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Descriptive Anatomy

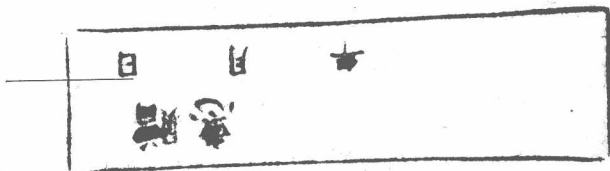
OF THE

Human Teeth

FIFTH EDITION

BY

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PREFACE TO THE FIRST EDITION.

BY my experience as a practitioner, as a teacher, and in my intercourse with fellow-practitioners, I have become convinced of a serious defect in the teaching of the details of the anatomy of the teeth, and in the systematization of the terms used in their description. This defect has been a constant drawback at the chair, in the laboratory, and most of all, in the college. The object of the present volume is to remedy, in a measure, this defect. To this end I have had constantly in view the needs of the dental student and practitioner.

We have heretofore had excellent general descriptions in human and comparative dental anatomy; but these have dealt principally with the general forms of the dentitions of the mammalia and other orders of animate beings, rather than with specific descriptions of the forms of the various surfaces and surface markings, making up the sum of the forms of the individual teeth of man. Valuable as these works have been, they have left the acquirement of a knowledge of the details of the specific forms of the human teeth mostly to individual observation. By this means, many have attained to an excellent perception of the various forms of the human teeth; but it is not reasonable to suppose the profession generally will do this without some fixed guide. What the dental student wants most in the college, and in the office, is a systematized nomenclature of the several parts of the teeth in detail; and such a description as will call his attention successively to every part of each tooth, as Gray, in his *Anatomy*, has called attention to every part of each bone, however apparently unimportant. It should be remembered that anatomy is not to be learned from books alone, but also by bringing the parts to be studied into view, and closely examining them in connection with the

descriptions given. Anyone who may read the present volume without a reasonable number of human teeth of each denomination before him for examination and comparison, will be but partially benefited.

It has been my object to systematize the nomenclature most in vogue with the profession, whenever practical, rather than to introduce new terms. However, the reader will find a few new terms, and possibly a few old ones that are used differently from the former custom. The terms up and down, to indicate direction or parts of teeth, are abandoned, because of their ambiguity. In a few instances, new forms of old words have been used, especially to avoid the terms inner, outer, backward, forward, etc., which are so often misleading. The words mesial, distal, labial, buccal, lingual, etc., are used as adverbs of direction by adding *ly*, or the same thing is accomplished by the use of the preposition *to*. It is as easy to say of a cavity that it extends far beyond, beyond, to, nearly to, or to the gingival line, as to say it extends up or down, etc., and the meaning will not be mistaken; or to say that a cavity extends distally, or to the distal, or lingually, or to the lingual, instead of backward, or inward, either of which has different meanings in different situations. The best rule is to use no extraneous object in the designation of the parts of, or direction on, the surface of a tooth; but to confine the phraseology to the specific and well-defined terms applied to its several parts. The back part of a molar would not mean the same relative part as the back part of an incisor. In many such ways the author has endeavored to systematize, and make more definite, the phraseology applied to the teeth without going to extremes, knowing well that forms of language once in use can be improved more easily than they can be displaced by new terms, though more exact.

The absence of a Bibliography may be noted. The plan and object of this work has not seemed to call for many references to authorities. This does not imply, however, that authors who have preceded me, as Fox, Carabelli, Tomes,

Wedl, Judd, Wortman, and many others, to whom we are greatly indebted, have been either overlooked or ignored.

The illustrations have all been made by the author for the purpose of illustration, rather than as works of Art. After experimenting with the various plans of the management of light and shade, diffused light has been used because more detail could be shown, especially in the difficult task of illustrating the occlusal surfaces of the teeth. Each picture of a tooth, in all its details, is drawn from accurate measurements of the particular tooth in hand.

Much of dental histology might properly find place in this book; but that subject is well represented by others. Malforms of the teeth, supernumerary teeth, and variations of arrangement, belong to the subject of irregularities, which is amply treated by several authors. My aim has been to confine the book strictly to normal macroscopic anatomy. However, a very serious difficulty, which has always met the dental anatomist, has been the variations of form in teeth of the same denomination. The endeavor has been to systematize these under one, two or more typical forms of each tooth, or its lobes, and point to the character of the changes which occur. This has occasionally led to the mention of abnormal forms.

