A revisionist history of American neurology

Neurology as a well organized and defined body of knowledge and a set of practices did not emerge at any precise time. Nor did it first come into being in any specific geographical context. Although many historians trace the intellectual history of neurology back to antiquity, it is noteworthy that the origins of the specialty in hospitals and universities can be located only in the mid-nineteenth century and afterwards, a fact that makes it difficult to identify the way neurological knowledge was systematically acquired before this period (McHenry, 1969; Dejong, 1982). Moreover, the inclusion of neurology as a discipline recognized within the medical profession in terms of autonomous hospital departments, university teaching and professional certification occurred only around the period of World War I (Magoun, 1975). Given these facts, it is surprising that whilst nineteenth-century neurology and earlier periods have received great historical scrutiny, historians have largely ignored the important inter-war and post-war periods (Dwyer, 2000). That is a circumstance now significantly adjusted by the publication of the two excellent works under consideration in this essay.

The formation of American neurology

Historians routinely associate the intellectual origins of American neurology with studies of wounded soldiers first conducted by Silas Weir Mitchell and William A. Hammond during the American Civil War. The work of these physicians and their contemporaries ushered in a period of heightened enthusiasm for studying ailments of the nervous system, especially among a small cadre of physicians working in the northeastern United States (Blustein, 1979).

As these physicians began elaborating a set of practices that would trigger the local emergence of modern neurology throughout North America, a simultaneous convergence of social, economic and intellectual forces in the commercial and industrial milieu of the post-bellum United States made the formation of clinical specialties increasingly acceptable to the medical profession and the public. Thus, within a few years of the conflict of 1861–65, specialist organizations devoted to the diagnosis and treatment of nervous conditions began to decorate the American medical landscape.

RAYMOND D. ADAMS: A LIFE OF MIND AND MUSCLE
By Robert Laureno
Oxford: Oxford University Press 2009
Price: £31.99 (Hard cover).

THE LEGACY OF TRACY J. PUTNAM AND H. HOUSTON MERITT: MODERN NEUROLOGY IN THE UNITED STATES
By Lewis P. Rowland
Oxford: Oxford University Press 2008
Price: £13.99 (Hard cover).

The Electro-Therapeutic Society, founded in New York in 1871, became in 1873 the New York Society of Neurology and Electroylo, the latter term referring to the therapeutic benefits then associated with electricity. This organization so closely mirrored its twin society, the New York Neurological Society (founded in 1872), that members of each believed: ‘there is but one society, and others, who attend the Neurological, suppose that they are attending the New York Society of Neurology and Electroylo’ (Beard, 1874). The practices and knowledge underpinning these two local organizations, the first of their kind anywhere in the world, were various and in the process
of formation. The American Neurological Association, organized a few years later in 1875, became the first national society of neurology in the world.

The formation of these organizations did not lead to broad enthusiasm for neurology amongst the wider medical community. Like their European counterparts, many established American physicians had little time for specialization. As one of the early American neurologists, George Beard, recalled, the New York Neurological Society had not been 'entirely successful' because the greater profession 'cared for none of these things' (Beard, 1874). Yet, carried forward largely by younger practitioners seeking economic stability through specialization, neurology, just as many other specialties, became evermore commonplace in the American scene (Weisz, 2006). The Boston Neurological Society, another example of the movement for American neurology, formed in 1880; and similar societies were established in other states, especially as the German influence spread through American medicine (Lanska et al., 2003).

By 1909, neurology had become so acceptable culturally that three physicians—Joseph Collins, Joseph Fraenkel and Pierce Bailey—successfully sought public philanthropy for the establishment of the Neurological Institute of New York. It became the first hospital for the care and treatment of patients with nervous conditions in North America and had centres only in London, Paris, Leipzig, Munich and Breslau as its international competitors (Riley, 1966).

Sources of resistance

This brief chronological survey of American neurology nevertheless is underwritten by certain social and economic realities. First, even as specialization became more commonplace by the end of World War I, American physicians never wholeheartedly or enthusiastically accepted the separation of neurology from what had come to be known, under the influence of Sir William Osler with formation of the Association of Physicians of Great Britain and Ireland in 1906, as 'internal medicine'. The Neurological Institute of New York, after a few successful years, fell upon hard times. Meanwhile, psychoanalysis and psychiatry enjoyed almost all of the popularity, prestige and patronage, while neurosurgery also increasingly competed for economic turf claimed for neurology (Gavrus, 2007). The American Neurological Association, limited in its membership, was unable to act as an effective lobbying organization or even an educational body. The American Board of Psychiatry and Neurology, established in 1935, did not begin giving separate designations in the two fields until 1948. University recognition of neurology was also limited. Even Johns Hopkins—a prominent and forward-looking medical school—had to fight internally and externally for neurology to be recognized as a necessary and beneficial academic discipline and clinical specialty (Casper, 2008).

