

A Biographical Portrait of Edward Hartley Angle, the First Specialist in Orthodontics, Part 2

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PART II

Edward Hartley Angle (1855–1930) had essential gifts of mechanical genius and dexterity, but these traits alone could not have brought him the status of singular greatness in the history of modern orthodontics. There were many other similarly talented individuals interested in “orthodontia” during the specialty’s early years. It was Angle’s bold, creative drive and his confident powers of persuasion in introducing new and simplifying devices, new methods, and new nomenclature that distinguished him from his peers, then and now.

THE WRITER

As a writer and speaker, Edward Angle was a precise wordsmith, a lecturer of great fluency, and a master at descriptive and colloquial speech (Figure 1). His letters contained within the Angle document archives (1899–1910) were spiced with sentences of rich humor and painterly narrative.^{1:37–38;2:35;3:196–197} He enjoyed using dialect^{1:751–753} and dry sarcastic wit^{1:25;2:123} to great effect in his letters, after the fashion of his revered contemporary, Mark Twain. By 1909, after his triumphant return to the East Coast as a moneyed celebrity in New York, Angle exuded proudly the prosperity he earned as the fruit of his labors—his orthodontic book-writing skills and appliance development ingenuity.^{3:305–306} He gleefully boasted to friends and colleagues about the unmitigated success of his brainchild: “Orthodontia is on the boom.”^{3:305}

Angle’s style of writing was largely verbal: his letters (and probably his speeches) were dictated to and tran-

scribed by his talented secretary (and later, second wife), Anna Hopkins. He was gifted with the turn of phrase, using colorful language in original ways, and often waxing effusively in a highly readable way.

Some observers have suggested that Anna deserved much of the credit for the high quality of Angle’s written record through her significant literary input during typing. There is absolutely no evidence to support this assertion, given the admirable consistency of Angle’s literary output, handwritten as well as typewritten, even during periods when Anna’s absence was known, such as when she was attending the College of Dentistry at the University of Iowa from 1900 to 1902. Angle’s letters to Anna are just as colorful and articulate as the rest of his correspondence.^{2:152–154}

However, Anna did provide valuable technical skills and judgment. She knew how to craft solid, well-spelled, grammatically correct text. She likely served as a trusted sounding board for her exuberant boss, and she surely must have woven some subtle corrections and softened phrases into his sometimes acerbic commentaries. Dr Angle often appended his own handwritten corrections, notes, or comments to the final typewritten letters. And to almost all addressees, including some close relatives, he hand-signed his letters boldly as “Edward H. Angle.” Only with old friends would he let go and sign a creative or diminutive nickname. At rare times during the 1899 to 1910 period, Anna would sign his letters in his absence. Her version of his signature is rather authentic looking, but still recognizably not his own.

For a period in 1901–1902, when Anna Hopkins was away at the University of Iowa studying for her dental degree, Angle’s correspondence was managed by his younger sister, Lillian, an accountant by occupation. The technical quality of the letters that “Lillie” attempted to transcribe during that time was noticeably weaker and Angle knew it. He had to apologize often to his correspondents for lateness and errors, and he resorted to handwritten corrections and appended notes more frequently.^{2:254}

Angle recognized that some of the commonplace vocabulary employed in orthodontia could be false or misleading. For example, the world of orthodontia that

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Figure 1. Edward H. Angle at his writing desk in his Pasadena, California home, mid-1920s.

Angle entered in the 1880s was one engaged primarily in “tooth regulation,” procedures and mechanisms geared to make crooked teeth less irregular. Hardly any attention was given by the patient or doctor to the role of occlusion or bite discrepancy in the etiology of tooth irregularities. Early on, Angle became convinced that anomalies of molar occlusion were prime factors in the origins of most orthodontic problems, including dental crowding. Thus, he took the bold step of popularizing the word “mal-occlusion” in the late 1890s, around the time he was creating his landmark work “Classification of Malocclusion.” Published in 1899, that article brought order out of chaos, simplicity from existing diagnostic complexity, transformations that Angle’s creative mind seemed particularly adept at seeing and doing. Quickly, he changed the title of his textbook from a prosaic “The Angle system of regulation and retention of the teeth . . .” (1890–1899) to the then ground-breaking concept, “Treatment of mal-occlusion of the teeth . . .” (1900, 6th edition).

