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Diversity in the Plant World

SUMMARY

In this chapter the stages in evolution of the diversity of plant life on Earth are outlined and the essential characteristics of the most successful land plants summarised, as an introduction to Chapters 2 and 3. The characteristics, origins and occurrence in the garden of primitive plants are then summarised. Finally, flowering land-plant forms, their occurrence in the wild and their value in the garden are presented in tabular form.

INTRODUCTION

The most remarkable thing about plants is that they are green (Fig. 1.1), a property that makes it possible for them to generate the energy required to sustain almost the entire living world.

This is an extravagant claim, but to appreciate its significance it is necessary first to consider what happens to the average motor car if, like the one in Fig. 1.2, it is neglected for long enough: the bodywork rusts and the non-ferrous components disintegrate and decay. Indeed, it is the usual experience that all inanimate things, left to themselves, eventually reach a state of disorder: books turn to dust, buildings crumble and machines rust. This general tendency is expressed in the second law of thermodynamics, which states, in essence, that in an isolated system the degree of disorder and chaos – the *entropy* – can only increase.

CREATING ORDER OUT OF DISORDER

When one thinks about living things, however, it is immediately apparent that they are able to create order out of disorder, assembling atoms and molecules to form tissues and bodies of great complexity and sophistication (Fig. 1.1). Now, living things must obey the laws of physics and chemistry, just as a motor car must, so how is this creation of order out of disorder possible, thermodynamically? The answer is that the cells of living things are not isolated systems in a thermodynamic sense, as a motor car is, for they are constantly deriving energy from another external source, the sun. It is necessary to go back in time to find out how this came about.

The Earth first condensed from dust and ashes about 4600 million years ago, and life must have appeared some time during the first thousand million years of the planet's existence. The molecules that made life possible may have arrived from another planet in, for example, a comet, but current theories suggest they were probably generated here on Earth. The earliest life forms would have derived their organic molecules (those containing carbon) from their