

A Text-book Of **ORTHODONTIA**

By

ROBERT H. W. STRANG, M.D., D.D.S.

*Director of courses in orthodontia in the extension teaching department of Temple University;
former Director of courses in orthodontia in the extension teaching departments of
Columbia University and the University of Toronto; Director of the Fones
School of Dental Hygiene, University of Bridgeport; Co-editor of "The
Angle Orthodontist," Consulting Oral Surgeon to the Bridgeport Hospital,
Bridgeport, Connecticut.*

AND

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*Fourth Edition, Thoroughly Revised, with 1178 Illustrations
on 647 Figures and 5 plates, some in Colour*

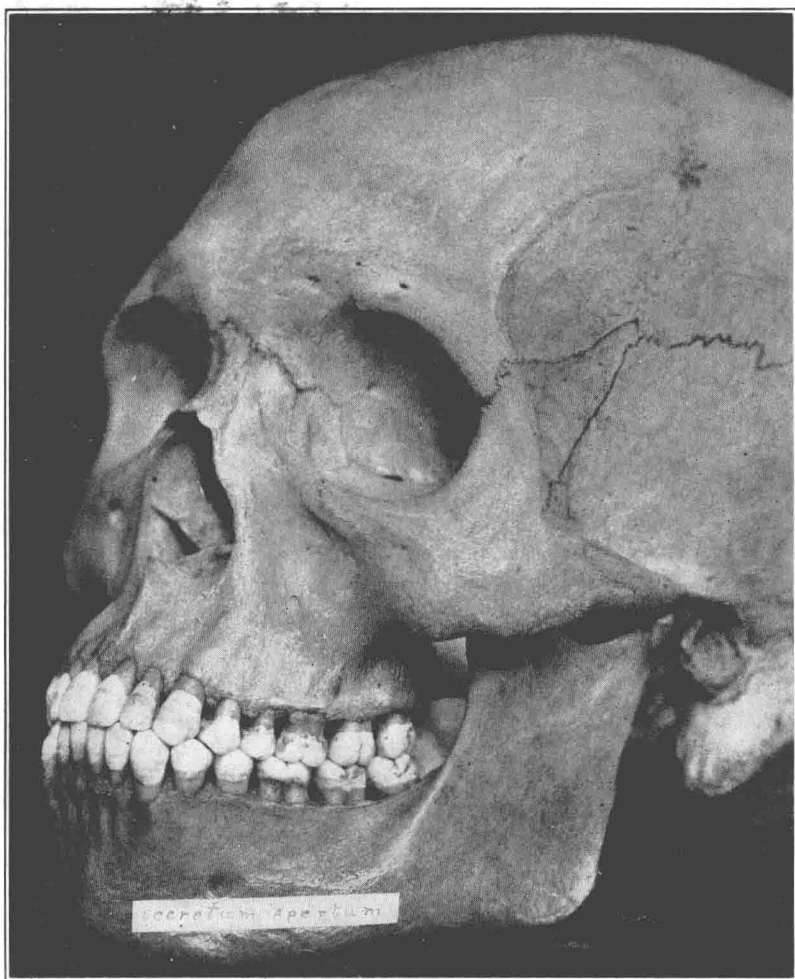
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PLATE I



THE "OLD GLORY" OF ORTHODONTIA
(A skull owned by Richard Summa.)

PLATE II



Longitudinal Section of Periodontal Membrane. (Noyes.)

Stained with hematoxylin and eosin. Showing part of the lingual gingivus and border of the alveolar process.

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Fourth Edition

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First Edition, 1933

Second Edition, 1943

Third Edition, 1950

Printed in the United States of America

THIS TEXT-BOOK
IS LOVINGLY DEDICATED
TO THE MEMORY OF MY REVERED FATHER

CLINTON WRIGHT STRANG, D.D.S.

A PRACTITIONER OF DENTISTRY FOR OVER FIFTY YEARS

*Through his interest in orthodontia and belief in its future growth and development, combined with his recognition of the limitations of a practitioner in this special field who had not received adequate preparation, I was given the opportunity to obtain a broad education in dentistry and medicine and the added chance to study with the most brilliant teacher that this specialty has evolved, the late
Edward Hartley Angle*

"The mind of a child is as tender and as lovely as the petals of a full blown rose. Beware how you touch it! Meet it with all the reverence of your being. Use it with gentle respect and fill it with the honey of love, the perfume of faith and the tenderness of tolerance. Thus shall you fulfill the mission of your life."

