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HORATIO C WOOD, JR

1841—1920

A Biographical Memoir by
GEORGE B. ROTH

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Biographical Memoir

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Horatio C. Wood Jr

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January 13, 1841—January 3, 1920

BY GEORGE B. ROTH

One should bear in mind that even if science and the scientific spirit were better understood and more widely spread, still we should not be too pleased with ourselves. Science, however necessary it may be, is not sufficient, and it will become more and more insufficient as it increases. There was a time when science sprang up as it were in the shadow of wisdom, but it has grown so exuberantly that wisdom is choked—and that is really frightening. If the same development continued without compensation, science would end in turning against humanity.—George Sarton. Foreword to Bernard Jaffe's *Men of Science in America* (1944).

AMONG THE PIONEERS in American science who rose to prominence in the latter part of the nineteenth century was a versatile Pennsylvanian: physician-teacher-scientist, Horatio C Wood.¹

¹ His name appears in the *Dictionary of American Biography* as Horatio Charles, and in the *Dictionary of American Medical Biography* (Kelly and Burrage) as Horatio Curtis.

His son, Dr. Horatio Charles Wood, Jr., in a personal communication to the author of this memoir, stated that his middle name was not Curtis or Charles, but simply C, without a period. Dr. Wood's father had wanted his name to be Horatio Curtis, but his mother wanted it to be Horatio Charles; so they compromised on Horatio C and this often confused the publishers of his writings.

The necrological list of Fellows appearing in the *Transactions of the College of Physicians of Philadelphia* for 1920, prints his name as Horatio C Wood.

Dr. Wood himself was not consistent in the use of his signature, having enrolled in the University of Pennsylvania as Horatio C Wood, Jr. This signature was used in correspondence with his commanding officers during his Civil War experiences in the Medical Corps of the U. S. Army and also in certain of his letters to the Secretary of the Smithsonian Institution. Later in life, he used the signature Horatio C Wood, Sr., apparently due to a desire to avoid confusing his name with that of his distinguished son, Horatio C(harles) Wood, Jr.

Dr. Wood was a Philadelphian of Quaker lineage, who attained distinction not only in the field of biological science but also in the field of medical education and in the science and art of medicine. He was outstanding not only at home but in foreign centers of learning.

Dr. Wood was born in Philadelphia on January 13, 1841. His father, Horatio Curtis Wood, was one of a family of seven, one brother being the distinguished teacher-physician and author, Dr. George Bacon Wood, who closely identified himself with the life and mental development of his nephew, the subject of these memoirs. This family was descended from Richard Wood, who came to Philadelphia in 1682 from Bristol, England, and is said to have come over with William Penn, presumably on the "Welcome." The family and descendants of Richard Wood were members of the Society of Friends, embracing this faith until the time of Dr. Wood and his descendants, some of whom, including Dr. Wood, became affiliated with other religious denominations.

Dr. Wood's mother was Elizabeth Head, daughter of John Bacon of Philadelphia.

On May 10, 1866, Dr. Wood married Elizabeth H. Longacre of Philadelphia, the daughter of the chief coiner of the U. S. Mint at Philadelphia.

The early educational training of Dr. Wood began at home. At the age of four years he was sent to the Friends boarding school at Westtown, where he was the smallest boy among more than two hundred pupils. At this school he obtained not only book knowledge, but also discipline and the capacity for enduring punishment without flinching. One of his biographers, a Philadelphian who in later life became a colleague in the scientific field states that Dr. Wood's father, coming from stern Puritan stock, believed heartily in vigorous discipline for his son. Apparently the discipline thus received from his father and his early schooling contributed to the development of a receptive and reasoning mind. As a boy he spent his summers in the country, which engendered a love for the beauties of

nature as well as its mysteries, also for hunting, which afforded him relaxation from his active professional life.