The one exception was Harvard Medical School where, with the backing of Abraham Flexner and financial support from the Rockefeller Foundation’s General Education Board, a small independent department and training centre for neurology was established by 1930 at the Boston City Hospital. However, its first director, Stanley Cobb, was also a great admirer of psychoanalysis and psychiatry, and he sought to integrate psychiatry and neurology (White, 1984). Consequently, it fell to the many familiar figures of twentieth-century American neurology who worked with Cobb at the City Hospital to establish a new approach to neurological conditions. It was this new approach, unique to the inter-war period but by no means solely a product of the Boston school, which characterized the structure of modern neurology (Talley, 2008).

Three neurologists: a revisionist account of modern neurology

Lewis P. Rowland’s The Legacy of Tracy J. Putnam and H. Houston Merritt: Modern Neurology in the United States and Robert Laureno’s Raymond Adams: A Life of Mind and Muscle begin to tell this story. In so doing, both works shed an important and revisionist light on the period in which neurology underwent its greatest social and scientific advancements. Each work is fascinating and enjoyable, but because both authors rely on traditional biographical conventions to advance their arguments, the more general importance of their narratives may escape the reader’s attention.

The general narrative of Lewis Rowland’s highly readable book contrasts Tracy J. Putnam and H. Houston Merritt’s discovery of the anti-convulsant drug ‘Dilantin’ with a wider account of the emergence of twentieth-century American neurology. On their own, Putnam and Merritt warrant close historical attention, but their biographies complement Rowland’s general account and reveal many fascinating details about North American neurology in the inter-war years. Tracy J. Putnam (1894–1975), born the son of a physician in Boston, Massachusetts, could trace the lineage of his family back to the American Civil War. Rowland describes Putnam as typical of the Bostonian Brahmin caste. His famous uncle, James Jackson Putnam (1846–1918), had been appointed professor of the diseases of the nervous system, of electricity in nervous diseases. James Jackson Putnam had by 1893 become professor of the diseases of the nervous system, but he had retired by the time Tracy Putnam completed his undergraduate degree, and he was already dead when his nephew graduated from Harvard Medical School.

After Harvard, Tracy Putnam trained in pathology at Johns Hopkins (1920–21), held a surgery residency at Massachusetts General Hospital until 1923, and then studied neurosurgery with Harvey Cushing at the Peter Bent Brigham Hospital until 1924. Following a Wanderjahr in Amsterdam with Bernard Brouwer, Putnam joined Stanley Cobb’s neurology unit at the Boston City Hospital, where he developed joint expertise in neurosurgery and neurology. When Cobb moved in 1934 to become head of psychiatry at the Massachusetts General Hospital, the faculty at Boston City Hospital appointed Putnam as Chief of Neurology. Perhaps attracted by the even larger neurology service, Putnam moved to the New York Neurological Institute in 1939, where he became Director of Neurosurgery and Professor of Neurology at Columbia Medical School. For reasons probably
related to his principled stand against institutional anti-Semitism, Putnam found himself ousted from his directorship by 1947. He spent the remainder of his days practicing in Los Angeles, where he became interested in multiple sclerosis. Putnam died embittered by his treatment in New York, and it was for this reason that he was cool towards his one-time collaborator, ‘faithful Chef de Clinique’, and replacement at Columbia, H. Houston Merritt (Rowland, 2009, p. 9).

Hiram Houston Merritt (1902–79) (Fig. 1) differed in every way from Putnam. Born in Wilmington, North Carolina, of Methodist stock. Merritt’s father was manager for a local railroad company. A brilliant student, Merritt had first attended the University of North Carolina, but transferred to Vanderbilt University where he completed his undergraduate work, and by 1926 had graduated from medical school at Johns Hopkins. Following an internship at Yale, Merritt moved to the Boston City Hospital. He subsequently studied in Munich under Walther Spielmeyer, and in 1931 he returned to Boston and an appointment at Harvard Medical School, where he eventually became full professor.

Throughout the 1930s, Merritt retained his appointment at the Boston City Hospital. He and Putnam began their collaborative research on anti-convulsants around 1935. When Putnam left for New York, Merritt became the interim director of the neurology unit and would have become permanent director had Derek Denny-Brown not accepted the offer. Merritt left for Columbia Medical School in 1944, where after Putnam’s unceremonious removal he became director of the Neurology department, remaining there until 1970.

