – provided Priestley with an interdisciplinary culture in which conversations touched on the latest scientific discoveries, the abuses of Parliament, and the fate of nonconformist religion.

This was a remarkably open information network whose members eagerly shared knowledge. (Johnson greatly admires Priestley for his "compulsive" sharing, both from discipline to discipline and among colleagues.) But coffee, Johnson also notes, is a stimulant that affects another kind of network, this one "neurochemical." Coffee became a popular European drink in the mid-16th century, replacing beer and wine as the breakfast beverage. The switch from alcohol to coffee as the daytime drug of choice meant that Europe "emerged from its centuries-long bender" and entered the Age of the Enlightenment.

Caffeine fueled Priestley's extraordinarily productive eight-year period in the 1760s and 1770s. These were the years of his groundbreaking forays in chemistry, including the oxygen experiments and his discovery of soda water; his synthesizing of existing knowledge on electricity; and the writing of numerous books and pamphlets on religion, politics, and education. Such productivity suggests to Johnson a "streak of innovation" similar to Joe DiMaggio's 56-game game hitting streak in 1941.

That was the young Priestley. The elder Priestley lived the last decade of his life in rural Pennsylvania, alone with his books and his experiments. This most convivial of men, this sharer of information and knowledge finally had angered too many in England with his unorthodox religious views and his support of the French Revolution. A Birmingham mob burned his house in 1791, forcing Priestley to seek a haven in a more open-minded country.

He craved a quiet life by then, but his political views soon got him into trouble in his adopted land. It took President Adams's personal intervention to prevent the government from prosecuting Priestley under the Alien and Sedition Laws. Fortunately, all ended well for Priestley, as Johnson notes. His good friend Thomas Jefferson was elected president in 1800, leading Priestley to note that only in old age was he privileged "to find myself in any degree of favour with the governor of the country in which I have lived." Jefferson's administration was "the best on the face of the earth." Jefferson returned the compliment, telling Priestley that "Yours is one of the few lives precious to mankind." *Judah Ginsberg, American Chemical Society, Washington, DC.*