The reader will find scattered through the work some hints with regard to the practical bearing of anatomical points on operative procedures, which, it is hoped, will be of value.

PREFACE TO THE SECOND EDITION.

THE rapid sale of the first edition of this work has shown an appreciation of a need for a more complete anatomical description of the human teeth. In preparing the work for a second edition, the aim has been to render the original design more complete in its details, and to make such verbal alterations as would better fit it for the text-book for the college, and for reference by the practitioner. The most notable changes are in the section on nomenclature; and these are confined to additional explanations of words and phrases. For the convenience of students a brief glossary has been added.

A number of the illustrations have been redrawn, and one has been added. Some of the numbers of the illustrations have been changed to render them consecutive; but the numbering of the paragraphs remains unchanged. Important words, especially the subjects of paragraphs and technical words the first time used, have been printed in bold-faced type. This, it is hoped, will be of advantage to the student and especially convenient for reference.

Valuable aid in the preparation of the work for reissue has been rendered by Mr. I. W. Davenport, Drs. D. M. Cattell, Edmund Noyes, and C. N. Johnson. G. V. B.

JACKSONVILLE, ILL., July 15th, 1891.

PREFACE TO THE THIRD EDITION.

THE continued favor with which this work is received by the profession has made another edition necessary. . In preparing this the endeavor has been to improve the detail without changing the form. The principal changes will be found in the nomenclature. The steady progress of dental nomenclature toward more exact forms demands this. It must now be recognized that we have two distinct forms of dental nomenclature, the one used in comparative dental anatomy, the other in human dental anatomy for the purposes of dentistry. The one is adapted to the description of the teeth of the various animals, including the teeth of man when his teeth are treated of in the comparative sense; the other is suited to the teeth of man when the more exact and detailed descriptions necessary to operative dentistry are presented. These word-forms necessarily become the basis of much of the nomenclature of operative dentistry. An extended examination of dental literature shows that up to a recent period, writers on operative dentistry had named more than twice as many points on the teeth than had writers on dental anatomy. This fact shows the necessity that had existed for the more extended and systematized presentation of the subject of dental anatomy, and the closer systematization of its nomenclature. However, the reader will find the changes introduced limited to one new word, *axial*; two new word-forms, *occlusal* in place of *occluding*, and *incisal* in compound forms, and the completion of the systematization of the names of the angles of the teeth. This latter has required but few word changes in the text.

Improvement has also been made in some of the descriptions, and a number of new illustrations have been added.

G. V. B.

JACKSONVILLE, ILL., August 21st, 1894.

PREFACE TO THE FOURTH EDITION

ON account of the exhaustion of the very large third edition of this work a fourth has become necessary. The teacher and the student will find but few changes. The author takes pride in referring to the very general approval of the work as a text-book, and to the fact that teachers who have used it in their classes since the first edition have so few changes to suggest.

The changes in this edition consist in the introduction of tables of the angles of teeth and the angles of surfaces of teeth, intended to aid the student in fixing these in his mind, and in the introduction of the word *embrasure* as an additional technical term.

Those openings between the angles of the teeth formed by the rounding of the proximate surfaces toward the buccal on the one side of the proximate contact and toward the lingual upon the other have never had a specific name, and the word *embrasure* has been introduced to supply this need in nomenclature. The word, when traced to its derivation, means an opening that widens, as in a wall, whether outward or inward. It has been most used in connection with defensive works; as "embrasures for cannon" in the walls of forts; though it frequently occurs in descriptions of other structures. The general progress of dental nomenclature toward exactness is very gratifying, and it is hoped that the addition of this word will be found advantageous.

G. V. B.

CHICAGO, October 9th, 1897.

GLOSSARY.

Alveolus. (Pl. Alveoli.) A socket: The cavity in the process of the maxillary bone in which the root of a tooth is fixed.

Alveolar process. The projection of the maxillary bones which envelops the roots of the teeth and forms their alveoli.