EDMUND H. WUERPEL,
(*The Angle Orthodontist*,
Vol. I, No. 1.)

Preface to the Fourth Edition

IN preparing the Fourth Edition of the *Text-book of Orthodontia*, the authors have, as their main objective, the production of a volume that will give the student a sound foundation, both in theory and technic, whereby the edgewise arch appliance can be successfully and intelligently used in the treatment of malocclusion of the teeth and associated facial disharmony.

Having mastered this fundamental and basic instruction, the individual will then be prepared to add to his knowledge by clinical experience and subsequent advanced training.

The material herein presented has been thoroughly tested as to its efficiency in initiating the student to the use of this mechanism. It represents a compilation of the lectures and technical instruction offered by the authors to their students in the graduate courses conducted for the past twenty-one years at Columbia University, the University of Toronto and Temple University.

Owing to the fact that this book is purposely limited to instruction in the application of this one appliance, it has been possible to describe every technical procedure in a detailed, step-by-step manner. This method of presentation, not found in any other text, will enable the reader to correctly assemble the appliance; to adjust primarily passively the archwires which later are to deliver the corrective force; and subsequently, to incorporate in these archwires, in an accurate, effective and safe manner, the essential modifications for the production of the required tooth movements. All guess work and trial and error procedures are completely eliminated.

The theoretical material has been carefully selected from the text books and papers of many eminent authorities. The authors gratefully acknowledge the privilege of so doing. Every effort has been made to give credit to those who have provided this information and we sincerely hope that no one has been overlooked. We would especially pay tribute to the research work and contributions of the following individuals:

Doctors	Allan G. Brodie	Herbert I. Margolis
	R. D. Emslie	Maury Massler
	B. Gottlieb	Albin Oppenheim
	W. K. Gregory	B. Orban
	Milo Hellman	Isaac Schour
	L. B. Higley	Cecil C. Steiner
	W. M. Krogman	O. H. Stuteville
	Rudolf Kronfeld	T. Wingate Todd
	W. H. G. Logan	Wendell L. Wylie
	Thomas J. Zwemer	

That portion of the text devoted to the Eruption of the Teeth and the Development of Occlusion is still based entirely on the scientific data contributed by Frederick B. Noyes and B. Holly Broadbent.

Still believing that eventually research efforts in endocrinology will bring forth important data pertaining to the etiology of malocclusion, the authors have again devoted sufficient space in this edition to cover basic material in this subject. This has been gathered from the *Text-book of Endocrinology* by Dr. Hans Selye of the University of Montreal and published by Acta Endocrinologica, Universite' de Montreal. We acknowledge with gratitude the permission from Dr. Selye to do this transcribing. We are also indebted to Dr. Isaac Schour for material on this subject.

The second edition of Drs. Weinmann and Sicher's book, *Bone and Bones*, has now been published by the C. V. Mosby Co. Again we are transcribing from this important contribution to our literature and express gratitude to the authors for permission to do so.

The chapters devoted to the Treatment of Malocclusion still follow, fundamentally, the principles and technical procedures advocated by Dr. Charles H. Tweed. However, we have purposely avoided the incorporation of any technical modifications in present use by Dr. Tweed that we judged to be too difficult for the initiate to acquire by description alone. The authors still hold the viewpoint that Dr. Charles H. Tweed is the outstanding clinical orthodontist of the present era and that his principles of treatment are basically sound and capable of producing results that are outstanding in effecting denture stability, maintaining health and longevity of service in the various oral structures, providing functional efficiency and producing marked improvement in facial esthetics. But to master this technic completely, one must have primarily acquired a sound basic foundation. Again, the authors state that the objective of this Text-book is to provide such a foundation.

In the chapters on Treatment of Malocclusion the authors again place strong emphasis on the principle that denture expansion is no longer to be considered as a tenable method of corrective procedure if stability in the final result is to be attained. Years of clinical testing have now proven that this contention is based on sound principles and cannot be over-emphasized.

