

Preface

This book is a companion to our 2017 book *The Teeth of Non-Mammalian Vertebrates* and the two books together are intended to provide a full account of the dentitions, dental tissues, and tooth ontogeny in the vertebrates. As with the previous book, the treatment is restricted to extant animals. To include descriptions of extinct mammals, or to trace the evolution of dentitions, would demand a book many times the size of the present volume. Instead, we have aimed, first, to provide an overview of the literature, both past and present, on the biology and function of teeth and, second, to present an amply illustrated survey of the dentitions of all of the main dentate mammalian groups.

Our first aim is addressed by the first three chapters and by the introductory sections of each of the later chapters. Chapter 1 presents some general aspects of mammalian teeth and dentitions. Chapter 2 describes the structure of unique mammalian tissues and discusses their functional adaptations. This chapter complements and completes the descriptions of dental tissues in our previous book. Chapter 3 discusses the special challenges posed by herbivory, a mode of feeding that is not unique to mammals, but one which they have exploited to a much greater extent than any other vertebrates.

The first three chapters are followed by 12 chapters that address our second aim: to describe and illustrate the dentitions of all the main groups of living, dentate mammals. Numerous images are used to show the diversification and specialization of mammalian dentitions. The accompanying text aims to describe the teeth against the context of the functional integration of the masticatory system, which includes, in addition to the teeth, the temporomandibular joint, the masticatory muscles, and the morphology of the mandible and the facial region of the skull. This

system has evolved to exploit almost all available food resources. The literature on teeth has ballooned in recent decades and we are acutely aware that a broad survey of this kind will not do justice to all of the work that has been done on those groups, such as primates, that have attracted the most attention. However, we hope that the literature cited will equip the reader with a useful introduction.

Our illustrations are mainly traditional photographs of skulls and dentitions, which have been kindly provided by internationally recognized museum collections and researchers from around the world. These are complemented by images obtained by computed tomography, which is the method of choice for illustrating small skulls, because it requires no skeletal preparation and avoids problems associated with dehydration and with the articulation of the lower jaw. Radiographs and dissected specimens provide additional information on root morphology and degree of hypsodonty. Some images are provided with scale bars, so they need no further information. In most cases, we supply the "original image width," i.e., the width of the field of view. In the case of a few images, unfortunately, we have no information on magnification.

Mammalian teeth grow in a regular fashion and retain traces of the growth pattern within their structure. Their composition is influenced by the environment in which they form. Our final chapter (Chapter 16) outlines the various ways in which these features can be used to generate information about the formation times of teeth, about the age at death, and about the diet and environment of the animal during tooth formation. Information of this kind has been very important in ecology, archaeology, and the study of evolution, and this chapter is a fitting way to conclude this volume.