For his later education he was sent to the Friends Select School in Philadelphia, which Dr. Wood said saved him from the herd-teaching of a university education. While here an ex-college professor, Joseph Aldrich, who won his respect, coached him beyond most of his colleagues in Latin, aided him in acquiring an adequate knowledge of Greek and mathematics, and gave him special instruction in the construction and derivation of the English language. His interest in natural science took a more serious turn at the age of thirteen, during a visit to the Philadelphia Academy of Natural Sciences Museum. The Director of the Museum, Professor Joseph Leidy, found him near the display cases, crying because of his inability to examine and study the specimens by handling them personally and to read the books in the Academy library. Sensing the boy's true interest, Dr. Leidy arranged that the contents of any case as well as library books should be made available to him for study, thus starting the lad on the quest which led to many diverse investigations.

Dr. Wood enrolled as a student of medicine in the University of Pennsylvania in the session of 1859-1860, his preceptor being Dr. J. E. Rhoads. At that time, for a student to graduate, the medical school required attendance upon two complete courses of lectures (over a two-year period), a graduation thesis, and the attainment of the age of twenty-one, the latter requirement accounting for the fact that Dr. Wood did not receive his degree in medicine until 1862. His graduation thesis was entitled "Enteric Fever."

His first paper of a scientific nature was one on botany, which he published in 1860, at the age of nineteen, while a student in the University of Pennsylvania. This paper was a report to the Philadelphia Academy of Natural Sciences on the carboniferous flora of the United States of America. A second paper on this subject appeared in the same year, followed by a third in 1866. The interim between the first and the third paper was occupied largely in earning his degree in medicine, serving internships in several hospitals, and serving

as Acting Assistant Surgeon in the Northern Army during the latter part of the Civil War. His last assignment in the Army was at Fairfax Seminary General Hospital, which was located near Alexandria, Virginia. This was a front-line hospital, where he saw the horrors of war at close range. After his discharge in 1866 he returned to Philadelphia to engage again in the practice of medicine.

Upon his return to civil life he supplemented his practice of medicine by serving his alma mater as a private teacher or quiz master in the medical school. It was not long until he was given the chair of botany in the Auxiliary Faculty of Medicine in the University, a position he held until 1876. In addition, in 1873 he was elected Clinical Lecturer in nervous diseases in the Medical School proper, advancing in 1875 to the position of Clinical Professor.

Dr. Wood's career in medicine was primarily as a consultant, his early years being devoted chiefly to neurology and psychiatry. However, his interest in botany did not abate during the earlier years of his devotion to science. His botanical publications from 1860 to 1877 numbered fourteen, one of which, containing 270 pages with 19 colored and uncolored plates describing the fresh water algae of the United States, was published by the Smithsonian Institution of Washington, D. C. In his introduction to this monograph he said: "Although beset with difficulties at the outset, no branch of natural science offers more attractions than the fresh water algae. The enthusiasm of the student will soon be kindled by the variety and beauty of their forms and wonderful life processes. They have been found in healthy life, in the middle of an icicle and in the heated waters of a boiling spring."

In 1876 he was made Professor of *Materia Medica* and Pharmacy to which title was added, in the following year, that of General Therapeutics. Dr. Wood was retired in 1907 because of ill health, receiving the title of *Emeritus Professor of Therapeutics*.

The famous remark of Dr. Oliver Wendell Holmes that the early medical teachers "occupied not a chair but a settee" was truly exemplified in the appointments of Dr. Wood.

Throughout the entire period of his active life he maintained an investigative attitude of mind, the culmination of which was the development of a text on therapeutics, based not upon usage but upon evidence obtained primarily in the experimental laboratory. Of his seven books relating to the broad field of medicine, the one which brought him both national and international fame was his *Treatise on Therapeutics* which appeared in 1874 and was dedicated to his uncle, George B. Wood. The twelfth edition of this work was published in 1905 shortly before his retirement. This book was a revolt against empiricism or, as he harshly put it, "clinical experience." His aim was "to make the physiological action of remedies the principal point in discussion," and not secondary as had been the custom in preceding works on therapeutics. In his introduction to the first edition he states: "Experience is said to be the mother of wisdom, verily she has been in medicine rather a blind leader of the blind."

