

# 10

## *Selection, Scale-up, Operation, and Control of Bioreactors*

### 10.1. INTRODUCTION

In our previous discussion we focused on idealized descriptions of homogeneous bioreactors with regard to operating mode (batch, fed-batch, continuous, and multistage) and generalized discussions of heterogeneous reactors (immobilized-cell systems and SSF). However, real processes demand greater insight into the details of reactor configuration. It would be impossible in a book of this type to provide the reader with all the information necessary to become a design engineer. However, we will introduce some of the concepts that drive the choice of real bioreactors. Our focus will be primarily on reactors for bacteria and fungi; some of the special reactor issues for animal and plant cell tissue culture will be handled in chapters on tissue culture.