did not even receive a proper education until the death of elder siblings promoted him in the family fortunes. After a spell of school-teaching, Jarvis, who had aspirations to become a preacher, finally gained a medical training, but quickly discovered that this was no freeway to fame. Barely lucrative practices near his native Concord (Massachusetts) were followed by an uncomfortable spell at Louisville, Kentucky, whose frontier ways and slave culture clearly offended our hero's principled New England sensibilities. The rest of Jarvis's career was spent in and around his native Massachusetts, where, failing to gain the remunerative practices to which he thought he was entitled, he sought and found consolation in pursuit of the more intellectual and scientific aspects of medicine, making himself an expert in psychological medicine, in public health, and, above all, in the evolving field of medical statistics. Opportunities to address learned societies on both sides of the Atlantic on topics similar to those that fascinated William Farr (by whom he was somewhat overawed on finally meeting him in person) seem to have formed the highspots of his career.

Jarvis dictated his autobiography (which is written in the third person) to his devoted wife, Almira, when in his seventies; and, as Rosalba Davico points out in her ambitious Introduction, the after-the-event apologetic nature of the work needs, therefore, to be offset by reference to other sources (which she does) if was are to gain an balanced picture of his existence. Albeit writing in a calm and dignified tone, Jarvis does not disguise the sense of frustration and failure that attended much of his medical career. As he never seeks to hide, he was continually passed over for advantageous practices, sometimes for sectarian religious reasons, and he never gained the challenging asylum superintendent's appointment that he clearly believed would exercise his talents. Personal considerations apart, Jarvis's text affords a splendid commentary upon the over-stocked and intensely competitive character of the American medical market-place at mid-century (as admirably analysed in Paul Starr's *The social transformation of American medicine* [New York, Basic Books, 1982]), and reveals the patient-driven nature of preferred medical philosophies and therapeutics.

Historians of Britain will also find Jarvis's comments on Old World medicine quite illuminating, not least the reverence that Jarvis evidently felt due to figures like John Conolly. It is hard to imagine a more succinct and telling verdict upon public lunatic asylums than this response upon visiting Hanwell:

> This is a huge establishment of stone . . . Here hundreds are gathered and crowded. The rulers prefer such large asylums. They think them economical. They save the pay of more superintendents, physicians, and other upper officers; but they diminish the healing powers of the hospital . . . The economy is not wise, or successful. (p.128.)

This well-edited, annotated, and indexed text affords many pleasures, historical and personal. It is, not least, a rather humbling experience to encounter the reflections of a dedicated practitioner whose prolonged labours yielded no great wealth or fame, and whose setbacks and achievements could be distilled in old age into a dignified philosophy of personal realization.

Roy Porter, Wellcome Institute

ADAM J. HIRSCH, *The rise of the penitentiary: prisons and punishment in early America*, New Haven and London, Yale University Press, 1992, pp. xvi, 243, £20.00, $35.00 (0–300–04297–3).

This book consists of two extended essays on the subject of the penitentiary in early America. The first, longer, and more useful essay concerns the origins of this institution; the second examines its relationship to the contemporaneous institution of slavery. On the first question, Hirsch makes a vigorous and convincing case for the earliness of the American penitentiary's origins, and for its roots in English experience of the sixteenth to eighteenth centuries. Focusing on Massachusetts, Hirsch valuably corrects David Rothman's highly influential and long-standing picture (based largely on Pennsylvania and New York) of a comparatively sudden emergence of the modern prison in America in the Jacksonian period; instead, he shows how much of it was discussed, legislated and institutionalized between the 1780s and the 1820s. He also—unusually for a U.S. historian—carefully examines the English background, and finds that the model of the house of correction for

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vagrants exercised much influence on American gropings toward an alternative to the public sanctions that had suited the tightly-knit communities of early colonial times but were now perceived as failing in the more populous, mobile and anonymous society of the late eighteenth century. Drawing upon recent work of Joanna Innes and other on the continuing importance of workhouses in eighteenth-century England, Hirsch suggests a growing tendency in eighteenth-century America to apply the notion of workhouses to criminal offenders. This suggestion is an intriguing one, although, since he deals primarily with tracts and other rhetorical sources, it remains unclear just how far actual treatment of offenders altered in line with changing public discourse. He also examines the varying penal philosophies of penitentiary advocates, but here adds little new.

On the second question—the relation of the prison and slavery—the author is chiefly concerned with inquiring how advocates of the penitentiary, who were frequently also supporters of abolition, dealt with criticisms, ironically from both slaveholders and radical opponents of incarceration, that penal incarceration and slavery were two faces of the same coin. Analyzing contemporary rhetoric, he finds that penitentiary advocates felt little if any tension between their two goals, seeing both based in "a broader social theory for the improvement . . . of all deprived citizens" (p. 109).

The book has an unusually thorough section of notes, as well as an essay on sources, which together form a helpful guide to further research.

Martin J. Wiener, Rice University, Houston

FREDERIC LAWRENCE HOLMES, *Between biology and medicine: the formation of intermediary metabolism*, Berkeley, Office for History of Science and Technology, University of California at Berkeley, 1992, pp. iii, 114, $18.00 (0–918102–18–9)

In 1990 F. L. Holmes gave four provocative lectures at the International Summer School in the History of Science at Uppsala. This slim volume now makes the text of those addresses available to a wider audience, a fifth discussion period being omitted. Holmes reflects on the development of the research field of intermediary metabolism. Intermediary, or intermediate, metabolism comprises a class of chemical reactions that occur in living cells; the term also designates a distinct research specialty within modern biochemical research. Investigating these complementary definitions, he addresses big questions about the nature of scientific research, its management and manipulation. The book thus provides a reassessment of the theses advanced by Thomas Kuhn in *Structure of scientific revolutions*, as to the criteria by which the progress of scientific research is recognized, and acknowledged. Throughout, he advocates investigation of the scientific process at every available level of organization, although as befits the author of masterly studies of Lavoisier, Bernard, and Krebs, the importance of the lab, the bench, and the individual scientist as components of that process is a consistent theme.

Despite, or perhaps as a result of, his own preoccupations, and his sensitivity to the interconnectivity of these constituent parts, Holmes's first lecture defines and discusses the "research field" as a unit of analysis for historians to examine research activities. A research field is characterized as "an ongoing investigative stream composed of the intersecting investigative pathways" and the lecture explores the shifting boundaries and limitations that can be used to distinguish research fields. By examining approaches to chemical phenomenon in the middle of the nineteenth century, and some of the contrasting attitudes and mechanisms of investigation, Holmes considers how an embryonic research field emerges. Within this analytical framework he fully acknowledges the problems in concentrating on more productive prominent members, and the danger of ignoring the more diffuse but collectively substantial contributions of apparently lesser members of a field.

A further lecture extends the analysis into the twentieth century and into inter-disciplinary considerations, as developments in one research field enrich another, and may create a powerful pivot from which a third arises. Holmes argues that biochemistry, by definition a hybrid subject, drew not only on late-nineteenth-century organic and physiological chemistry, but also on the synergistic demands of the new scientific medicine. By focusing particularly on Franz Knoop's *in vivo* work on fatty acid oxidation in whole animal studies, and on Gustav Emden's use of isolated

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