Angle. The line, or point, where two or more surfaces of the teeth join. The mesial and buccal surfaces join in the formation of the mesio-buccal angle. (See Par. 7.)

Apex. The terminal end of the root of a tooth.

Apical foramen. The minute opening of the pulp canal at the apex of the root of a tooth. (See Par. 153.)

Apical space. The space between the bone, or wall of the alveolus, and the apex of the root of a tooth. This space is filled with the soft tissues of the periodontal membrane, and is the seat of alveolar abscess.

Axial Angle. The line angles that are parallel with the long axes of the teeth are called axial angles. They are the mesio-buccal, and mesio-labial, disto-buccal, and disto-labial, mesio-lingual and disto-lingual angles.

Axial surfaces. Those surfaces of the teeth that are parallel with their long axes. They are labial, buccal, lingual, mesial, and distal surfaces.

Axial Walls. Of pulp chambers. Those walls that are parallel with the long axes of the teeth; the mesial, distal, buccal, and lingual walls.

Bell-Crowned. A tooth in which the mesio-distal diameter of the crown is much greater than that of the neck.

Bicuspid. A tooth with two cusps. They are also called premolars. There are eight bicuspids; two on each side of the upper jaw, and two on either side of the lower jaw. They are named right and left upper first and second, and right and left lower first and second bicuspids. They are situated between the cuspids and molars.

Border of the alveolar process. The thin edge of the alveolar process surrounding the necks of the teeth.

Buccal. Pertaining to the cheek. Toward the cheek.

Buccal surface. The surface of a tooth next to the cheek.

Buccal-gingival ridge. A prominent ridge near the gingival line on the buccal surface of the deciduous molars. It is especially prominent on the first deciduous molars.

Buccal-lingual. From the cheek toward the tongue; as the bucco-lingual diameter of the crown of a lower first molar.

Canal. See Root Canal.

Cementum. A tissue resembling bone which forms the outer surface of the roots of the teeth.

Contact point. The point on the proximate surface of a tooth which touches a neighboring tooth.

Crown. That portion of a tooth which is covered with enamel, and which projects from the tissues in which the root is fixed.

Cutting edge. The edge formed by the junction of the labial and lingual surfaces of the incisor and cuspid teeth. In the cuspids the edge is raised to a point near its center.

Cusp. A pronounced elevation, or point, on the surface of a tooth, more especially on the occlusal surface.

Cuspid. A tooth with one point, or cusp. There are four cuspids: one on either side in each jaw, situated at the corners of the mouth.

Deciduous teeth. The teeth of the child which are shed to give place to the permanent teeth. They are also called temporary teeth.

Dentine. The tissue of which the main body of a tooth is formed.

Developmental grooves. Fine depressed lines in the enamel of a tooth which mark the junction of its lobes. (See Pars. 21 and 69.)

Developmental lines. See developmental grooves.

Distal. Away from the median line of the face following the curve of the dental arch. The surface of a tooth most distant from the median line. (See Par. 5.)

Distally. A direction away from the median line of the face following the curve of the dental arch.

Distal angle. A contraction of disto-incisal angle. Used, also, instead of disto-bucco-occlusal angle (*q. v.*).

Disto-buccal angle. The angle formed by the union of the distal and buccal surfaces of the bicuspid and molars.

Disto-bucco-occlusal angle. The angle or corner of a bicuspid or molar tooth formed by the junction of the angles of its distal, buccal, and occlusal surfaces at a point.

Disto-incisal angle. The angle or corner of an incisor or cuspid tooth formed by the junction of the distal surface and cutting edge, or incisal surface.

Disto-labial angle. The angle formed by the union of the distal and labial surfaces of the incisors and cuspids.

Disto-lingual angle. The angle formed by the union of the distal and lingual surfaces of any of the teeth.

Disto-linguo-occlusal angle. The angle or corner of a bicuspid or molar tooth formed by the junction of the angles of its distal, lingual, and occlusal surfaces at a point. Rarely used.

Disto-occlusal angle. The angle formed by the union of the distal and occlusal surfaces of the bicuspid and molars.

Embrasure. An opening that widens outward or inward; as an opening in a wall for cannon. That portion of the inter-proximate space that widens toward the buccal or labial, or toward the lingual.

