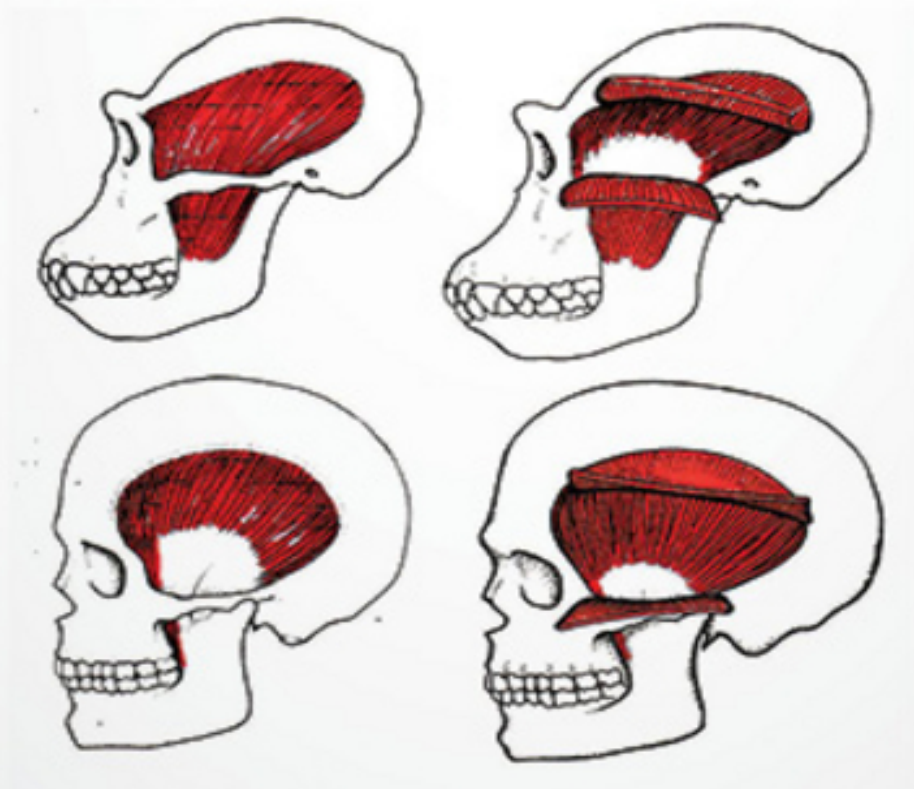


Advances in Human Biology • Matt Cartmill and Kaye Brown, Series Editors

The Scientific Bases of **HUMAN ANATOMY**

Charles Oxnard



WILEY Blackwell

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The Scientific Bases of Human Anatomy

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For Eleanor

I was a studious student: I married the Medical Librarian

She has been in my work and my life for nearly 60 years

Willingly helping me cross three continents

Foreword

To readers who think of human anatomy as a petrified science, in which all the facts are established and all the big questions have been answered, Charles Oxnard's new book will come as a surprise. *The Scientific Bases of Human Anatomy* is unlike any other book on the subject. In reading it, you will come to perceive your own body and the bodies of others in a dramatic new light, as the culmination of a story: the narrative of the journey that our bodies have taken to become human.

In other books of human anatomy, the bold outlines of this story are washed away in an inundation of facts. Anatomical pedagogy has traditionally relied on mnemonics and rote memorization to support learning and recall of this flood of detail. Oxnard's approach uncovers the deficiencies of this tradition and overcomes them. His book shows us a way around reliance on memorization and mnemonics by concentrating on how human bodies come into existence. The analytical system that he uses relies on identifying recurring patterns and tracing these back to the processes that formed them. In Oxnard's words,

The method that I have developed, over the years is, in contrast to 'the naming of the parts', an holistic integrative approach to human structure. It involves understanding that the structural details of the human body are the end results of a series of biological processes. These produce anatomical pattern due to:

- change from differentiation and growth **over developmental time;**
- diversification through comparisons of different forms **living at the same time;**

- adaptation to mechanical and other factors **during functional time;**
- interaction between body and brain, brain and body, **through mind time,** and
- innovation in structure resulting from evolution **during deep time.**

Oxnard escorts his readers on a guided exploration of what he identifies as “the principles of body construction from their beginnings” – a tour of the human body factory, in the company of a most engaging guide who reveals and explains how bodies are made and how they work. This exploration is grounded in current ideas drawn from a wide arc of biological sciences, ranging from genomics and neuroscience to the latest findings in comparative anatomy. In the hands of a less skilled and knowledgeable writer, the confluence of all these “developmental, comparative, adaptive, integrative (and) evolutionary” ideas would have left the reader lost in a wilderness of unrelated notions. But Oxnard's mastery of biology and passion for anatomy hold the reader's journey on a steady course, relieved by a few delightful side excursions and enlivened by his unique and accessible narrative style. Profound, strong, sure, sometimes poetic and even beautiful, Oxnard's distinctive voice will remain with his readers long after they have finished this book.

Oxnard is careful to point out that *The Scientific Bases of Human Anatomy* is not a textbook of anatomy. As he emphasizes in [Chapter 1](#), there is nothing here to memorize, and it is not his intention to prepare the reader for a test based on the “naming of the parts.” Reading Oxnard will not obviate the need for professionals to acquire this sort of detailed anatomical knowledge, but it will both lighten and illuminate that task. His book conveys

lasting images of how bodies come into being and function, which will help students organize those details in ways that make fundamental sense. For teachers of anatomy, the new insights and ways of thinking laid out in the following pages may serve to rekindle the spark of inquiry that drew them to the topic in the first place. For uninitiated readers with no professional interest in anatomy, the book will raise the curtain on a theater of the mind in which they will come to care about the making of bodies. In this book, Oxnard seeks to lay down new modes of understanding and thinking about the formation of the human body, as both process and product, for students, teachers, researchers, and others. All of his readers will henceforward see the human body in a novel and deeply enlightening way. We are honored and delighted to include his book in the *Advances in Human Biology* series, and to welcome its readers to the New Anatomy.

Kaye Brown and Matt Cartmill

Preface

How it started: I was trained as an old fashioned medical anatomist, a physician who chose to specialize in anatomy; today a species possibly extinct, probably obsolete. Thus, though I just escaped being a student in a medical anatomy course of one thousand hours in two years, I nevertheless took a medical anatomy course of six hundred hours in five terms. I dissected the entire human body and brain and I taught in this mode for six years. I was later involved in teaching a medical anatomy course in two quarters (still with dissection of the entire body), and then a course in one quarter (with dissection of the entire body!). Finally, I was involved in teaching a course that was not entitled anatomy at all, but that contained just enough anatomy to understand physiological systems such as the cardiovascular system, and simple clinical problems. It contained no regional anatomy (though perhaps one third of medical conditions involve complex anatomical regions like the back of the abdomen) and no human dissection (though a small aliquot of students were permitted to take an elective dissection course in which they dissected a single region of the body of their own choosing). These gradual reductions of anatomical teaching meant that my own teaching became better and better – the smaller the amount of teaching, the higher the quality of teaching!

The researches that I carried out concomitantly with this medical student teaching led me to undertake undergraduate and graduate courses in the scientific bases of human anatomy. For, if one wants to attract graduate and post doctoral students, it is wise, in the American system, to provide graduate level courses in one's own direct discipline. But how does one transmute that kind of