Angle was a perfectionist whose painstaking exactness in his scientific thinking and writings became a hallmark of his lifetime of work in orthodontics. His detailed letters to managers and book editors of the SS White Dental Manufacturing Company show him as a polymath with a remarkable understanding of the tasks of typesetter, illustrator, and publisher.^{3:82–90} Angle edited his book six times over, modifying and adding to it every time, as his own expertise developed and progressed, turning what began as a 20-page article in 1887 into a 628-page text in 1907. He always seemed to be at work on an address, an illustrated presentation, or publication. He prepared by hand many of his intricate drawings and by 1900 had a library of over a thousand glass lantern-slides for projection. Besides his well-known textbook editions, Angle wrote around 80 articles for publication in various professional journals in the United States, Europe, and Australia be-

tween 1887 and his death in 1930.^{3:766–772} In addition, during his lifetime, close to 100 abstracts and commentaries about his work were published.^{3:772–775} Another 150 articles are recorded in the indexed scientific literature about Edward Angle and his legacy, and this number continues to grow.^{3:775–784}

In addition to his own writing, Angle’s letters show that he served enthusiastically as a mentor in scientific writing and editing, long before the era of peer review. He generously volunteered ideas and topics for former students and colleagues, including one of his first four students, Milton T. Watson,^{1:203–205} longtime friend William J. Brady,^{1:211} and brother-in-law/editor Cy Camp,^{2:240–241} who was essential in the final editing and proofing of the sixth edition (1900) of Angle’s textbook. Angle conscripted all of them and three other colleagues to write popular articles to increase public awareness of the young specialty of orthodontia in the first decade of the 20th century.^{2:214–216}

Minneapolis merchants Robert Foster and Otto Keidle remained close friends with the Angles from their formative years there. In the Angle letter archive from 1899 to 1910, “Bob and Otto” (also called “White Child and Baron”) received some of the most entertaining yarns and homespun dialects from an Edward Angle at his charmingly best.^{1:1–3} Angle, who no longer used his childhood name “Hart” with newly acquired friends, still often signed off humorously as “Rube” or “Reuben” or the like.^{2:294} In his well-written personal ramblings to friends, Angle’s broad and deep nonprofessional interests in people, poetry, literature, history, and the world came through clearly.^{1:103,151–152;2:232}

THE INVENTOR

Edward H. Angle’s correspondence and patents reveal features of the most dynamic side perhaps of this multidimensional man: the rapt and consummate inventor, a human wellspring of new ideas (Figure 2). During his lifetime, Angle applied for and received 45 patents (his wife Anna obtained his 46th patent in 1934, four years after his death). Most were appliances and instruments related to clinical orthodontics, but they included laboratory equipment and a novel automobile wheel. His contemporary role models were likely among the new breed of inventive, risk-taking industrialists, such as Thomas Edison, George Eastman, and Charles Kettering. America led the world by the beginning of the 20th century in technological innovation and entrepreneurship. In the first years of the 1900s, American medicine was ablaze with new light and directions for the medical and dental community. At Johns Hopkins University, William Osler initiated creative reforms in clinical education and single-handedly systematized the field of internal medicine. At

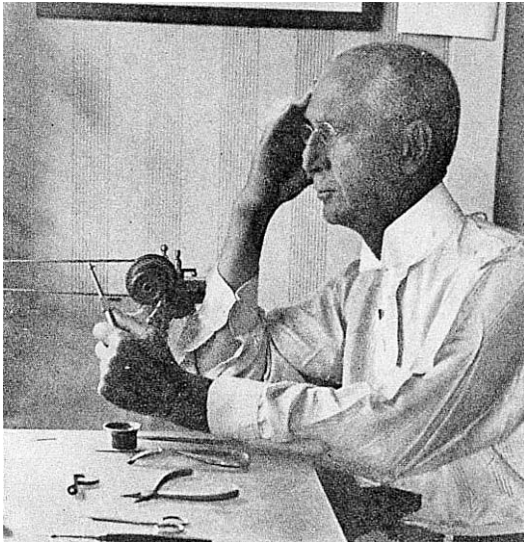


Figure 2. Dr Angle, the inventor, at his workbench in Pasadena, mid-1920s. There is evidence that he was ambidextrous in his prodigious mechanical skills.

Northwestern University, Greene Vardiman Black introduced the nomenclature of tooth anatomy and the modern principles and tools of operative dentistry.

Edward Angle's rationale for patenting his inventions was to take legal claim of his ideas and to protect his business interests.^{1:126–128;3:372} However, many of Angle's colleagues criticized him for the zeal with which he protected his breakthrough appliances and systems for doing "tooth regulation" and "orthodontia" more easily. Patent protection certainly makes sense in today's high-stakes environment of corporate espionage and intellectual property rights, but in Angle's time, patenting—particularly in medicine—was viewed in many circles as selfish and mercenary.

