

Part 4 we discuss applications to special systems and the particular characteristics of mixed cultures, genetically engineered cells, plant cells, and animal cells. These application chapters reinforce the previous engineering and biological concepts while providing more detailed information about important new biological systems.

This book reflects useful and important suggestions from many people. Students in Chemical Engineering 643 (“Introduction to Bioprocess Engineering”) at Cornell University in Fall 1989 provided written critiques on the chapters. This input has been invaluable and is deeply appreciated. The two external reviewers of this text also provided invaluable suggestions. Harvey Blanch, Charles D. Scott, and Octave Levenspiel have provided one of us (FK) with suggested homework problems, which have greatly enhanced the potential usefulness of this book. Finally, the superb technical skills of Bonnie Sisco have been instrumental in converting nearly incomprehensible written scrawls into a readable text.

Finally, both authors wish to thank their families for their patience and support during this process.

*Michael L. Shuler*  
*Fikret Kargi*