Enamel. A very hard tissue covering the crown of a tooth.

Fissure. A fault in the surface of a tooth caused by the imperfect joining of the enamel of the different lobes. Fissures occur along the lines of the developmental grooves.

Fossa. (Pl. Fossæ.) A round or angular depression in the surface of a tooth. Fossæ occur mostly in the occlusal surfaces of the molars, and in the lingual surfaces of the incisors.

Gingiva. (Pl. Gingivæ.) The portion of gum tissue enveloping the necks of the teeth crown-wise from the attachment at the gingival line. The free margin of the gum.

Gingival. Pertaining to the gingival line; as the curvature of the gingival line, gingival margin, etc.

Gingival curvature. The deviation of the gingival line from the horizontal in its course around the neck of a tooth.

Gingival line. The line around the neck of a tooth at which the gingiva is attached. The line of junction of the enamel and cementum.

Gingival margin. The portion of the crown of a tooth next to the gingival line.

Gingivally. A direction from any part of the crown toward the gingival line of the tooth.

Groove. A long-shaped depression in the surface of a tooth. (See Par. 11.)

Horn. A slender, or blunt pointed process of the pulp of a tooth extending toward the point of a cusp.

Incisal. The cutting edges of the incisors and cuspids are regarded as incisal surfaces.

Incisal margin. That margin of a surface of an incisor or a cuspid tooth formed by the incisal surface or cutting edge; as the incisal margin of the labial surface of the central incisor.

Incisor. A tooth with a cutting edge. There are four incisors in the upper jaw, and four in the lower jaw. They are called the upper and lower right and left central, and the upper and lower right and left lateral, incisors.

✓ **Inclination.** Of a tooth: The deviation of the long axis of a tooth from the perpendicular line; as the mesial inclination

of the incisors. (See Par. 191.) Of a surface: The deviation of a portion of the surface of a tooth from the general plane of that surface.

Incline. See Inclination.

Inter-proximate embrasure. That portion of the inter-proximate space which widens toward the buccal or labial, or toward the lingual. (See Par. 194.)

Inter-proximate space. The V-shaped space bounded by the proximate surfaces of adjoining teeth, and the border of the septum of the alveolar process between their necks. Normally this space is filled with gum tissue. (See Par. 193.)

Labial. Pertaining to the lips. Toward the lips. •

Labial surface. The surface of a tooth next to the lips. The incisors and cuspids have labial surfaces.

Labially. A direction toward the lips.

Labio-lingual. From the lips toward the tongue; as the labio-lingual diameter of the central incisor.

Labio-lingually. A direction from the lips toward the tongue.

Line angles. Of the teeth: Those angles formed by the junction of two surfaces along a line; as the mesio-buccal angle, disto-buccal angle, etc.

Lingual. Next to, or toward the tongue; as lingual surface.

Lingually. A direction toward the tongue.

Lingual surface. A surface of a tooth next to the tongue. All of the teeth have lingual surfaces.

Linguo-gingival fissure. A fissure occurring occasionally in the lingual surface of the upper incisors. It usually separates the lingual lobe from one of the marginal ridges and extends into the cementum. (See Fig. 10.)

Linguo-gingival ridge. A ridge near the gum on the lingual surface of the incisors and cuspids. It is on the lingual lobe. (See Par. 21.)

Lobe. A division of a tooth formed from a separate point of the beginning of calcification. (See Pars. 21 and 69.)

✓ **Mammelons.** The three rounded prominences seen on the cutting edges of the incisors when they first come through the gums. (E. Magitot.)

✓ **Marginal ridge.** The ridges, or elevations of enamel on the margins of the occlusal surface of the bicuspid and molars, and on the mesial and distal margins of the lingual surface of the incisors and cuspids.

Median line. The antero-posterior perpendicular central line of the body.

Mesial. Toward the median line. Those surfaces of the teeth which, as they stand in the arch, and following its curve, are toward the median line, are called mesial surfaces.

Mesial angle. A contraction of mesio-incisal angle, also of mesio-bucco-occlusal angle (*q. v.*).

Mesially. Toward the median line.

Mesio-buccal angle. The angle formed by the union of the mesial and buccal surfaces of the bicuspid and molars.

