Human Growth

A COMPREHENSIVE TREATISE

Second Edition

Volume 2

***Postnatal Growth
Neurobiology***

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Edited by Frank Falkner and J. M. Tanner

Volume 1	Developmental Biology
Prenatal Growth
Volume 2	Postnatal Growth
Neurobiology
Volume 3	Methodology
Ecological, Genetic, and Nutritional Effects on Growth

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Volume 2 Postnatal Growth Neurobiology

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Preface to the Second Edition

It is a source of great satisfaction to us that a Second Edition of this treatise should be called for, especially because it has given us the opportunity to produce, we believe, a better book. Eighteen chapters, amounting to one-third of the whole, are new, and of these, 13 deal with subjects not covered at all in the First Edition. We have paid more attention to embryonic and fetal growth, with chapters on cell differentiation (Lehtonen and Saxén), embryonic growth (O'Rahilly and Müller), control of fetal size (Snow), regulation of fetal growth (D'Ercole and Underwood), and ultrasonic studies of fetal growth (Meire). At last the data are available for a chapter on the evolution of the human growth curve, by Elizabeth Watts. Large parts of the endocrine section have been rewritten (by Michael Preece, and by William Crowley and Margaret Wierman), and the genetics section has been largely recast, with new contributions by William Mueller and Ronald Wilson. Reynaldo Martorell has contributed a new chapter on growth in developing countries, and Tanner discusses growth surveys and standards as well as catch-up growth. Finally, there are two new chapters dealing with growth as a monitor of the health of populations—one by Tadeusz Bielecki, considering the contemporary scene, and the other by Robert Fogel, on the contribution that such studies are making to the economic history of the eighteenth and nineteenth centuries.

The appearance of Tanner's *A History of the Study of Human Growth* (Cambridge University Press, 1981) meant that we could drop the long historical chapter in Volume 3 of the First Edition, and that has provided space enough so that these new departures could all be fitted in without (or nearly without) increasing the total size of the book.

Our First Edition contributors have been meticulous in updating their chapters. As in the First Edition, our only regret is that one promised new Second Edition chapter—on the important subject of neuronal migration in brain development—failed to arrive.

To our considerable wonderment, our secretaries proved capable of working even harder than before, for this time all three volumes have been produced simultaneously. We, and more particularly our readers, owe the greatest debt to Karen Phelps at Berkeley, and to Jan Baines Preece and Susan Barrett in London. Without their gentle aid, neither we nor scarcely any of our contributors would have met the publisher's deadline. That they did all meet it is a marvel for which we give them our heartfelt thanks.

Frank Falkner
James Tanner

Berkeley and London

Preface to the First Edition

Growth, as we conceive it, is the study of change in an organism not yet mature. Differential growth creates form: external form through growth rates which vary from one part of the body to another and one tissue to another; and internal form through the series of time-entrained events which build up in each cell the specialized complexity of its particular function. We make no distinction, then, between growth and development, and if we have not included accounts of differentiation it is simply because we had to draw a quite arbitrary line somewhere.

It is only rather recently that those involved in pediatrics and child health have come to realize that growth is the basic science peculiar to their art. It is a science which uses and incorporates the traditional disciplines of anatomy, physiology, biophysics, biochemistry, and biology. It is indeed a part of biology, and the study of human growth is a part of the curriculum of the rejuvenated science of Human Biology. What growth is not is a series of charts of height and weight. Growth standards are useful and necessary, and their construction is by no means void of intellectual challenge. They are a basic instrument in pediatric epidemiology. But they do not appear in this book, any more than clinical accounts of growth disorders.

This appears to be the first large handbook—in three volumes—devoted to Human Growth. Smaller textbooks on the subject began to appear in the late nineteenth century, some written by pediatricians and some by anthropologists. There have been magnificent mavericks like D'Arcy Thompson's *Growth and Form*. In the last five years, indeed, more texts on growth and its disorders have appeared than in all the preceeding fifty (or five hundred). But our treatise sets out to cover the subject with greater breadth than earlier works.

We have refrained from dictating too closely the form of the contributions; some contributors have discussed important general issues in relatively short chapters (for example, Richard Goss, our opener, and Michael Healy); others have provided comprehensive and authoritative surveys of the current state of their fields of work (for example, Robert Balázs and his co-authors). Most contributions deal with the human, but where important advances are being made although data from the human are still lacking, we have included some basic experimental work on animals.

Inevitably, there are gaps in our coverage, reflecting our private scotomata, doubtless, and sometimes our judgment that no suitable contributor in a particular field existed, or could be persuaded to write for us (the latter only in a couple of instances, however). Two chapters died on the hoof, as it were. Every reader will notice the lack of a chapter on ultrasonic studies of the growth of the fetus; the manuscript, repeatedly promised, simply failed to arrive. We had hoped, also, to include a chapter on the very rapidly evolving field of the development of the visual processes, but here also events conspired against us. We hope to repair these omissions in a second edition if one should be called for; and we solicit correspondence, too, on suggestions for other subjects.

We hope the book will be useful to pediatricians, human biologists, and all concerned with child health, and to biometrists, physiologists, and biochemists working in the field of growth. We thank heartily the contributors for their labors and their collective, and remarkable, good temper in the face of often bluntish editorial comment. No words of praise suffice for our secretaries, on whom very much of the burden has fallen. Karen Phelps, at Fels, handled all the administrative arrangements regarding what increasingly seemed like innumerable manuscripts and rumors of manuscripts, retyped huge chunks of text, and maintained an unruffled and humorous calm through the whole three years. Jan Baines, at the Institute of Child Health, somehow found time to keep track of the interactions of editors and manuscripts, and applied a gentle but insistent persuasion when any pair seemed inclined to go their separate ways. We wish to thank also the publishers for being so uniformly helpful, and above all the contributors for the time and care they have given to making this book.

Frank Falkner
James Tanner

Yellow Springs and London

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