ing of how consumers utilize credit resources available in our economy. The authors' work makes possible a reevaluation of whether the bankruptcy system is being abused by some debtors who could afford to pay or by some creditors who are lax in their lending practices. The first to document and analyze several phenomena such as repeated filings, success rates for chapter 13 cases, and the distribution of cases between chapters 7 and 13, the authors found that only a few debtors (3.7% of their samples, or 56 debtors out of 1502) were repeaters and that the preponderance (70%) of the chapter 13 cases fail and became chapter 7 cases over time. The authors conclude by suggesting that bankruptcy serves as a social safety net and essentially serves those people it is designed to serve. They further suggest that bankruptcy law should be a fair balance between debtor and creditor. To give favor to either party would necessitate change in our overall credit system.

RAMONA K. Z. HECK
Department of Consumer Economics and Housing, Cornell University, Ithaca, NY 14853–4401

Biomedical Progress Report

Sickle Cell Disease. CHARLES F. WHITTEN and JOHN F. BERTLES, Eds. New York Academy of Sciences, New York, 1989. xiv, 477 pp., illus. $119. Annals of the New York Academy of Sciences, vol. 565. From a conference, Bethesda, MD, April 1988.

Although sickle cell anemia was among the first illnesses to be understood on a molecular basis, our detailed knowledge of its etiology and pathogenesis has not brought us very far toward a cure, or even an effective management strategy. There is hope for the future, however, as described in this book, which contains the proceedings of a conference held under the joint sponshorship of the National Association for Sickle Cell Disease and the New York Academy of Sciences. The list of contributors includes eminent scientists and clinicians from around the world, and the papers cover a wide range of topics.

The international scope of sickle cell research is underscored in this volume by contributions from countries where the sickle gene is more prevalent than it is in the United States and where other traits that are common can materially influence the course and severity of sickle cell disease. Patients from India, for example, have a mild form, and this correlates with a higher incidence of deletional alpha thalassemia and higher fetal hemoglobin levels than are found among patients in Jamaica, where the degree of anemia and the frequency of pain crises is much higher.

The papers dealing with the molecular genetics of hemoglobin report notable progress. It is now possible to determine whether a 10-week-old fetus in utero is likely to have homozygous sickle cell disease by using DNA from a small sample of chorionic villus. The controls governing the expression of the cluster of globin genes on chromosome 11 are becoming better understood. This region of the genome codes for the synthesis of the mutant beta chain in sickle cell disease, and also for the gamma chain of fetal hemoglobin. If it were possible to prevent or reverse the switch from fetal to adult hemoglobin around the time of birth, the hazards of inheriting a double dose of the sickle cell mutation would be greatly reduced. An ultimate treatment strategy for the disease would be to remove some marrow cells from the patient, incorporate into them a message for normal beta globin, ablate the remaining marrow cells, and repopulate the empty marrow space with the patient's "retrained" red cell precursors. Some of the hurdles that lie in the way of progress toward such a genetic cure are reported in this volume.

Other papers describe the consequences for the red cell, the patient, and the patient's family of the single nucleotide substitution that is the etiology of sickle cell anemia. The abnormal hemoglobin causes alterations in the structure of both the lipid and the protein components of the red cell membrane, and there are consequences for ion transport that seem to confound the sickling tendency by making the cells vulnerable to solute and water loss. These membrane effects cause the cells to become sticky or desiccated and apt to obstruct the flow of blood to any organ in the body, with consequences ranging from strokes to priapism to the immunodeficiency state that accompanies the loss of splenic function in infancy.

The physical chemistry of hemoglobin polymerization is considered in several papers, and there is a consensus that any maneuver that would decrease the concentration of hemoglobin S in the red cell—even by a few percent—could reduce the sickling tendency. It is reported in this volume that a feasible way to dilute hemoglobin S is to treat sickle cell patients with certain antileukemic agents like azacytidine or hydroxyurea that seem to alter the kinetics of red cell production. In some cases there is an amelioration of symptoms and an improvement in the anemia, as the red cells with the highest hemoglobin S concentration are replaced by a new cohort of cells in which the hemoglobin S is diluted out by fetal hemoglobin.

The advances described in this book exemplify how investigation of a natural mutant can contribute to general knowledge and how advances in basic scientific research can be brought to bear on a debilitating disease that afflicts 50,000 Americans and many others throughout the world.

JOHN C. PARKER
EUGENE P. ORRINGER
Department of Medicine, University of North Carolina, Chapel Hill, NC 27599

Guppies and Their Kin

Ecology and Evolution of Livebearing Fishes (Poeciliidae). GARY K. MEFFE and FRANKLIN F. SNELSON, JR., Eds. Prentice Hall, Englewood Cliffs, NJ, 1989. xxvi, 453 pp., illus. $50. Prentice Hall Advanced Reference Series.

The first report of an all-female species of vertebrate appeared in the pages of *Science* in 1932. The discoverers of this fish appropriately named it the Amazon molly, on the basis of mythology rather than geography. Over 50 years later, as is pointed out by Jack Schultz in his review of unisexual poeciliids in this volume, many biologists are still surprised to learn of this departure from "normal" reproduction by a vertebrate. Surprises continue to be mined from the fascinating family of fish that includes the Amazon molly. For example, Klaus Kallman reviews his recent studies of allelic variation at a single gene that is associated with tremendous differences in size and age at sexual maturity in males of several species of platyfish and swordtails.

The poeciliids are an exceptionally appropriate subject for such a book. Stocks of poeciliid fishes have been maintained in laboratories and used in genetic studies since the early 1900s, as long as *Drosophila* and the laboratory mouse. Poeciliids also have played a central role in investigation of several important evolutionary and ecological topics (among them unisexuality, sexual selection, and the evolution of life history traits). Poeciliids have the added advantage of being familiar to all biologists, given how many people have at some time in their lives had a tank of guppies or swordtails. My son continues to be amazed by the female guppy in his bedroom that has been regularly producing healthy broods in the absence of male companionship for over four months.

Meffe and Snelson have combined 19 chapters from most of the top workers in the field to review and synthesize the widely scattered literature on poeciliids, and also to