Mesio-bucco-occlusal angle. The angle or corner formed by the junction at a point of the angles of the mesial, buccal, and occlusal surfaces of the bicuspid and molars.

Mesio-distal. From mesial to distal; as, the mesio-distal diameter of the lower first molar.

Mesio-incisal angle. The angle or corner formed by the junction of the mesial surface and cutting edge, or incisal surface, in the incisors and cuspids.

Mesio-labial angle. The angle formed by the union of the mesial and labial surfaces of the incisors and cuspids.

Mesio-lingual angle. The angle formed by the union of the mesial and lingual surfaces of the teeth.

Mesio-lingual groove. A developmental groove running from the mesial surface diagonally to the lingual surface in upper first molars that have the fifth cusp. (See Par. 69.)

Mesio-linguo-occlusal angle. The angle or corner formed by the junction of the angles of the mesial, lingual, and occlusal surfaces of the bicuspid and molars. Rarely used.

Mesio-occlusal angle. The angle formed by the union of the mesial and occlusal surfaces of the bicuspid and molars.

Neck. That portion of the tooth which forms the junction of the crown and root.

Oblique ridge. A ridge running obliquely across the occlusal surface of the upper molars. It is formed by the union of the triangular ridge of the disto-buccal cusp with the distal portion of the ridge forming the mesio-lingual cusp.

Occlude. To shut. To close.

Occlusal surface. That surface of a bicuspid or molar tooth that makes contact with a tooth of the opposite jaw when the mouth is closed.

Permanent teeth. The teeth of adult age as distinguished from the temporary, or deciduous teeth.

Pit. A sharp, pointed depression in the enamel. Pits occur mostly where several developmental grooves join; as in the occlusal surfaces of the molars, and at the endings of the buccal grooves on the buccal surfaces of the molars.

Point angles. Of the teeth: Those corners or angles formed by the junction of the angles of three surfaces at a point; as the disto-bucco-occlusal angle, the mesio-bucco-occlusal angle, etc.

✓ **Point of proximate contact.** The point at which the proximate surface of a tooth touches the proximate surface of a neighboring tooth.

Proximate contact. The contact, or touching, of the proximate surfaces of neighboring teeth.

Proximation. The near approach, or contact, of the proximate surfaces of neighboring teeth.

Proximate surface. The surface of a tooth which lies next to another tooth. (See Par. 5.)

✓ **Pulp.** The soft tissue that fills the pulp chambers and root canals of the teeth.

Ridge. A long-shaped elevation on the surface of a tooth.

✓ **Root.** That portion of the tooth that is fixed in the bony walls of the alveolus, or socket; and is covered with cementum.



Root canal. The opening through the center of the long axis of the root of a tooth from the crown to the apex.

Rugæ. A series of irregular ridges in the roof of the mouth.

Septum. (Pl. Septa.) A partition: That portion of the alveolar process which lies between the roots of the teeth separating their alveoli.

Succedaneous teeth. Those of the permanent teeth which succeed, or take the places of, the temporary teeth.

Sulcate groove. A groove following the bottom of a sulcus.

Sulcus. (Pl. Sulci.) A notable long-shaped depression in the surface of a tooth the inclines of which meet at an angle. A sulcus has a developmental groove at the junction of its inclines.

Supplemental groove. A shallow long-shaped depression in the surface of a tooth, generally with a smoothly rounded bottom. Supplemental grooves differ from developmental grooves in that they do not mark the junction of lobes.

Supplemental lobe. A lobe that does not belong to the typical form of the tooth; an additional lobe.

Supplemental ridge. A ridge on the surface of a tooth that does not belong to the typical form of the tooth; an additional ridge.

Temporary teeth. See deciduous teeth.

Thick-necked. A tooth in which the mesio-distal diameter of the neck is nearly equal to that of the crown. (See bell-crowned.)

Thirds. Division of a crown of a tooth; as to length, into occlusal, or incisal third, middle third, and gingival third; as to mesio-distal breadth, into mesial third, middle third, and distal third.

Transverse ridge. A ridge formed of two triangular ridges, which join to form a continuous ridge across the occlusal surface of a tooth. *buried*