Angle's enthusiasm for advancing the materia technica of orthodontics was so strong that he freely mentored, encouraged, and worked with colleagues in their efforts to develop new appliances. This is seen in Angle's letters to Henry A. Baker of Boston in which he praises the "Baker method of anchorage"^{1:229} and later seeks to protect Baker's professional reputation as the first to use intermaxillary anchorage^{2:667–669,784} against equal claims made by Calvin S. Case of Chicago. It is also apparent in his letters to E. L. Townsend where he encourages Townsend to write and publish articles concerning Townsend's idea for a prosthetic bridge appliance.^{2:622} Angle worked cooperatively with several of his former students to develop orthodontic appliances and instruments: Jacob Lowe Young, Spencer R. Atkinson and Albert H. Ketcham each jointly held patent rights to one or more inventions with Angle.* Furthermore, trusting the biome-

chanical acumen of his former student Milton T. Watson, Angle asked him to try out competitors' orthodontic appliances and to conduct a comparative study and report back to Angle with his conclusions.^{2:279–280}

Angle, the enterprising innovator, worked and reworked designs to develop the best appliances. As President of the E. H. Angle Regulating Appliance Company, incorporated in St Louis in May 1907, he kept track of the work of other inventors active in the budding field of orthodontia and maintained a folder with relevant patents filed by others. Within the 11-year record of correspondence covered by the Angle letter archives, he relentlessly hounded those he perceived as idea stealers, patent infringers, and plagiarists—Drs. Clarence D. Lukens, James N. MacDowell, and Miland Knapp, and manufacturers Julius Aderer, Claudius Ash, and Blue Island Specialty Company. In anger, he slapped some with lawsuits and inflammatory defamations.

The age-old rule that brilliant inventors make poor business people did not apply to Edward H. Angle. He was in fact the consummate, confident businessman, maximizing income and minimizing expenses. Angle was a demanding taskmaster in his detailed letters to the machinists to whom he outsourced appliance manufacture at various times: William Hahn, the Hardinge brothers, and John E. Canning. They were required to fabricate his devices with tight tolerances and on tight budgets.† He held the SS White Dental Manufacturing Company, which by 1895 became the exclusive distributor of the Angle System, to a rigorous Angle-controlled business relationship. His detailed handwritten invoices from the "E. H. Angle Regulating Appliance Co" show his (and Anna's) arithmetic accuracy in billing to the penny, making a lie of his schoolboy reputation of being weak with numbers.

THE PROFESSIONAL

Dr Angle was an inspiring teacher and professional role model for his students. His patients saw him as a devoted, caring, and hard-working doctor. His acquaintances and friends viewed him as an upstanding citizen with personal magnetism and delightful wit (Figure 3a,b). He focused a large measure of his life to fostering and molding orthodontics as a self-standing specialty, a profession unto itself. The whole purpose of his Angle School of Orthodontia was to create a community of professionals locally, nationally, and internationally. As he expressed it, "Besides making this an ideal school for teaching this interesting science, I want it to be more than that. I want each class to be

* References 3:590–593, 608–615, 699–703.

† References 1:35, 71–73, 144–145; 3:407–408.

