

A Leader of the Fly Room

Thomas Hunt Morgan: The Man and His Science. GARLAND E. ALLEN. Princeton University Press, Princeton, N.J., 1979. xviii, 448 pp., illus. \$25.

Thomas Hunt Morgan: Pioneer of Genetics. IAN SHINE and SYLVIA WRÖBEL. University Press of Kentucky, Lexington, 1976. xvi, 160 pp., illus., + plates. \$7.50 (Kentucky Bicentennial Bookshelf edition, \$3.95; after 1 June \$4.95).

Thomas Hunt Morgan was born in 1866, the year in which Gregor Mendel's remarkable paper on plant hybridization was published. The Morgan family belonged to the Lexington, Kentucky, aristocracy, to the part that was declining into shabby gentility. The father, scrounging without much success for minor political appointments, spent his days memorializing the Confederate cause, particularly the reputation of his dead brother, John Hunt Morgan, the celebrated leader of Morgan's Raiders. Young Thomas Hunt shied from the dash and glory. Disheveled in dress—all his

life he was given to appearing in worn collars, frayed jackets, and sagging, beltless trousers—Morgan studied natural history, methodically collected butterflies and bugs, and, finding his way to a Ph.D. at Johns Hopkins University, ultimately launched into productive scientific research.

Over a lifetime of almost 80 years—he died in 1945—Morgan published some 370 scientific papers and 22 books. His research spanned embryology and evolution as well as genetics. The range and length of his prolific scientific career could easily daunt prospective biographers. The paucity of primary Morgan materials—Morgan apparently destroyed much of his correspondence—would discourage them further. Nevertheless, Garland Allen, a historian of science at Washington University in St. Louis, set out some years ago to reconstruct the life of this American biologist who in 1933 became the first geneticist to win the Nobel Prize in Physiology or Medicine. The result, based upon not on-

ly the published record but some interviews and whatever archival materials Allen could locate, is a biography of major importance.

Crucial to Morgan's career, Allen stresses, was his breakaway from the descriptive and speculative tendencies of late-19th-century biology and his commitment to a program of framing testable hypotheses, then testing them by experiment. Morgan was introduced to experimentalism at Johns Hopkins mainly by the physiologist H. Newell Martin. His respect for it grew considerably during study abroad in 1893–94, particularly at the Naples Zoological Station, where Hans Driesch, who became Morgan's close friend, preached the gospel of experimental embryology. While on the faculty at Bryn Mawr College after 1891, where his colleague Jacques Loeb advanced the doctrine of physicochemical experimentalism in biology, Morgan pursued experimental embryological research. He was already one of the world's leading biologists when in 1904 he joined the Columbia University faculty.

At Columbia Morgan gradually moved from general embryology to questions of sex determination, then of evolution, especially natural selection. It was with the aim of studying the selection of mutations in rapidly breeding populations that Morgan took up the study of *Drosophila*. For reasons that Allen spells out with admirable cogency, Morgan had long refused to accept both Mendelism and, despite its advocacy by his Columbia colleague Edmund B. Wilson, the chromosomal theory of heredity. But early in 1910 Morgan found his celebrated white-eyed male fruit fly and in short order embarked upon his epoch-making research in chromosomal and Mendelian genetics. During the next five years in the "fly room," A. H. Sturtevant, C. B. Bridges, H. J. Muller, and Morgan worked out the key features of *Drosophila* genetics, including crossing-over, coupling, chromosomal mapping, linkage, and nondisjunction. The results were summarized in their classic book of 1915, *The Mechanism of Mendelian Heredity*.

Along with exploring in depth the crucial pre-World War I period of Morgan's career, Allen examines the development of *Drosophila* genetics after 1915 as well as Morgan's later forays in the establishment of connections between the new genetics and long-standing problems of evolution. It is a great strength of Allen's treatment that he explicates the often complicated scientific issues so as to make Morgan's work accessible to non-



"Morgan's group in the fly room at Columbia University in 1919. The occasion is a party for A. H. Sturtevant (front, center, leaning back in chair) who was returning from military service in World War I. . . . The figure at the center of the table (back) is a dummy of the 'honored guest,' Pithecanthropus. Others shown in the photograph are: back row (left to right) E. G. Anderson, S. C. Dellinger, C. B. Bridges, Pithecanthropus, H. J. Muller, and T. H. Morgan; front row (left to right) Alexander Weinstein, Franz Schrader, Sturtevant, A. F. Huettnier, Otto Mohr, and F. E. Lutz (barely visible on extreme right)." [From *Thomas Hunt Morgan: The Man and His Science*, courtesy of Isabel Morgan Mountain]

specialists and to set it in the scientific context of the day. Allen also delineates Morgan's role in building a new (experimental) biology in the United States, notably through his strong support of the Marine Biological Laboratory at Woods Hole, where he summered every year, his production of students, his promotion, with Loeb, of a series of advanced biological texts, and his founding in 1928 of the Biology Division at the California Institute of Technology.

For all its considerable strengths and intelligence, Allen's biography has its disappointments. At times Allen seems naïve, to put it mildly. He calls Morgan's methodology a form of "dialectical materialism," and he editorializes that the entry into the work force of scientists' spouses—Morgan's put her husband and children ahead of her career—may well reduce individual research output. Allen's treatment is also less analytically critical than his subject demands. He discusses Muller's claim that most of the original ideas in the fly room came from its younger members, but he fails to provide a discerning evaluation of the strengths and weaknesses of Morgan's intellect. He reports yet does not really account for Morgan's inclination to avoid publicly denouncing extravagant eugenic assertions. Then, too, he claims that Morgan recommended to Robert A. Millikan against Caltech's hiring Leonor Michaelis, a distinguished biophysicist, "largely because Michaelis was not a young man" (p. 353) yet neglects to say that in the letter to Millikan Morgan went on to reveal another reason: Michaelis "already has collected about himself a few young Jews. He himself is markedly Semitic. I have my doubts whether we should want to start under these conditions" (Morgan to Millikan, 28 May 1978, Robert A. Millikan Papers, California Institute of Technology Archives, file 18.10).

While Allen has captured some of Morgan's impish humor and often anonymous financial generosity, his portrait of Morgan the man is unhappily incomplete. More frustrating, Allen's biography tends to keep Morgan the man and Morgan the scientist in separate compartments. One wishes that Allen had written a more integrated life, a dynamic union of scientific and human process. From Allen's book one learns how Morgan's ideas changed but not how the man evolved or what made him tick.

The deficiency is not overcome in the *Thomas Hunt Morgan* written by Ian Shine, the director of the Morgan Institute of Genetics in Lexington, and Sylvia Wrobel, a free lance, for the Kentucky

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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.