Merritt and Putnam began their collaboration in 1935, publishing seven papers together between 1937 and 1941. Bromides and phenobarbital were then the only pharmacological treatments available for treating epilepsy. Both had unpleasant hypnotic effects. Merritt and Putnam’s research aimed to alleviate these side effects while increasing anti-convulsant activity. Using an animal model of epilepsy, and examining 19 chemicals structurally similar to phenobarbital (provided by the pharmaceutical company Parke-Davis), Putnam and Merritt demonstrated that the palliative properties of phenobarbital were separable from their hypnotic ones. In their second paper, they reported that the most active substance—phenytoin—appeared highly anti-convulsant and less hypnotic than phenobarbital. They also demonstrated similar effects in epileptic patients, and ‘Dilantin’, the brand name for phenytoin, soon became the best anti-epileptic available. In many respects, their research was part of a broader shift in the ethos underlying drug development. But a wider discussion of the larger medical history context is absent from Rowland’s story, a fact also to be regretted in Robert Laureno’s otherwise excellent study of Putnam and Merritt’s contemporary, Raymond Adams. Indeed, by way of a brief aside, the absence of these general contextual details from many published histories of neurology, neuroscience, and neurosurgery has created significant obstacles for the wider recognition of the important roles these clinical and scientific fields have had during the twentieth century.

Raymond Adams (1911–2008) (Fig. 2), the subject of Robert Laureno’s oral history, was one of the most important American neurologists of the twentieth century. He possessed an almost complete knowledge of the neuropathology and neurophysiology of his day and used it to make original clinical contributions to neurology, psychiatry and psychology. His research touched on a variety of clinical research topics, most significantly diseases of muscle, nerves and liver. The textbook Adams completed in
1977 with Maurice Victor, *Principles of Neurology*, remains a classic. He was one of the first neurologists to consider developmental disabilities from a neurological and biochemical perspective. He reclaimed stroke as a neurological condition, insisted that clinicians view mental illness from that perspective as well, and drafted the first legal definition of ‘brain death’ in the United States. To his students, colleagues and rivals, Adams elaborated through his research and teaching a complex ‘monist’—the word is his—world view describing nervous function as encompassing ‘all diseases of the nervous system from the simplest disorder of muscle function to the most elaborate psychological derangement such as impaired memory, alertness and attention’ (Laurenzo, 2009, p. 151).

Through a comprehensive series of interviews, Robert Laurenzo reveals much about this important and complicated figure. Born in 1911 in Portland, Oregon, the son of a farmer and oil distributor, Raymond Adams grew up in modest middle-class circumstances. Following completion of his undergraduate degree in psychology from the University of Oregon in 1937, Adams matriculated at Duke University Medical School, where he was subsequently an intern and assistant resident in internal medicine. After receiving a fellowship from the Rockefeller Foundation in 1938, Adams became a resident in neurology at the Massachusetts General Hospital, where he met Stanley Cobb, who introduced Adams to psychoanalysis, a subject with which he quickly lost patience. In 1940, Adams continued his Rockefeller fellowship in psychiatry at Yale University working under Eugen Kahn and where he met such notable physiologists as John Fulton and Warren McCulloch. From 1941 until 1951, Adams was neurologist at Boston City Hospital, neuropathologist at the Mallory Institute of Pathology, and Assistant Professor of Neurology at Harvard Medical School. He eventually became Chief of the Neurological Service at Massachusetts General Hospital and, in 1954, Bullard Professor of Neuropathology at Harvard Medical School. He eventually became Chief of the Neurological Service at Massachusetts General Hospital and, in 1954, Bullard Professor of Neuropathology at Harvard Medical School, a position from which he retired in 1978. As noted above, the careers of Putnam, Merritt and Adams spanned an important period in the history of medicine. To understand how we can construe each as a representative of a new movement in neurology, it is necessary to place their biographies into a wider chronological context than is to be found in either of these works.

The study of nervous diseases in the nineteenth century was mainly a clinical and descriptive pursuit. While clinical medicine had benefitted from Rudolf Virchow’s cellular theory of pathology, and Louis Pasteur and Robert Koch’s theories of disease transmission, the value of those investigators’ discoveries for the study of the diseases of the nervous system was not immediately evident, save in a very few instances. Although some anatomical and physiological investigations—e.g. those of Charles Bell, Robert Bentley Todd, Marshall Hall, Paul Broca and David Ferrier—had already provided deeper insight into the multiple functions of the nervous system, the benefits of those endeavours did not fully manifest themselves until the late-nineteenth century. Then Santiago Ramón y Cajal’s use of histological techniques revealed that the nervous system is comprised of single cells; Charles Sherrington formulated the synapse theory; and Paul Ehrlich worked on cellular membrane biochemistry. Together, these pointed towards new directions for understanding nervous disease.