A further quotation from his introduction to the first edition reveals the breadth of his therapeutic horizon and indeed makes him one of the medical prophets of the nineteenth century. It reads as follows: "A primary knowledge of the end to be accomplished and a secondary acquaintance with the instruments are a necessity for successful human effort; and until the sway of this law is acknowledged by physicians, medicine can never rise from the position of an empirical art to the dignity of applied science. Until within a comparatively recent period, it has been impossible to comply with this law. But, through the advances made by pathologists and by the students of the natural history of disease, we are fast learning the methods in which nature brings the body back to health."

The *Treatise* ushered in a new era in therapeutics and was adopted by most of the leading medical schools of this country. It was the principal American textbook in materia medica and therapeutics for about thirty years. One of this country's leading pharmacologists said that it had probably more influence than any other single book in this country in the origination of the idea of pharmacology as a distinct subject in the medical curriculum.

In Dr. Wood's earlier years, entomology as well as botany occupied his serious attention. From 1861 to 1869 he published over a dozen papers in this field of investigation. Most of these studies were reported in the *Proceedings of the Philadelphia Academy of Natural Sciences* or in the *Transactions of the American Philosophical Society*. His major studies in entomology were those on the North American myriapoda or centipedes. His monograph of 112 pages, entitled *The Myriapoda of North America*, was intended for and first accepted by the Smithsonian Institution, but while waiting its turn to be published the manuscript was destroyed by fire. The paper was subsequently rewritten but, as the funds for its publication by the Smithsonian had been depleted, it was, with the consent of the Institution, offered to and accepted by the American Philosophical Society for publication in the *Transactions*. This monograph on the myriapoda attracted the attention of Louis Agassiz who, upon returning from a collecting trip to Brazil, placed his entire collection of myriapoda at Dr. Wood's disposal for study and report.

In the field of medical education, especially in the latter part of the nineteenth century, Dr. Wood was aggressive in his reform attempts to bring the medical schools of the United States, and in particular the University of Pennsylvania, up to the standards set by a few of the American schools and those of the leading foreign schools. Writing upon this subject in *Lippincott's Magazine* for December, 1875, he said: "The methods of education pursued in this country, are at present singularly imperfect and the need of some control from without the profession is imperative."

Dr. Wood pointed out that at this time there were about 100 medical schools, whereas the natural demand should be for about a dozen. During 1874 in the German Empire with a population of about 42,000,000, there were 660 physicians licensed to practice medicine, whereas in the United States with a population of about 40,000,000, there were 3,000 graduates in medicine.

He urged that a thorough general education should precede the

study of medicine and that the technical and practical training in medicine should be in stages, namely, in botany and chemistry, then anatomy and physiology, to be followed by medicine and, finally, the clinical aspects of medicine, pursued both in theory and practice at the bedside.

He considered that a four-year course in medicine was the least time that should be required for graduation. This was a revolutionary idea, for at this time a large portion of students who had not received a solid year of training in medicine were entitled, with such limited training, to engage in the practice of medicine.

The interest and influence of Dr. Wood in the selection of members of the medical staff of which he was a member are shown by the following incident described by one of his colleagues. During the discussion of a successor to Dr. Alfred Stillé, who was retiring in 1884 from the Professorship of Medicine, Dr. Wood learned that Dr. William Osler, then of Montreal, was being considered for the vacancy. Although knowing of Dr. Osler's high attainments in his field, Dr. Wood, in the midst of a heavy schedule of duties, took time out to interview him in Montreal. On his return to Philadelphia, his report to his colleagues in Dr. Osler's behalf was so enthusiastic, and his presentation of Dr. Osler's qualifications so praiseworthy and convincing, that the result was the election of Dr. Osler to the Professorship of Medicine in the University of Pennsylvania.