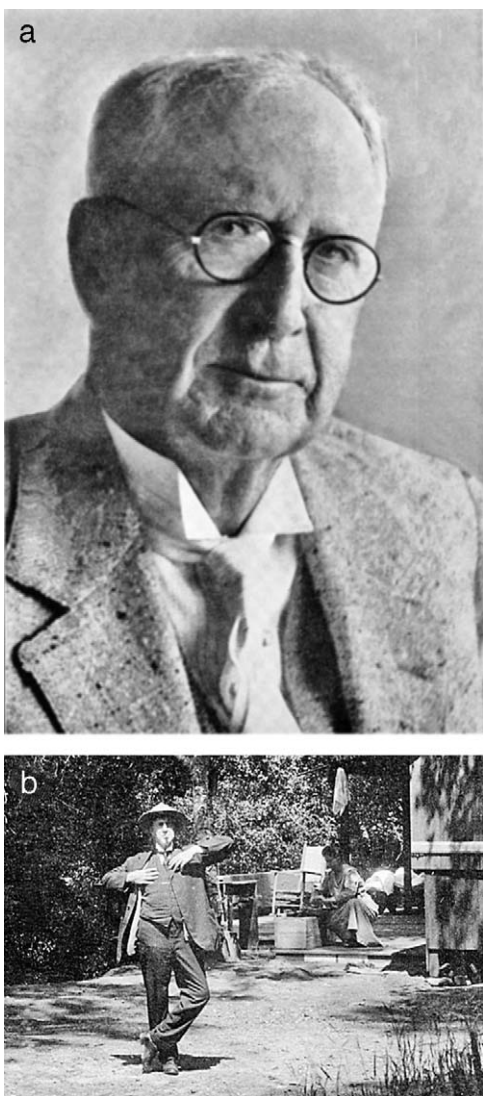


Figure 3. (a) Despite his somewhat austere look, always dressed in starched wing collar and tie (portrait photo, mid-1920s), Edward Angle's letters reveal him as a person of great sociability, charm, and wit. (b) Here, he clowns for the photographer at his cabin in the San Gabriel Mountains near Pasadena, while Anna prepares food in the background (1919).

a federation of friends and enthusiastic workers for the new science."^{2:288}

With unsurpassed content and style, and a growing network of influential former students touting his greatness, Edward H. Angle was in great demand as a lecturer. He was a passionate and informed speaker, and had descriptive visuals to project about orthodontia that most presenters did not have. His treatment approaches were ingenious for his time. Many of his ideas, such as the buccal tube and the "edgewise" mechanism, have survived the test of time and are still fresh and useful in everyday modern orthodontics. During his St Louis and New London years documented in his letter archive, he kept a full schedule of

speaking engagements and actually turned down many invitations to speak. Those lectures he wrote about are cited in the Angle Archives book under the subject index entry for "Speaking Engagements."^{3:815}

Angle was a mentor in the fullest sense of the word. He continued to provide direction and advice to his students long after they completed his course. He spent time writing friendly instructive letters particularly to some of his favorite early graduates, including Lloyd S. Lourie,^{2:321} Milton T. Watson,^{1:265–266} and Guilhermena Mendell.^{3:396} Several of his students (eg, Norman Reoch and Herbert Pullen) stayed on for a while after graduation to be Angle's office assistants, permitting more interaction and learning.^{1:320;2:689}

Encouraging letters with personal advice were exchanged with colleagues who did not graduate his course, but for whom he had a liking. For example, he had a rich correspondence mentoring two dentists whom he taught in the late 1890s at Marion-Sims College of Medicine in St Louis, and who spent some time in his office before the creation of the Angle School: Herman T. Spann^{2:38–39} in Germany and Arthur C. Edmonds^{1:208–210} in South Africa. Angle wrote supportive words even to former students who dropped out of his course for personal reasons, such as E. H. Stanley^{1:607} of Seattle, Washington. Perhaps his most tender counseling was the support and encouragement he gave his secretary Anna Hopkins to attend dental school, graduating from the University of Iowa in 1902.^{2:152–154} Afterward, she returned under Angle's wing as an informal student and teacher at all future sessions of the Angle School, although she never actually practiced dentistry or orthodontics. Their famous compatibility and years of teamwork blossomed into a lasting marriage in 1908.

Edward Angle, who raised his opinionated voice about so many things and people in his professional sphere, was surprisingly apolitical. Comments in his letters about current events, personalities, and world affairs were remarkably rare. Of the little we may deduce, he was a pacifist who avoided politics and detested imperialism.^{1:625–626}

His idealism about orthodontic education was anchored deeply in his bones. Angle was generous in giving free advice to inquiring doctors,^{2:396–398} and he proudly proclaimed that he "never received a farthing" directly off his school.^{3:432} That was indeed true. His altruism was partly driven by his perception that orthodontia needed a legion of trained practitioners in order to be recognized as a specialty. He also knew that the more orthodontists he trained to use his appliances, the better would be his chances for a lifetime annuity from appliance-sale royalties. Therefore, he taught many financially strapped students without charging them tuition.^{2:362,479;3:420} In 1902, he wrote of his dream

to run a free-of-charge school, for both student and patient.^{2:451} Twenty years later, in Pasadena, the Angle College of Orthodontia became his dream-come-true with complete financial support provided by his grateful alumni, many of whom remembered Angle's generosity to them when they most needed it.

