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SILAS WEIR MITCHELL

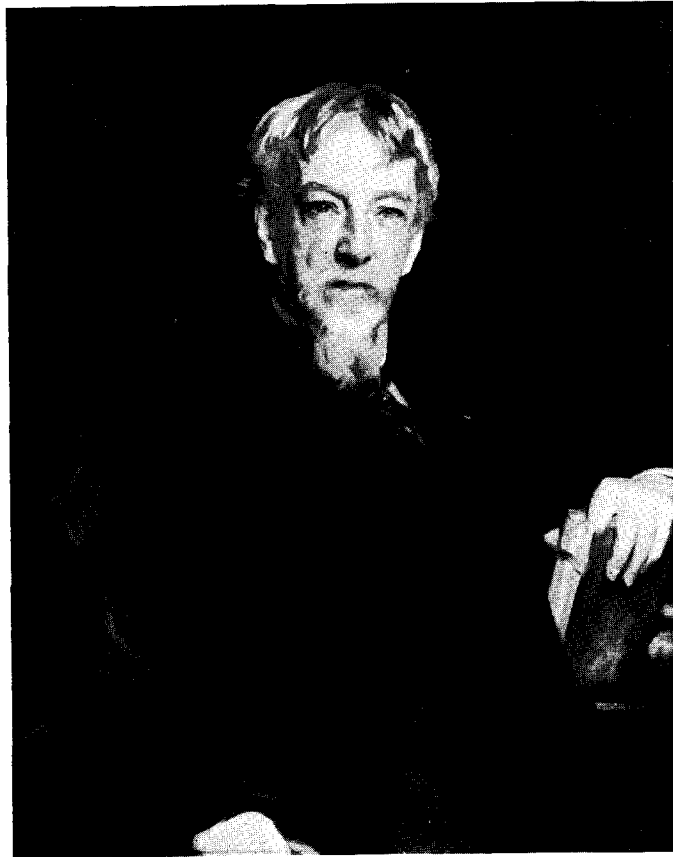
1829—1914

A Biographical Memoir by
PERCIVAL BAILEY

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Biographical Memoir

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S. Weir Mitchell

SILAS WEIR MITCHELL

February 15, 1829—January 4, 1914

BY PERCIVAL BAILEY

SILAS WEIR MITCHELL was born in Philadelphia on February 15, 1829. His father, John Kearsley Mitchell, was the son of a Scotch immigrant and his mother, Sarah Matilda Henry, was the daughter of a prosperous merchant with wealthy relatives in England who were later of great assistance to the family.

John Kearsley Mitchell was a physician with a successful practice and, as was customary in those days, if one wanted to be considered a leader in the profession, taught chemistry in the Philadelphia Medical Institute. He made some creditable contributions to osmosis and to the liquification and solidification of carbonic acid, and wrote an original dissertation on the neurotic spinal atrophies. He wrote poetry, some of which was praised by Edgar Allan Poe, and was much addicted to literary societies. He was also very fond of the out of doors. A cheerful, sociable person, he was universally liked. He drove himself unmercifully at his varied interests; his health failed early, and he died in 1858, just as Weir was trying to establish himself in practice.

Weir was the third of nine children, a noisy turbulent crew, who entered into all the activities of their father and became easily accustomed to the distinguished guests who frequented their home. They were very fond of their father, who could still their noise with a word.

A lanky, lackadaisical boy, dreamy and, later, diffident, Weir was usually to be found lying on his stomach reading anything that came

into his hands, but mostly fiction. His mother finally burned the *Arabian Nights* from despair that he would ever study as long as he could gain access to it. He was usually in trouble at the various schools which he attended. The masters in those days were rather brutal, and Weir tells how, years afterward, he could never meet one of them without terror. This life continued until he was sixteen, when he began to spit blood. His father then purchased a boat for him and encouraged him to spend more time out of doors.

Weir was slow in deciding on a vocation. His father suggested that he enter the mercantile life. His mother's cousin, a merchant in Manchester, England, proposed to take him into his firm and make him his heir, but died before the plan could be carried out. At last Weir decided to be a doctor, much to the disgust of his father, who remarked that he had brains enough but no industry. The outlook was not bright. After he had acquired the boat, he used to lie in it for hours, dreaming and writing poetry and tales.

