

Bicentennial Bookshelf. Shine and Wrobel were generously aided by Allen and others in their research, and they conducted a number of interviews with Morgan's onetime associates. Their volume is not as deep or analytic as Allen's in dealing with Morgan's science, but its account of his research is generally reliable in spite of some historical inaccuracies. The authors' bluegrass perspective brings out a good deal of information about the Morgan family background and social relationships. Skillful in their use of anecdote and narrative, Shine and Wrobel also frequently accomplish a vivid portrait of the man and his scientific setting. Unlike Allen, they show us Morgan at work, carefully observing, then squashing *Drosophila* in the malodorous fly room, with its rotting bananas and scurrying cockroaches. Gracefully and absorbingly written, the Shine and Wrobel volume provides a helpful, if slight, complement to Allen's forceful treatment.

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Memoirs of an Apostate

Heraclitean Fire. Sketches from a Life before Nature. ERWIN CHARGAFF. Rockefeller University Press, New York, 1978. viii, 252 pp. \$13.

Erwin Chargaff is one of the most interesting scientists of the present century and for the most ironic of reasons: for his discoveries of the variation and regularity in DNA composition, he is entitled to a central place in the history of molecular biology, and yet he has become an alien and embittered figure hating his very field. Where others see in the double helix a symbol of progress, Chargaff sees all that is wrong with what he calls "our bestial century."

What has made of Chargaff this stranger in our midst? This memoir offers many clues. We learn that Chargaff's alienation is of long standing. A lover of the arts and literature, reared in the rich cultural ambience of Vienna in the '20's, Chargaff appears to have chosen chemistry as a career for no more profound reason than that it was a dependable livelihood for a man of intelligence and provided a means for him to enjoy the fruits of culture. Obligated to emigrate because of the Nazi terror and leaving behind a

mother who was to disappear in the Holocaust, Chargaff remained ever after an uprooted alien unassimilable to the crass, commercial, often insensitive America in which he found asylum.

But this is not the only strain we perceive in Chargaff's autobiographical sketches. We detect the plaintive tone of a man who feels unappreciated, even rejected. Chargaff notes somewhat bitterly that no other university ever saw fit to lure him away from Columbia, where he received his first faculty appointment. Chargaff is bitter, too, about the seeming haste with which Columbia moved him out of his laboratory following retirement. But the key passages have to do, of course, with the discovery of the double helical structure of DNA. Watson, in his version of the famous visit Chargaff paid Watson and Crick in May 1952, recalls a cynical, somewhat contemptuous visitor unimpressed by the virtues of model-building. Chargaff, for his part, remembers an aggressive pair of boorish "hucksters" and "pitchmen," pumping him for all he knew (which was a great deal) and eager to fit it all into a preconceived helical structure despite an appalling ignorance of basic chemistry. Indeed, Chargaff believes that "the double-stranded model of DNA came about as a consequence of our conversation" (p. 102) and complains that in their initial paper Watson and Crick failed to acknowledge either his help or his crucially relevant reviews of 1950 and 1951. As a parting shot, Chargaff informs us that, even if he had been so fortunate as to come up with the idea of the double helix as an explanation for his own findings and the x-ray diffraction data of Rosalind Franklin, he would never have "elevated the double helix into 'the mighty symbol that has replaced the cross as the signature of the biological alphabet'" (p. 103).

We have in that reflection of Chargaff's the heart of his resentment against modern science as typified by molecular biology, which he sees as having been engulfed by an "orgy of exaggeration and empty promise" (p. 5) and as having given rise to "obnoxious dogmas" (p. 106). Chargaff's own inclination, he tells us, "has always been more to marvel at a mystery than to explain it to the onlookers" (p. 98), and his ideal scientist is one who, engaged in "orderly, loving, and careful study" (p. 107), is "conscious of the perpetual darkness that must surround him as he probes nature" (p. 123). Chargaff also inveighs more than once against the current bigness of science. He longs for "conditions in

which one man, perhaps together with two or three younger ones, can pursue his search in a quiet and dignified manner" and hopes for the day when "'scientific breakthroughs' and 'centers of excellence,' 'interdisciplinary team research' and 'peer review' will be memories of an ugly past'" (pp. 122-123).

Chargaff does not take up the practical question of how present-day science could be diverted from the course he deplores. Perhaps as enchanted with despair as the "entrepreneurs" he sees around him are with hope, he is content with a literary rendering of the plight of the outcast in a scientific world of dogmatic imperialism and with apocalyptic visions of the end of that world. Chargaff's writings remind us that there are many different personalities in science and that we probably need all of them. We need Chargaff for his critique of science, although we will need the continued thought of others to deal with the problems he sets out so dramatically.

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Darwin and Philosophers

The Young Darwin and His Cultural Circle. A Study of the Influences Which Helped Shape the Language and Logic of the First Drafts of the Theory of Natural Selection. EDWARD MANIER. Reidel, Dordrecht, 1978 (U.S. distributor, Kluwer Boston, Hingham, Mass.). xii, 242 pp., illus. Cloth, \$24.50; paper, \$11.95. Studies in the History of Modern Science, vol. 2.