Paradoxically, as much as Angle was a practicing idealist about access to education based on merit, he was intractably stuck in the 19th century on some professional issues of the day, such as fee-splitting and student decorum. Through 1908, his last days in St Louis before his retirement from the active practice of orthodontia, Angle routinely gave 20% of his specialist's fee to the referring general dentist as a commission. Thus, he wrote many short perfunctory letters to accompany his checks to the referring doctors. This kind of kickback scheme was standard practice in American medicine at the time, but the times were changing rapidly at the beginning of the 20th century. New graduates rejected fee-splitting practice as unethical, and soon it was completely outlawed. Early in the life of the new American Society of Orthodontists (ASO), this problem was confronted, to the dismay of Dr Angle and many of his older contemporaries who viewed the issue as trivial. Regarding the behavior of students, Angle demanded military-style obedience and agreement on the part of his Angle School students. Four of his students in 1906 questioned Angle's lectures to such a vocal extent that he expelled them all from his course. This matter became a cause célèbre at the ASO Board of Censors, who ultimately sided with one of the dismissed students (Hubert C. Visick) and prompted ASO founder Edward H. Angle to resign with characteristic 19th-century gravitas.^{3:342,505-507}

On the other hand, Angle showed a sympathetic, almost paternal concern for his patients.^{1:73-74,109-111,112-114} Some he tried to coax into better cooperation with well-chosen words in his letters. Others he gently or not-so-gently prodded because of missed appointments or nonpayment of account. He personally seemed to know much about each member of his family of patients. He enjoyed establishing some lasting doctor-patient relationships in which patients continued to correspond with Angle long after treatment and even after his retirement from practice.^{3:260-261}

SUMMATION

As a coda, can anything be presented about multifaceted Edward H. Angle—short of recommending perusal of his extensive papers published in the Angle Archives multi-volume sourcebook—to highlight further the persona and world of this legendary figure in the history of medicine? Today, almost 80 years after his death on August 11, 1930, those who knew Dr

Angle personally are deceased too. Through the inexorable progression of years, Edward Angle, like others of olden fame, has faded from being a familiar personality to being merely a recognizable name. Two illuminating tributes from close contemporaries offer personal reflections on the man.

One was written by Martin Dewey, DDS, MD, who stood among the most accomplished of Angle School graduates. It was published as his editorial for the first issue of *The International Journal of Orthodontia* in 1915, when Angle was approaching 60 years of age:

It is well known that Dr Edward H. Angle is the Nestor of orthodontia. To him, more than to any other individual, is this science indebted. His life has been spent nursing and developing it.

To practically every dentist today throughout the world, orthodontia is synonymous with Dr Angle's name. Few men have the privilege of living to see the child of their creation in science develop to that degree of efficiency which orthodontia now so rightly enjoys. Most pioneers in the field of science only find the trail; Dr Angle not only blazed the trail, but he today enjoys the rare pleasure of seeing this pathway trodden by the multitudes who seek information at this shrine.

All those who have had the privilege of intimate acquaintance with Dr Angle know how jealously he has guarded orthodontia. To keep it out of the hands of the incompetent and thus prevent it being besmirched by faulty results has been his one ambition. To this end he has constantly striven, constantly lifted his voice, and constantly cautioned his students throughout the length and breadth of the land.

The International Journal of Orthodontia in this, its initial number, pays a tribute of respect to the work of this great man. His ideals of service, of thoroughness, of care and attention to detail, perfect results, and devotion to one's work, will ever be its motto.

In the final analysis, Anna Hopkins Angle, DDS, may have given us the best simple characterization of Dr Angle. She knew this complex man better than anyone did. In 1932, two years after Angle's death, she submitted a solicited biographical sketch of her famous husband for *The National Cyclopædia of American Biography*. In addition to the requisite dates, places and happenings, she inserted three defining sentences that probably reflected how the Angles wished Edward Hartley Angle would be remembered. Her earnest words, understandably hagiographic, still express one of the most fitting tributes we may bestow on this extraordinary prime mover in the evolution of orthodontics:

Dr Angle was a thinker of vision and imagination and a lover of the beautiful in character, art, and nature. He was fond of children, literature, and outdoor life. He lived and worked intensely and gave always the best his mind and hand could evolve to advance the profession of which he was the founder and leader.

REFERENCE

Numbers in superscript in this article refer to related Angle letters (volume:page) as published in the comprehensive archival publication cited: Peck S, ed. *The World of Edward Hartley Angle, MD, DDS: His Letters, Accounts and Patents*. 4 Volumes. Boston, Mass: E.H. Angle Education and Research Foundation; 2007. ISBN 978-0-9779524-0-3; available on a nonprofit basis at angle@allenpress.com.