Theory into practice

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Genetics and Medicine in the United States, 1800–1922. By Alan R. Rushton. *Johns Hopkins University Press: 1994. Pp. 209. $45, £37.*

FOR centuries people have noted that offspring tend to favour their parents, an observation that earlier generations of scholars often summarized in the convenient expression 'like begets like'. Today, as every reader of *Nature* must surely know, this older simpler observation has been transformed into the more complex language of molecular genetics, an apparently omnipresent discipline whose persistent promise of widespread clinical use seems to be moving rapidly towards fruition. How should one seek to understand this transition of genetics from general observation to practical tool? In this slim volume, which traces the way in which scientific ideas about heredity and disease made their way into medical discourse in the United States, Alan Rushton shows that apparently new ideas about the clinical relevance of hereditarian theories often have much older roots.

He asks an important question: what use could a physician make of the finding that a disease is passed from generation to generation? After examining early nineteenth-century observations of patterns of human inheritance of, for example, haemophilia, he goes on to describe the rediscovery of Mendel's laws of heredity at the beginning of the twentieth century and the ensuing controversy about whether Mendelian theory, which appeared to work well for predicting the inheritance of simple traits in plants and animals, could help to explain the inheritance of diseases in seemingly more complex humans.

Rushton is at his best when exploring the tension between views of disease as having either internal or external causes. Physicians in the early twentieth century debated whether heredity should be thought of as the fundamental cause of disease or merely the source of a tendency to acquire disease, a sort of 'diathesis' that had no effect without the presence of some external stimulus. The microbiological revolution of the late nineteenth century unleashed what at the time seemed to be an endless stream of discoveries linking specific microorganisms to specific human diseases. Microorganisms began to attract more and more attention as a potential external cause of a wide range of ailments. Rushton argues that the microbiological revolution was partly responsible for a shift around the turn of the twentieth century away from seeing the causes of disease as primarily hereditary and towards seeing them as primarily environmental. But the shift reflected more than new laboratory science; it also reflected the clinical implications of disease theories. The germ theory of disease, unlike heredity, meant that a clinician had a chance of being able to prevent or treat a patient's disease. But if the cause of disease were exclusively hereditary, then physicians would be able to do far less for their patients. In this sense, the germ theory was far more attractive for clinicians.

The theory of heredity, of course, appeared to hold out the promise of improving the overall health of a human population through selective breeding. Rushton describes US physicians' interest in eugenic science, particularly as promoted by the Eugenics Record Office at Cold Spring Harbor in New York state. Physicians became less enthusiastic about eugenics by the 1920s, he claims, because of the demonstrated inadequacy of genetics as an explanation of human disease.

Rushton's approach is unabashedly that not of a historian but of "a medical scientist", and he states forthrightly that his work "is not primarily a political or social history". The book is largely based on published medical texts. By relying on this narrow range of sources Rushton ends up listening to the voices of a rather limited community of actors, and as a result some of his conclusions may surprise those acquainted with other literature in the field. Rushton notes for example that the published literature on the use of eugenics to control human reproduction abated after the 1920s, yet an important group of physicians in the United States continued to preach, and to practise, eugenic sterilization for some time. His limited sources also makes it difficult for him to answer his main question about the clinical relevance of genetics: published medical literature, past and present, bears only a modest and variable relationship to the

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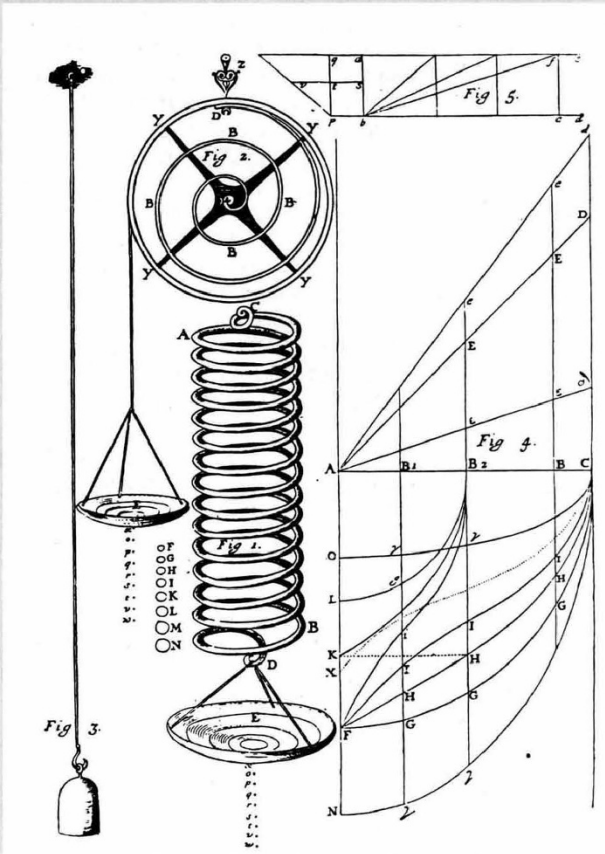

PLATE TO HOOKE'S LECTURE 'OF SPRING' 1678.

FIG. 1. Wire helical spring stretched to points *s*, *p*, *q*, *r*, *s*, *t*, *v*, *w*, by weights F, G, H, I, K, L, M, N.
FIG. 2. Watch spring similarly stretched by weights put in pan.
FIG. 3. The 'Springing of a string of Brass Wire 36 ft. long'.
FIG. 4. Diagram of velocities of springs.
FIG. 5. Diagram of law of ascent and descent of heavy bodies.

ROBERT Hooke (1635–1703) was the first Curator of Experiments of the Royal Society, London. He promised to "furnish the society . . . with three or four considerable experiments" every week its members met. Shown here is the plate to his 1687 lecture "Of Spring", in which he demonstrated his well-known law of elasticity. In *The Diaries of Robert Hooke*, Richard Nichols has assembled the random jottings of Hooke's diary into subject headings, and accompanied them with Hooke's own illustrations while providing background information on domestic, social and scientific life in seventeenth-century England. Published by The Book Guild Ltd, 25 High Street, Lewes, Sussex BN7 2LU, UK. Price £15.