CHAPTER ONE

HISTORY OF EVOLUTIONARY PRINCIPLES

1.1 Introduction

There are two firm observations that can be made about the living world: first, that it comprises a rich diversity of animal, plant and microbial life, and second, that all living organisms seem to be well-fitted for the problems posed by the environments in which they live. It is conceivable that either the characters of organisms are fixed and have remained so since the origin of life, or that they are mutable and that their diversity and adaptability have unfolded progressively with time. The dynamic process is now termed evolution. However, several possible mechanisms have been proposed to account for it, ranging from divine intervention to natural selection. The latter view, initiated by Darwin, is now dominant and it will be the aim of this book to summarize the complex collection of ideas and facts that have become associated with it, particularly over the last hundred years. To do this adequately, however, it is necessary to appreciate the historical and philosophical background from which the Darwinian Revolution emerged, and so this chapter will present a short historical review and some philosophical comments.

1.2 Fixity, design and creation

Nullae speciae novae was the catch-phrase for the early systematists, including Linnaeus (1707–1778). Species were the units of creation as prescribed in Genesis and were therefore immutable. Moreover, the reason they were so well-fitted for the challenges presented by everyday life was that they had been designed by God for specific functions in nature. John Ray (1626), clergyman, naturalist and early systematist, saw the fitness of species as evidence for the existence of a Designer, and this
Argument from Design was made even more explicit later by William Paley (1743–1805). Animals and plants are wonderful bits of machinery, they asserted, more wonderful than any man-made machine, and so they must be the product of an intelligence more wonderful than that of Man. (There was a later, more subtle, version of this argument which emphasized harmony of form rather than utility. These are described as the idealist and utilitarian positions, respectively.)

Yet there were biological and even theological and philosophical problems with this creationist position. For example, many fossilized organisms had been discovered that no longer existed on earth, and yet it was inconceivable that the perfect products of an omnipotent designer could ever have become obsolete. Cuvier (1769–1832), a very influential French biologist, offered catastrophes as a way out. A series of upheavals, Noah's Flood being one, had removed some of the species initially created by God. Apparently useless characters were another worry because, again, inferior design could hardly be attributed to a super-intelligent designer. Buffon (1707–1788), another French biologist, wrote of the pig:

> it has evidently useless parts, or rather parts of which it cannot make any use; toes all the bones of which are fully formed and which, nevertheless, are of no service to it.

To explain such useless characters he suggested that the Supreme Being had created perfectly designed types embodied in the original species, but that new species arose from them by a process of hybridization and degeneration. Thus the ass was supposed to be a degenerate horse and the ape a degenerate man. But this meant that the assumption of strict fixity of species had to be relaxed and the concept of *nullae speciae novae* disappeared from the last, revised edition of Linnaeus' taxonomic tomb, the *Systema naturae*. (There were also deeper theological and philosophical flaws in the Argument from Design concerned with the origin of imperfections and the image of the Creator as a humanoid designer, but these will not be considered further here.)

### 1.3 Programmed evolution

Even some of the enlightened medieval scholars considered the story of creation in Genesis to be a myth. Augustine (353–430) likened the work of the Creator to the progressive growth of a tree, and Aquinas (1225–1274) similarly saw creation as a process whereby the powers given to matter by God progressively unfolded.

It was in this sense that Charles Bonnet (1720–1793) first applied