Dr. Wood was a member of a number of scientific societies of high repute, among which were the American Physiological Society and the National Academy of Sciences. He was one of the five councilors of the former, chosen following the adoption of its constitution on December 30, 1887.

Howell, in his history of the first twenty-five years of the Society, wrote as follows: "The Society itself was fortunate in having among its original members, Mitchell (S. Weir), Wood (Horatio C), Welch (William), Osler (William), and Vaughan (V. C.), who were or soon became the acknowledged leaders of scientific medicine in this country." Howell further wrote: "Compared with similar organiza-

tions in science or medicine of the same period the Society set a relatively high standard of membership. The shibboleth demanded was research. There can be no doubt that the standard thus set and maintained has exerted a stimulating influence on research, not only in physiology but in other branches as well."

Dr. Wood was elected to membership in the National Academy of Sciences at the meeting held in Washington from April 15 to 18, 1879, in the rooms of the All Souls' Church. He was one of four to be so honored that year; the others were Cleveland Abbe, William G. Farlow, and Josiah Gibbs. Among those at this meeting who offered communications and were invited to take part in the scientific sessions of the Academy was Alexander Graham Bell, the title of his paper being "On Vowel Theories Considered in the Light of Recent Experiments with the Phonograph and Phonautograph." Bell was elected a member of the Academy in April, 1883.

Early in his career, Dr. Wood was offered professorships in the College of Physicians and Surgeons and in the Bellevue Hospital Medical School, both in New York City, but declined both offers. Later he was invited to become the Professor of Therapeutics in the Johns Hopkins University of Baltimore, and also to accept the Professorship of the Theory and Practice of Medicine in the Jefferson Medical College of Philadelphia, but again declined both, considering it best to be faithful to his alma mater. He was a firm believer in the influence of environment upon the success or failure of the individual, which may have led to his decisions to remain in Philadelphia. In this connection it should be recorded that his distinguished uncle, Dr. George B. Wood, an influential member of the medical faculty during and following Dr. Wood's student days, was one of the men whose advice Dr. Wood usually sought and respected highly.

Dr. Wood was an extensive contributor to medical literature. Three of his papers won prizes. The first (1869) was a special prize from the American Philosophical Society for his paper entitled "Research upon American Hemp" which has become a classic in the

literature of hemp (hashish). Two years later the Warren prize of the Massachusetts General Hospital was awarded to him for his "Experimental Researches in the Physiological Action of Amyl Nitrite," and in 1872 he received the Boylston prize for his paper on "Thermic Fever or Sunstroke."

Dr. Wood's studies on fever engaged his attention for many years, his interest perhaps having been fostered by his work on enteric fever, the subject of his thesis for graduation in medicine.

In 1875 he was invited to give the Toner Lecture, established in Washington, D. C., by Dr. Joseph M. Toner, a practicing physician in that city. This lectureship was placed in charge of a Board of Trustees, consisting of the Secretary of the Smithsonian Institution, the Surgeons General of the U. S. Army and the U. S. Navy, and the President of the Medical Society of the District of Columbia. The interest on the fund provided for this purpose was to be applied annually for an essay "relative to some new truth fully established by experiment and observation."

The invitation was accepted by Dr. Wood, whose essay was entitled "A Study of the Nature and Mechanism of Fever." It was published in the Miscellaneous Collections of the Smithsonian Institution in 1875.

This paper encouraged the Smithsonian Institution to assist Dr. Wood financially in further studies on fever, and in 1880 his later work in this field was reported in the Smithsonian's *Contributions to Knowledge* under the title of "Fever, a Study in Morbid and Normal Physiology."

Dr. Wood served as editor of the following medical journals: *New Remedies* (1870-1873), *Philadelphia Medical Times* (1873-1880), and *The Therapeutic Gazette* (1884-1890). He also edited the *U. S. Dispensatory* (still in existence) from 1883 to 1907, relinquishing the position shortly before his retirement from active work in the University of Pennsylvania School of Medicine.