John Fowles's novel *The French Lieutenant's Woman* contains a passage appropriate to discussion of *The Young Darwin and His Cultural Circle*:

The fact that every Victorian had two minds . . . is the one piece of equipment we must always take with us on our travels back to the nineteenth century. It is a schizophrenia seen at its clearest, its most notorious, in the poets . . . Tennyson, Clough, Arnold, Hardy; . . . in the ubiquitous neuroses and psychosomatic illnesses of intellectuals otherwise as different as Charles Kingsley and Darwin; . . . transparent also in the mania for editing and revising, so that if we want to know the real Mill or the real Hardy we can learn far more from the deletions and alterations of their autobiographies than from the published versions . . . more from correspondence that somehow escaped burning, from private diaries, from the petty detritus of the concealment operation. Never was the record so completely confused, never a public facade so successfully passed off as the truth on a gullible posterity.

In the case of Darwin the public record was formed by his publications, the most prominent of which was, of course, the *Origin of Species*. The private record, as it survived, is contained in Darwin's letters, research notes, and other manuscripts. Drawing on this private record, much of which has become available only recently, Edward Manier has reconstructed the private philosophical world in which the young Darwin operated as he explored the question of the mutability of species. As Manier shows, from 1837 through 1839 Darwin was seriously interested in the metaphysics of science and read such philosophers of science as John Herschel, William Whewell, and (in review) Auguste Comte in order to check his own perceptions of the nature of science against theirs. As one might expect, Darwin was particularly interested in the views of philosophers as they spoke for or against principles underlying his own theory. As Manier puts it, correctly:

The answer to the question, "Did Darwin take philosophical questions seriously?" is that he took his *theory* very seriously, and that—as a *young* man—he was concerned to probe *all* its implications and deal with *all* the difficulties it raised. He had, we might say, a serious philosophical interest in *one* scientific theory.

Darwin's private philosophical speculations are important partly for what they reveal about his development as a scientist and partly because the theory of evolution itself poses some interesting philosophical questions, for example concerning the origin, and hence the status, of metaphysical concepts and language generally. As an evolutionist, Darwin began by presuming that language, including philosophical language, had developed gradually over time and that all usage of language, including philosophical usage, must be judged accordingly. Hence, Darwin was interested in philosophical treatments of language and took some care in reading authors, such as Dugald Stewart and Benjamin Smart, whose views of language were compatible with his own. Significantly, Darwin's gradualistic view of the origin of language also contributed to his confidence in the propriety of using analogies and metaphors to express theoretical concepts.

In addition to considering Darwin's reactions to views held by philosophers, Manier also describes some of Darwin's own opinions on a variety of philosophical subjects including materialism, skepticism, chance, necessity, and design. As Manier shows, the private Darwin was philosophically more radical than his

published writings suggest. For example, Darwin did not hesitate to call himself a materialist—in private. Nor did he hesitate to give naturalistic explanations for religious belief and for the origin of the moral sense. Again, however, this was done privately.

In reconstructing the private philosophical world in which Darwin operated, Manier also addresses two questions of particular importance to historians and philosophers of science: How did Darwin choose what he read in philosophy? and How did his reading in philosophy, particularly respecting method, affect the form or content of his written work? Manier's answer to the first question is only partly adequate. He suggests that Darwin's reading was determined by what he terms Darwin's "cultural circle." While the term "cultural circle" is rhetorically appealing and the relation it presumes between culture and science defensible, Manier does not make clear what external reality this circle had beyond the fact that each member of it was cited in Darwin's notes. The second question, regarding the effect of Dar-

win's reading on his written work, may never be fully answerable. Clearly Darwin's reading in philosophy and related areas helped him choose his words and gained him confidence in the adequacy of his own insights. On at least one point—the influence of Malthus—the influence is substantial and explicitly acknowledged. However, if one reads all of the works Darwin read in the period from 1837 through 1839 and has access to his notes on his reading, one still cannot extrapolate from this Darwin's earliest draft of his species theory, written in 1842. What Manier has given us narrows the gap between Darwin's brilliant remarks of 1837–1839 and the highly deductive but chastened argument of the first draft of his theory. But it does not close that gap, and it may be that in this instance the distance between the private and the public record is ultimately unbridgeable. Every Victorian may still have two minds.

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The Dynamics of a Central Illusion

Conceiving the Self. MORRIS ROSENBERG.
Basic, New York, 1979, xvi, 320 pp. \$16.95.

In spite of over half a century of behaviorism in psychology the popular preoccupation with identifying and fostering the self has never been greater than it is today. The psychoanalytic melodrama in which a heroic or cowardly ego presides over the struggle between id and super-ego still appeals to popular fancy. More recently many "pop" intellectuals have translated the search for a reified self into a moral imperative. Because of irrepressible tendencies toward such faulty thinking, behavioral scientists often shy away from using the term "self" altogether. But social behavior seems to be distinctively and inescapably shaped by the human practice of observing and appraising one's own behavior and appearance. The fruits of this practice are organized into a conception of self, and the individual tries to behave so as to enhance and protect the self-concept. While the self as an entity is an illusion, the self-concepts people create for themselves are a vital and important part of human experience. How they are formed

and how they affect behavior are deemed crucial questions in understanding why some people succeed while others fail, why some choose the conventional life while others rebel, and why people often seem to act against their own best interests. Assumptions about the dynamics of the self-concept have played an important part in black and Chicano nationalist movements, the women's liberation movement, and many social programs to upgrade the disadvantaged.

Morris Rosenberg's book sheds important new light on the question of how the self-concept is formed and raises disturbing questions about the assumptions underlying some of our valued social programs. Although the book adds new knowledge and insights that are of importance to the specialist, the lucid writing and orderly development make it equally an excellent introduction for the general reader. The self-concept is defined as "the totality of the individual's thoughts and feelings having reference to himself as an object" (p. 7). The book explores the organization and dynamics of this totality, lays the groundwork for understanding why members of minority