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Lives of a Biologist: Adventures in a Century of Extraordinary Science

John Tyler Bonner, 2002. Harvard University Press, Cambridge MA. 256 pages. US$24.95 hardcover.

John Tyler Bonner is not a household name, nor, I daresay, has he aspired to be: he has spent the past 60 years primarily studying an important zoological oddity that, though fondly nicknamed "Dicty," is, really, slime mould. The eminent professor has now written a memoir of his remarkable achievements, *Lives of a Biologist*. It is both a window on a past era in science and academe, and a vantage point from which to ponder its present state. Bonner's prose is at once effortlessly lucid and leisurely, and the book (written in an old farmhouse in Nova Scotia) is an intriguing piece of work.

The book's structure was motivated by Prof. Bonner's own research program: how do plants and animals manage to travel in time—from egg and sperm through embryo, juvenile, and so on to adult—then somehow reproduce egg and sperm to start the cycle again? The study of the causes and consequences of this unfolding of pattern is called 'developmental biology' and is a subject that is both very venerable and newly hip. Prof. Bonner organizes his book as a series of discrete stages parallelling his own 'development': the coming together of egg and sperm (1900-1920, the year of his birth); a twenty-year 'embryonic' period; the exciting years of early adulthood (1940-1960); the mature years (1960-1980); and to close, a period he terms "coming together" (1980-2000), which straddles his official retirement from Princeton University in 1990. In an explicit parallel, he offers an insider's description of the leading scientists working in his field in those times, showing how evolutionary biology in general, and developmental biology in particular, have developed over the century.

These two strands intertwine neatly. We are offered a romantic picture of growing up in New York worthy of *The Great Gatsby*: Lynne Fontane, Dorothy Parker and Ginger Rogers among others make their way through the wealthy family home. The young Bonner seems to have led a blessed life and this romance continues throughout the book. The locations (Exeter, Harvard, Princeton, Italy, India) are sketched with some nostalgia, as he recalls the early days of apprenticeship, the avuncular tyranny of his major professor, the self-flagellation of his PhD defense, the squabbles of his colleagues. Even his amours seem winsome yet sophisticated, and his meeting and courtship of his wife-to-be occupies a single tidy paragraph. I guess memoirs can be like that.

The second strand concerns the science. Here Prof. Bonner's own work is described with not unexpected feeling, but also is a textbook example of how science is done best: a complex problem (how do animals develop from egg to adult?) is broken down into the very basics (e.g., how do cells communicate so that they can get that job done?), the biology of a useful system (here, the slime moulds', where single-celled forest creatures swarm together in order to build a litte scaffolding and send off new spores) grappled with in depth, and definitive experiments performed (one example involving both the professor's and his pregnant technician's urine as possible attractants of Dicty cells). More generally, the five surveys of science of the time will be exciting to anyone with some knowledge of academic biology: being a "big name," Prof. Bonner

knew and interacted with the likes of Thomas Hunt Morgan, Konrad Lorenz, J.B.S. Haldane, Robert MacArthur, and others—and the immediacy of the stories (e.g. that of the inestimable Robert MacArthur's early death) makes for compelling reading. Bonner's views on the progress of his science are thoughtful. Certainly, there could be no more measured tour guide to the heady days of molecular biology in the 1950s and 1960s. The professor had an intellectual foot in many camps and deftly puts his finger on the way overbearing personality can be more a force of evil than good in academe. One would never get that from a memoir by James Watson.

The most interesting aspect of the book, however, is its extended metaphor. Biological development is a fascinating cascade of events that is in turns incredibly susceptible to small changes in starting point (this is often a short critical period during early gestation, often long before women are sure they are pregnant) and very robust. In this sense it is seductive to compare it with our individual mental and social development. Importantly, however, biological development is constrained by a genetic program that has evolved over hundreds of millions of years and is purposeful: there are sophisticated instructions that move the egg to embryo and on to adult. Human lives are most often ad-libbed, duct-taped affairs governed more by fleeting circumstance and whim than by any stately unfolding. Indeed, the metaphor risks being itself anachronistic: how many educated western adults born after 1960 or so would think in terms of a linear progression of anything? We are born, grow old, and die; but what happens in between is nowhere preordained. In hindsight, of course, decisions may wear the cloak of inevitability. I wonder if Prof. Bonner is not making this fairly subtle point in his book - that patterns of purpose often may be discerned where none was at work.

Moving outward from the individual, to suggest that science (or any other collective endeavour) “develops” in the sense of “unfolding” is also surprising. Though the ultimate product of science (improved prediction of nature) is predictable, the path of science rarely is. Of course (and again, in hindsight) the likes of a Jim Watson might suggest that the human genome project and its fruits were obvious outcomes of the work of the 1950s, but I would not believe them—we realize now, for instance, that often it is not the famous coding genes that dictate differences between individuals, but the way they are regulated by other, far more subtle parts of the genome.

This leads to a further comparison. To judge from Bonner's book, scientists of the past were often lone, driven, brilliant creatures—in essence, madmen. In the old days, it seems, much could be gained from individual insight, correspondance, inspiration, and toil. This is the science that Prof. Bonner describes. The future looks different. The problems we are prepared to tackle now (describing, modifying, even creating life) require huge inputs of money and humanpower, multiyear, multicountry, multidisciplinary grants and vast amounts of data processing. Toil and inspiration are still necessary but no longer sufficient, and the endeavour is rarely individual. Prof. Bonner may disagree with this assessment, and it is clear from his work and from this book that he is aware of the convergence of the sciences, but the sort of science highlighted in this memoir harkens back to the proverbial “good old days” of learned men and sherry. In a sense, then, science is developing into a new beast, and perhaps not one that would have been predicted. It will be interesting to read the memoirs of the great minds involved in this new chapter, in, say, 50 years…

So, to conclude, *Lives of a Biologist* reads as the work of a very successful, assured but unassuming gentleman scientist. Besides being an interesting reflection on a "century of extraordinary science," it is a reminder of how quickly things are changing in our own era.

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