When the English *Journal of Physiology* came into existence under the editorship of Michael Foster of Trinity College, Dr. Wood

was honored by being selected to be one of three Americans to act as co-editors, the other two being H. P. Bowditch of Boston and H. N. Martin of Baltimore. The first volume appeared in 1878-1879.

The honorary degree of Master of Arts was conferred upon Dr. Wood by Lafayette College in 1881 and he received its Doctor of Laws degree in 1883. He also received the honorary degree of Doctor of Laws from Yale University in 1889, and from the University of Pennsylvania in 1904. When the new Philadelphia General Hospital was completed, the members of its staff honored him by dedicating a ward to "Horatio C Wood, distinguished pharmacologist, therapist and clinician."

Dr. Wood was President of the College of Physicians of Philadelphia in 1902-1903, election to this office having occurred while he was on a trip to Egypt for his health. His first official address as President of the College of Physicians called attention to the need for an increase in the size of the building for the College if it were to prosper and its library be maintained. After four years of discussion, favorable decision to carry out his wishes in the matter was made, and a committee was appointed, among whom was S. Weir Mitchell, an adept in such matters. Sufficient funds, including a gift of \$100,000 from Mr. Andrew Carnegie, were soon obtained from members and friends.

Dr. Wood's connection with the U. S. Pharmacopoeia covered almost three decades, during two of which he served as President of the Convention, from 1890 to 1910. He considered the influence of the Pharmacopoeia upon medicine, through the establishment of standards for uniformity, especially for potent drugs, to be a most important one. This beneficial impact on medicine was fully appreciated by his colleagues and associates.

The Philadelphia *Public Ledger*, in its announcement of Dr. Wood's death, held that the crowning honor of his career came to him in 1902, when he was appointed to be a representative of the United States to the Brussels Conference, called by the Belgian Government for the unification of heroic remedies, the first en-

deavor to establish international standards for the definition and strength of the more important potent medicinal remedies in use throughout the world.

Dr. Wood was an ardent advocate of the use of animals as a preliminary step for ascertaining physiological functions and for determining the mode of action of drugs. He often appeared before state and federal committees to justify and explain his belief in their use. When he learned that certain members of the medical profession, who were inadequately informed, readily could be made to subscribe to the statements of opponents of animal experimentation, he answered one of his opponents as follows: "It is probable that no American believes in unrestricted vivisection; it is certain that 'unrestricted vivisection exists in most parts of the United States' is a falsehood. What the American physician contends for is that vivisection requires no special brand to be placed upon it; that the vivisectionist needs no other restriction than that placed upon all other members of the community by the general law. Every physiologist familiar with antivivisection literature knows that it is full of misstatements, so that this attempt to manufacture public opinion by the circulation of what should be called by the Saxon word 'lies' is concordant with the history of the past in warranting a strong suspicion that signatures to the document circulated . . . will not be honestly dealt with. I therefore suggest that the proper receptacle for the circulars is the waste-paper basket."

Dr. Wood's last public appearance was in June, 1904, the occasion being the formal opening of the new laboratories of physiology, pharmacology and pathology of the University of Pennsylvania. In 1906 his breakdown in health was so complete as to render him an invalid for his remaining years.

His last paper of scientific import was on the action of alcohol on the circulation, with Daniel M. Hoyt as the junior author. For this investigation he received financial aid from the National Academy of Sciences through the Bache Fund.

Dr. Wood's last public address was made in 1910, as retiring Presi-

dent of the United States Pharmacopoeial Convention. Because he was too ill to attend, the address was read by the secretary. Some excerpts follow: "Morituri Salutamus! From a sickbed the President of the United States Pharmacopoeial Convention of 1890-1900 salutes you and sends salutation to the men of the Convention of 1910, with a brief account of his stewardship during the last decade.

