About birds and trees and flowers and water-craft, a certain free margin, and even vagueness—perhaps ignorance, credulity—helps your enjoyment of these things, and of the sentiment of feather'd, wooded, river, or marine Nature generally. I repeat it—don't want to know too exactly, or the reasons why.

WALT WHITMAN

This book was personally satisfying to write because it enabled me to combine experiences from my life, from childhood to adulthood, with my scientific background as a botanist. I have always had a strong connection to plants and their colors in the various landscapes of my life. As a toddler I watched my mother garden, adding flashes of bright color to our yard. My emotional attachment to the landscapes of my childhood, and my fascination with the color produced by their plants, inspired my training and career as a botanist. Part of my research during that career, particularly the last thirty years of study in the tropics, focused on the colors produced by plants, particularly colors produced by foliage—and their adaptive significance. So I write this book from the perspectives of my emotional attachment to those landscapes, amazement at the intricacy and beauty of plants, and curiosity about how they function.

My life, in the tropics and then on the edge of the tropics in Miami, has combined a scientific fascination with nature and an emotional attachment to the landscapes I studied. These interests have made transparent for me an issue we all face in our lives, a reconciliation of the intel-

lectual with the emotional and intuitive. So my approach in this book is to write about the science *and* culture of plant color. By the science, I mean the physical and chemical explanations of colors, and the selective advantages they provide the plants in their natural environments. By the culture, I mean our aesthetic and emotional responses to plant colors, which have become parts of the diversity of ways by which people live on our planet.

Nature's Palette: The Science of Plant Color explains the science behind the production of color by plants: the nature of light, optical principles relevant to color production, vision, and the perception of color. It describes the production of color on chemical and biological levels, and discusses the biological importance of plant colors. It surveys the remarkable diversity of color production in leaves, stems, flowers, and fruits. Two chapters describe two particularly remarkable color phenomena: iridescent metallic colors produced through physical effects and not by pigments, and the phenomenon of red leaf color and autumn coloration in temperate forests.

This book also explores our fascination with plant color and its importance in our lives. Since plants were the principal materials for the fabrication of tools, clothing, and shelter, and were the main source of food from our beginnings, their colors became culturally important as well. The colors of plants, particularly of flowers and fruits, were incorporated into culture and language, and they continue to be important today by giving us a connection to nature and adding aesthetic diversity to our lives.

Plants provided fibers for the production of fabrics, and these natural fabrics are still very important today. Plants also provided agents for the curing of leather. Dyes, derived principally from plants, were applied to leather and fabrics to make them more attractive. The collection and cultivation of dye materials along with the dyeing of fabrics became an important economic activity, part of the mix of commodity trade that fed the Renaissance and justified the colonization of the tropics by the European countries. The value of dyes stimulated the development of organic chemistry and the discovery of synthetic substitutes.

In some way, poorly understood, plants soothe us and may be therapeutically beneficial to us. Perhaps we are attracted to the greenness of plants for deep reasons that relate to our origins as forest primates and then as humans. I hope that the cultural descriptions will add a dimension to the science, and reveal the broad reach of plant color in human life.

My target in writing this book is an informed nonscientist, probably with an interest in gardening or natural history. The text is, I hope, straightforward. It is illustrated with a variety of photographs and diagrams. It is

not cluttered with footnotes, references, or detailed information on illustrations. At the same time, I provide the additional information in separate sections so that the interested reader can go much deeper. I have added proper scientific names of every illustrated plant, including authorities and families, in either the chapter or illustration notes, and have mainly used common names in the text, with few exceptions. I have standardized varietal names, which traditionally vary among different plants, to provide the name of the genus followed by the variety name, capitalized and enclosed in single quotes. Common names are always uncapitalized, unless they include a geographical location or other proper noun. At the end of the book, the notes for each chapter document the sources of information I used, written in order of the ideas in the chapter. A section at the back of the book provides full information about the identification and location of the plant in each figure, and acknowledges the individuals who provided the photographs. Providing this information certainly satisfies the scientific side of my personality. It may also make this book detailed enough to satisfy some of the demands of a professional biologist. Thus I am trying to find the balance that Whitman wrote about (but I am certainly erring on the side of the scientist!).

Thus this story about plant colors combines elements of the scientific along with the aesthetic and emotional. These traits are common to all of us, in some combination or another. For me, understanding the scientific basis for a phenomenon, such as plant color, adds to my aesthetic appreciation of it. I hope that this book fulfills the same purpose.