The senior author would be most remiss if he did not again publicize his profound gratitude to his former teacher and friend, Edward Hartley Angle, for the privilege of studying under his guidance. This not only gave him the best preparation available at that time, but also developed a profound and tenacious desire to be, in proportion to his ability, a contributing member of his specialty. If this *Text-book* has been of assistance to his students and associates, he shall feel that he has, in some measure, repaid the great debt that he owes to this wonderful man. Much that he taught still remains within the covers of this book, and while scientific knowledge, brought to light since he passed on, has modified to a considerable degree our concepts and hence, our methods of treatment, one can never cease to marvel at the intuitive knowledge of basic principles that is portrayed in Dr. Angle's teaching and writing. As a mechanical genius he stands supreme today, and his edgewise arch mechanism is still the appliance chosen by hundreds of members of his profession.

The senior author welcomes most enthusiastically, Dr. Will M. Thompson Jr., as co-author of this edition. Primarily as a student and subsequently

as an associate instructor in every course given by me, we have worked together in complete harmony which is so essential for efficient teaching. His counsel and advice in the preparation of this edition has been extremely helpful. The chapter dealing with Cephalometrics was assigned entirely to him and is a most essential and valuable addition to this volume.

To my associates in teaching, Will M. Thompson Jr., co-author of this fourth edition, and Glenn H. Whitson, I again express my sincere gratitude for their loyal support over a period of twenty-one years. Their help in evaluating this work as a teaching text has been exceedingly profitable and their encouraging faith has been a constant stimulation to continue as an instructor and author.

The contribution of my former student, the late Edward Ray Strayer, on the use of musical instruments for muscle training is still, in my opinion, a most practical method of controlling and improving the tonus and action of these vital environmental tissues and is again included in the text. Dr. Bruce A. Curran has also aided by furnishing photographs of skulls.

Dr. Kenneth T. Adamson, professor of Orthodontia at the University of Melbourne, Melbourne, Australia, a former student of the senior author, has again offered constructive advice that has been instrumental in clarifying a certain portion of the textual material.

I gratefully acknowledge the arduous and painstaking work of my secretary, Miss Margaret Baldwin, in preparing this lengthy manuscript for press.

As in previous editions, my publishers, Lea and Febiger, have been most cooperative, helpful and generous. The skillful workmanship of the members of this organization speaks for itself throughout the entire edition.

R.H.W.S.

BRIDGEPORT, CONNECTICUT

Foreword to the First Edition

My friend, Dr. Robert H. W. Strang, has asked me to write a Foreword for this, his book on Orthodontia. Sincerely appreciating the honor, I have tried to comply with his request although feeling that the book speaks so eloquently for itself as to need little, even in the way of introduction from the pen of another.

The author's claim, in presenting his book, is not to a great amount of original material, but largely, rather, to a simplifying, an amplifying and an interpreting of the writings of others, chiefly those of Dr. Angle. The need for this, at this juncture in orthodontia, can hardly be overestimated, and Dr. Strang has performed the by no means easy task surpassingly well.

The matter of his book, founded on true principles, is well organized, its language is clear, simple and readily understandable even in necessarily involved technical description, its logic is convincing, its tenor stimulating.

The author has given credit for the thoughts of others with wholehearted generosity, and the tributes of love and understanding, of appreciation and gratitude he pays to him of whom he tenderly speaks as "my Teacher, my Guide and my Friend" ring with the deep sincerity of an honest man and a true friend. He does not in every instance agree with his teacher, as, notably, in the case of a certain mooted technical procedure which Dr. Angle believed unwarranted, but a frank statement and discussion is made of this fact and reasons for contrary opinions are fully and most respectfully given.

Appearing at a moment when the general teaching and practice of orthodontia are in chaos, this book will stand as a beacon to light the honest but perplexed student on his way; experienced orthodontists will read and re-read it with ever-increasing profit; and the many who anxiously await the breaking of a better day in orthodontia will receive it with acclaim.

It has been said that "principles are living things and must work out what is in them." It can only be through such instrumentalities as this outstandingly worthy book that there will ultimately be worked out the tremendous good that the great and living principles of orthodontia encompass.

ANNA HOPKINS ANGLE

PASADENA, CALIF.

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