"Gentlemen of the Convention: In April, 1860, as a medical student, eighteen years of age, by finishing a paper on the carboniferous flora of the United States published in June by the Philadelphia Academy of Natural Sciences, I commenced my public scientific career; in April, 1910, with the writing of this address I close it. A half-century has passed, most of it spent in over-strenuous labor, so that the evil days spoken of by Solomon the Poet-King have come to me before the three-score and ten years have ended: and so I bid you farewell."

Dr. Wood's personal attributes were of the highest order, as may be gathered from the many tributes that were paid to him by his onetime students, colleagues, and other associates in their numerous memorial addresses honoring him. Many of these memorial addresses may be found in the *Transactions of the Philadelphia College of Physicians* for 1920, the year of his death.

Dr. F. X. Dercum described him as one "who possessed a unique and striking personality" who "made his presence instantly felt." "His face was strong and handsome, his voice full and round, his thoughts original. His language was vigorous and expressive . . . his personality, also, was one to inspire regard and affection. He had a group of devoted followers who from youth to maturity never faltered in their loyalty. . . . When we think of him, it will not only be of his scientific achievements, of his books and writings, but of his warm, his living, his inspiring personality."

Dr. Hobart A. Hare said of him: "He made his mark in medicine because he had visions of a coming dawn in medicine as a science, because he had the force and vigor, because he fought hard for the right whenever the opportunity arose . . . he filled young men with

enthusiasm and he taught them to think and by thinking to arrive at accurate deductions."

Dr. Wood's "Reminiscences," written after many years of suffering, gives one a clear insight into his guiding philosophy in life, which he describes as "Kindness and sympathy alike toward the highest-born and strongest, and toward the lowest and weakest."

In his early manhood he was very active in the Methodist church, in which he maintained an interest throughout life. His religious faith he summed up in these words: "The long bitter years of suffering have taught me to wish for speedy death, with the hope and faith that the sacrifice of Christ and the mercy of the Lord would bring me to Beatitude."

He had no fear of eternal punishment or death and could see no final fate in death other than "an escape from a life of suffering to an eternal sleep." "And so, striving during life to do the right as it is given us to see the right, may we go out with the cheery cry 'What of the night, brother, what of the night.'"

His death on January 3, 1920, in his eightieth year, resulted from pneumonia. He was buried in the city of his birth.

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KEY TO ABBREVIATIONS

- Am. J. Med. Sci.=American Journal of the Medical Sciences
 Am. J. Physiol.=American Journal of Physiology
 Am. J. Sci. Arts=American Journal of Science and Arts
 Boston Med. Surg. J.=Boston Medical and Surgical Journal
 J. Acad. Nat. Sci. Phila.=Journal of the Academy of Natural Sciences of Philadelphia.
 J. Am. Med. Assn.=Journal of the American Medical Association
 J. Nerv. Mental Dis.=Journal of Nervous and Mental Diseases
 J. Physiol.=Journal of Physiology
 Med. News=Medical News
 Phila. Med. J.=Philadelphia Medical Journal
 Phila. Med. Times=Philadelphia Medical Times
 Proc. Acad. Nat. Sci. Phila.=Proceedings of the Academy of Natural Sciences of Philadelphia
 Proc. Am. Phil. Soc.=Proceedings of the American Philosophical Society
 Smithsonian Contrib. to Knowledge=Smithsonian Contributions to Knowledge
 Smithsonian Misc. Coll.=Smithsonian Miscellaneous Collections
 Therap. Gaz.=Therapeutics Gazette
 Trans. Am. Phil. Soc.=Transactions of the American Philosophical Society
 Trans. Assn. Am. Physicians=Transactions of the Association of American Physicians
 Trans. Coll. Physicians Phila.=Transactions of the College of Physicians of Philadelphia
 Univ. Med. Mag. Phila.=University Medical Magazine of Philadelphia
 Univ. Pa. Med. Bull.=University of Pennsylvania Medical Bulletin

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