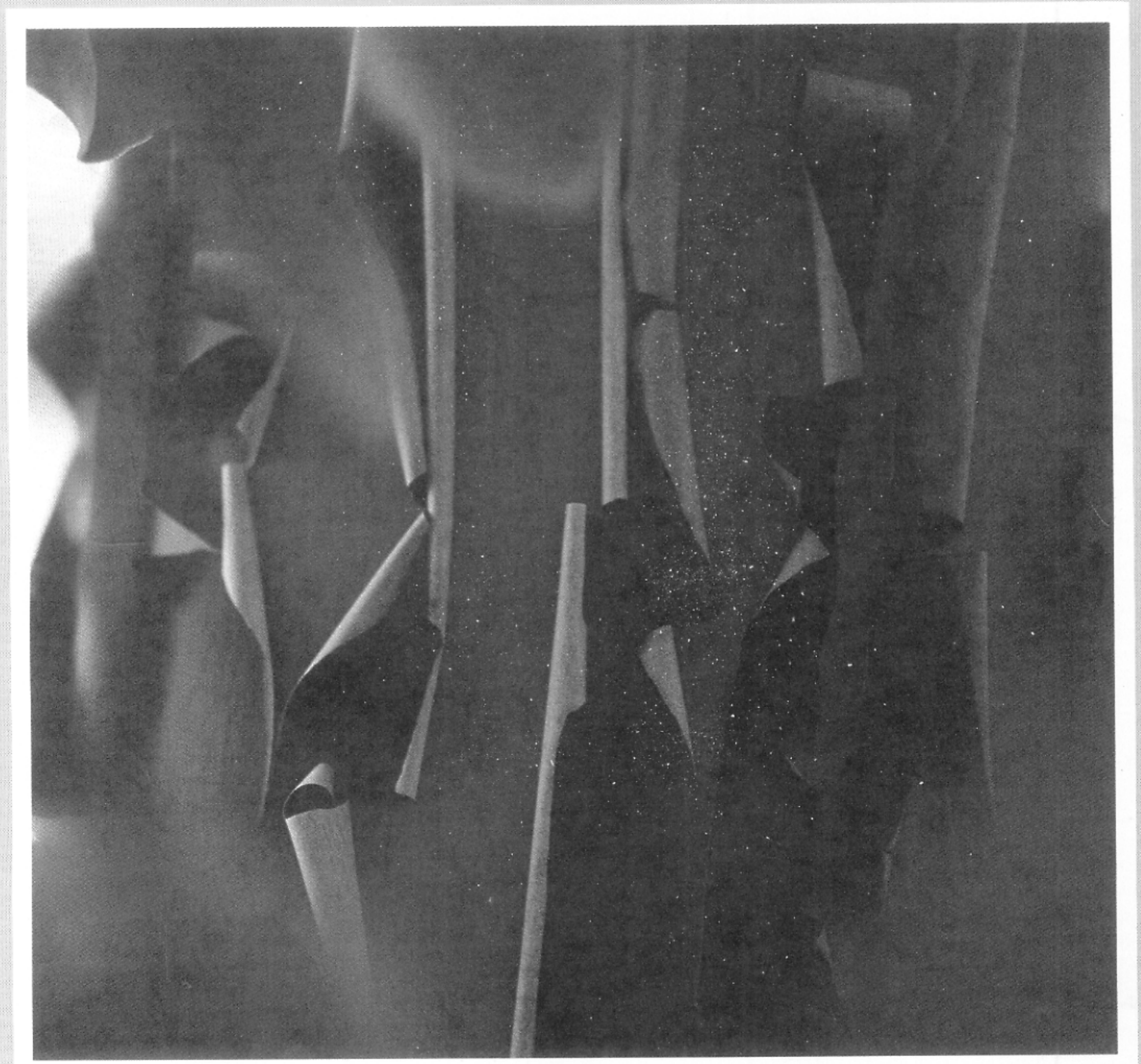
Plant Systems



In the dooryard fronting an old farm-house near the white-wash'd palings,
Stands the lilac-bush tall-growing with heart-shaped leaves of rich green,
With many a pointed blossom rising delicate, and with perfume strong I love,
With every leaf a miracle—and from this bush in the dooryard,
With delicate-color'd blossoms and heart-shaped leaves of rich green,
A sprig with its flower I break.

—Walt Whitman (1865)

From the towering trees of temperate forests to the gentle blades of grass that color the rolling prairie, plants have successfully colonized nearly every corner of the planet. In our effort to study and understand living things, it is all too easy to assign plants a passive role, to relegate them to the background with respect to the ongoing drama of animal life. As animals ourselves, we have a tendency to equate life with movement. The fact that plants are often stationary has led many to the unfortunate conclusion that plants are less than alive. The great irony of this view is that the environment of this planet has been modified by plants and their relatives in a way that has made it hospitable to other organisms, including ourselves.

The atmosphere, one of earth's most precious resources, is the direct result of the process of photosynthesis carried out by plants and their relatives. Plants were essential in forming the biosphere, and they continue to be essential for its maintenance and good health. The central position of plants in the biosphere is reason enough to be curious about plant biology. The utility of plants as providers of food and fiber in our daily lives is another. But there is a third, more subtle reason why we should be interested in plants: They help to expand our understanding of the possibilities of living organisms.

With few exceptions, plants do not gather food, nor do they move about, nor do they struggle directly with predators. They are unable to flee from danger or to strike swiftly when a moment of opportunity arises. Despite these differences from many animals, plants are successful. Indeed, they are *the* most successful form of life on earth. Part of this success arises, naturally enough, from the ability to convert sunlight into chemical energy. But the abilities of plants to respond to challenges, to reproduce under adverse conditions, and to respond to biological and meteorological adversity should prove a powerful reminder that there is more than one road to evolutionary success. In this volume we will explore some of the adaptations that have made plants so different from other organisms and yet so successful in the grand scheme of life. Beginning with an analysis of plant structure and function, we will examine the ways in which plants reproduce, obtain nutrients, and respond to their environment.

A study of plants helps us to appreciate the beauty that they lend to our world. It helps us to understand the importance of plants in our daily lives. And it also helps us to learn the most profound lesson of all: that the multiple possibilities of life embrace ways of living very different from our own.

◀ A Madrone tree, an evergreen, sheds bark as well as leaves every year during the heat of the summer. As a result, no moss or epiphytes are able to grow on these trees.