Amongst other neurologists, Putnam, Merritt and Adams seized upon these new concepts, providing one of the defining intellectual foundations of clinical neurology. And they were also influenced by novel histological approaches being pioneered by figures such as Walter Spielmeyer, Fritz Nissl and Oskar and Cecil Vogt, namely, the attempt to characterize in even more detail the histological architecture of the nervous system at the microscopic level. These studies eventually resulted in the publication of atlases depicting the anatomical organization of cells in the brain. Such histological and pathological approaches—and indeed Putnam, Merritt and Adams’s own research—would not have been possible but for another set of convergences, this time in industry, pharmacy and physiology (Goodman, 2000). Since the mid-nineteenth century, the textile industry had been reliant upon natural and synthetic dyes. These dyes soon proved useful also in histological research because they bind selectively to some tissues but not others. One implication of this observation was that the dyes contained components that could be targeted to specific organ systems, and some of those, it was believed, might possess therapeutic benefits. Consequently, throughout the late nineteenth and early twentieth century, many clinical researchers began isolating and purifying the biologically active components of those dyes.

As these industrial endeavours accelerated among pharmaceutical companies, the physiological principles of how they work generated general theories on how biological substances interact with the cell membrane (Stadler, 2009). Paul Ehrlich’s Nobel Prize winning research on side-chain theory was one example. Furthermore, by the 1920s, the purification and examination of hormones and enzymes had also begun, most famously in the Nobel Prize winning research on insulin conducted by Frederick Banting and Charles Best. Pharmaceutical companies like Pfizer, Burroughs-Wellcome, Lilly and Company and Parke-Davis were at the forefront of these developments. Putnam’s and Merritt’s work derived in part from the fervour surrounding such research and, in turn, contributed to that fervour in several important ways. Their separation of therapeutic properties from side effects must be seen in this context. This research was an important demonstration of the multiple types of biological activity possessed by large compounds. Putnam and Merritt indicated that the psychological and organic effects of compounds could be differentiated, a finding with ramifications for neurology and psychiatry, as well as pharmacy. Clinical research could remove the undesirable psychological effects of some drugs without jeopardizing their therapeutic potential. Moreover, certain chemicals could be isolated precisely for their psychological properties.

The study of neurological conditions fundamentally changed with these discoveries in pharmacy and pathology. There are, of course, exceptions to this claim, but the defining feature of clinical neurology prior to the inter-war period was that it offered insight into the larger physiological functions of the nervous system. In other words, clinical neurology—operating in a therapeutic void—was valuable mainly because of its ability to reveal physiological functions.
Raymond Adams, perhaps more so than Putnam and Merritt, combined pathological and physiological investigations with developments in synapse theory, immunology, and histology-driven anatomy. He insisted, for example, that his residents attend weekly conferences on neuropathology and microscopy (Laurenro, 2009, p. 71–81). This new approach to neurological diseases reformulated many clinical problems in terms such as problems of synaptic transmission, disease at the level of the cellular membrane, and demyelination. All implied novel potential chemical interventions, such as those conducted by Putnam and Merritt, for the treatment of neurological diseases. In many respects, modern neurology originated through this new conception of disease, not as a window on normal function, but as an entity in its own right and ripe for treatment.

The early work of figures like Putnam, Merritt and Adams changed the profile of neurology. By turning away from the holistic and clinical features of neurological lesions, and reformulating them in microscopic, biochemical and immunological terms, Adams and his contemporaries created the possibility for therapeutic intervention in nervous diseases in ways that had not previously existed. Putnam and Merritt’s work likewise rooted neurological treatment in a new clinical configuration and thus aided the subsequent rise of psychotropic medications, such as chlorpromazine. To use an old phrase from the history of science, such integration of multiple fields of knowledge led to a paradigm shift in clinical practice, and had profound implications for the subsequent organization and treatment of neurological and psychiatric patients in America and elsewhere.

**Conclusion**

Both Laurenro and Rowland’s works speak only slightly to these wider contexts. This oversight is more obvious in Laurenro’s book, which combines an extensive collection of interviews with only a few brief analytical essays. But Rowland’s otherwise valuable work suffers at times from similar limitations. The authors seem unaware of the restrictions that the conventions of biography place on historical analysis. They also become too adulatory at times. Like most biographers, it is clear that Rowland and Laurenro both believe that readers may learn something significant through pondering the life of great scientists. Yet, neither work sinks so far into hagiography as to become unreadable, and both provide extraordinary insights into the past. In venturing into the almost completely neglected terrain of inter-war and post-war American neurology, Laurenro and Rowland have given historians several clues as to how future analyses of neurology in this later period might proceed. That is a great service; these superb books are profoundly useful and important, and will be much enjoyed.

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**References**


