presentation. He has amassed an incredible amount of information on a very large number of individual scientists and their activities. He tells us about the backgrounds, formal training or educational experience, employment, and professional association with other scientists and with the larger community. He traces the formation of scientific institutions and measures their significance and he compares the activities of different regional groups of scientists. But it is in keeping with his stated aim that he generally makes no real evaluation of the scientific contributions of the individual scientists he discusses.

Bruce introduces many of the scientists in his book with brief physical characterizations. James Dwight Dana, the geologist, "was a small, slender man, full of nervous energy . . . and winning in his smile". Ormsby MacKnight was a "small, restless Ohioan". Joseph Leidy was a "heavily built man, slightly round-shouldered, but with a face described by one of his friends as of the 'Christ type' ". Asa Gray was "boyish in his short, slight, agile body and clean-cut beardless face". Charles Henry Davis "was a tall, spare man of military bearing, with a high forehead, and aquiline nose, and kindly eyes". But we are told nothing about Davis's main contribution to science, his scholarly edition in English of Gauss's *Theoria Motus*, which made available that master's method of using least squares. Nor are we much enlightened concerning George W. Hill's real achievement to be told that Henri Poincaré said it "contained the germ of all subsequent progress in celestial mechanics", which does not even contain a hint that Hill had been working on problems of the motion of the Moon. The otherwise uninitiated reader will not really be helped much in understanding either the nature of Henry Rowland's great discovery or its significance by the rather vague (and somewhat misleading) statement that "he had made a discovery of some significance for later electron theory". Can one truly understand the emergence of an American scientific community without some evaluation of the worth of the contributions to knowledge on some comparative scale?

Bruce concludes that by the time of the centennial year, 1876, "all the key elements of the modern American scientific establishment had . . . made at least an initial appearance". The "image of American science" invoked by an examination of the 1870s "is that of a newborn foal, callow, ungainly, yet fully formed and swiftly gaining strength. It still had a long way to go. But it had some definite ideas of how to get there". □

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Bad blood

D.R. Higgs

The Molecular Basis of Blood Diseases. Edited by George Stamatoyannopoulos, Arthur W. Nienhuis, Philip Leder and Philip W. Majerus. *Saunders: 1987. Pp. 747. $76, £69.*

ABOUT 12 years ago, Francis Crick came to lecture at the medical school where I was training. Inevitably, there was a large audience and there were even scuffles at the door when the lecture hall became full and the latecomers were asked to follow the talk on a video screen in an overflow room. The event got off to a bad start when the eminent professor introducing Crick temporarily forgot his name, and at the end of the lecture there was an embarrassing dearth of questions. This early encounter between molecular biology and medicine thus turned out to be a sadly inauspicious occasion.

How rapidly times have changed, and no more so than in the field of haematology. The first impact of molecular biology on medical science came in the late 1970s, when the human globin genes were isolated using complementary DNA synthesized from the naturally purified globin RNA present in red blood cells. Subsequent analysis of the common mutants of globin synthesis (thalassaemias) provided a comprehensive catalogue of the mechanisms that underly single gene disorders. By the early 1980s various techniques had been developed which allowed other specific sequences to be isolated from complex mixtures of mRNAs, and the lessons learned from the study of globin genes were rapidly applied to other haematological disorders.

Thus during the past, remarkable decade we have witnessed fundamental changes in our understanding of the immune response, haemostasis and the pathogenesis of haematological malignancy. This information is not only intellectually satisfying but is already being exploited for the benefit of patients, both in diagnostic services and through the production of the genetically engineered coagulation factors, fibrinolytic agents, lymphokines and haemopoietic growth factors.

The Molecular Basis of Blood Diseases summarizes and critically evaluates these developments. For those with no background in the subject, an introductory chapter explains the terms and methodologies used. Not surprisingly, about a quarter of the book deals with the globin genes which are still the most comprehensively studied of all eukaryotic systems. Perhaps the most interesting unsolved problem in this field concerns the mechanism by which the expression of the globin genes is controlled during development. This complex subject is dealt with in an excellent chapter by two of the editors. Another large section of the book summarizes our current knowledge of the immunoglobulin and T-cell receptor genes, and contains chapters on the proposed mechanisms underlying haematological malignancy (a clear, timely account of human T-cell leukaemia viruses among them). A third section covers haemostasis, including chapters on inherited bleeding diatheses and fibrinolysis. In addition to the contributions on these main topics, there are also chapters on haematological problems that are just starting to yield to molecular biology, such as the mechanism of complement action, iron metabolism, phagocytosis and platelet function.

This is a beautifully produced book, and with one or two exceptions the standard of writing and presentation is very high. There will clearly be room for expansion in future editions, however; for example there are no chapters on the red cell membrane, or the red cell enzymes which are frequently involved in genetic blood disorders.

Nevertheless, like the *New York Times*, the current version contains "All the news that's fit to print". Furthermore, the editors have succeeded in their attempts to ensure that the information is up to date by "enlisting the leading investigators in hematology". The fact that only one of the 31 authors is from a British university is a conspicuous reminder of the declining influence of Britain's research community.

Because the application of molecular biology to medicine is such a recent event, it is only to be expected that many practising physicians still regard it with a mixture of awe and suspicion, doubting whether it will have much effect on the management of patients. I believe that in the history of medicine the impact of molecular biology will be compared to the development of the microscope in the seventeenth century, in that it will open up new vistas in all branches of medicine. It will eventually change the way in which we think about disease processes, how we analyse them, classify them, and devise strategies to prevent and treat them (take AIDS, for example). *The Molecular Basis of Blood Diseases* is among the first textbooks to examine the effect of molecular biology on the understanding of disease mechanisms. Although it will appeal primarily to those interested in blood disorders, it should also be consulted by all those who are fascinated by the mechanisms that underlie human genetic diseases. □

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