PART 1
Introduction

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What Is a Bioprocess Engineer?

1.1. INTRODUCTORY REMARKS

We can now manipulate life at its most basic level—the genetic. For thousands of years people have practiced genetic engineering at the level of selection and breeding. But now it can be done in a purposeful, predetermined manner with the molecular-level manipulation of DNA. We now have a tool to probe the mysteries of life in a way unimaginable 25 years ago.

With this intellectual revolution emerge new visions and new hopes: new medicines, semisynthetic organs grown in large vats, abundant and nutritious foods, computers based on biological molecules rather than silicon chips, superorganisms to degrade pollutants, and a wide array of consumer products and industrial processes.

These dreams will remain dreams without hard work. Engineers will play an essential role in converting these visions into reality. Biological systems are very complex and beautifully constructed, but they obey the rules of chemistry and physics and they are susceptible to engineering analysis. Living cells are predictable, and the processes to use them can be rationally constructed on commercial scales. Doing this is the job of the bioprocess engineer.

Probably the reason you are reading this book is your desire to participate in this intellectual revolution and to make an important contribution to society. You *can* do it, but it