Having made up his mind, he entered Jefferson Medical College. It was very hard for him, since he had not learned to study. He used to fall asleep over the books and had to drink much strong coffee in order to keep awake. Moreover, he loathed blood and fainted repeatedly at operations. He fell severely ill of jaundice and it was four years before he completed his medical studies, in 1850.

Meanwhile, the only subject which had interested him was physiology. He made up his mind to obtain a chair in one of the medical schools. Always rather smug and self-satisfied, he found it a great blow when he failed to obtain the post he coveted, in spite of his abilities, accomplishments, and undoubted political skill.

Although his father's health was failing, it was possible for Weir, with financial assistance from his mother's cousin, to go abroad for further study. After a brief stay in London he went on to Paris, then the Mecca of American physicians. Here he came under the spell of Claude Bernard, who made a remark which greatly influenced his later career. Weir had said that he thought something must be so.

“Why think,” replied Bernard, “when you can experiment? Exhaust experiment and then think.”

As soon as he entered the wards of the hospital, he caught smallpox and was very ill. His older sister Elizabeth came to Paris and took him on a trip to Italy to recuperate. His request to resume his interrupted studies in Paris was refused because of his father's decline in health, and he was obliged to return home and help his father with his practice. Although his father wanted him to become a surgeon, and Weir had taken courses in that subject in Paris, he found it distasteful and turned to internal medicine. He wanted to become an interne at the Pennsylvania Hospital, but was never accepted because his father had some dispute with the Trustees. He did some teaching, but was a poor lecturer. He applied for the chair of physiology at Jefferson, but failed to obtain it.

His talents and interests had been turned by Bernard toward experimentation, his principal interests being in the field of toxicology. When lecturing in the summer school on animal poisons, he had been intrigued by a remark of one of his auditors, W. A. Hammond, later Surgeon General of the Army, concerning an antidote for snake bite which he had heard of in Texas. While he was turning this over in his mind, a man came to his door with some rattlesnakes which he wished to sell. He immediately launched, with the assistance of Hammond and the advice of Edward T. Reichert, Professor of Physiology in the University of Pennsylvania, upon a long experimental study of snake venom, which taxed his strength and resources to their limits, since heavy family burdens had fallen onto his shoulders at the death of his father after a series of strokes. Their combined practice dropped off to a third of its former volume and picked up slowly. Fortunately, his English relatives came to his aid again and made a substantial allowance to the family for several years. This allowed him to marry Mary Middleton Elwyn, but for many years the burden which he carried was very heavy. Nevertheless, he tenaciously carried on his experimental studies, in spite of

the advice of his colleagues that a reputation as a scientist would harm his practice.

Busy with his experiments, his teaching, his practice, and his family responsibilities, the years passed by until 1862. His reputation grew. He was made an honorary corresponding member of the British Medical Society. His researches on the venom of the rattlesnake attracted much attention abroad, and Oliver Wendell Holmes sent him a copy of *Elsie Venner* with the remark that it might interest him because it was a little bit rattlesnaky. His responsibilities had sobered him; he got his irascible temper under control; he developed an affability tempered by a certain austerity. He made many friends—Hammond, Billings, Keen, Da Costa, Phillips Brooks—and his life had begun to run in the smooth groove of a successful practitioner when John Brown's Raid led him into an experience which was to color his entire subsequent existence. About this time his wife died of diphtheria and, although his mother and his sister Elizabeth took over the care of his family, he was very lonely and plunged desperately into the work of the army.

Because of his heavy family responsibilities, he did not become a surgeon with the army, but took charge of the Turner's Lane Military Hospital near Philadelphia in which, because of his interest, the Surgeon General concentrated all of the injuries of nerves. These cases Weir studied assiduously with W. W. Keen and Morehouse. Together with his growing practice, these clinical responsibilities took all his time and energy. His experimental studies ceased, but he interested a young Japanese physician named Noguchi in them and continued to devote interest and financial support to the study of animal poisons.

The results of this study of wounds of the peripheral nerves were embodied in a monograph written with Keen and Morehouse, which remained the classic on the subject until the First World War. Mitchell wrote many other articles and pamphlets of permanent value on his experiences with lesions of the nervous system, of which might be mentioned his description of a painful syndrome which he

named causalgia. These studies permanently altered the nature of his medical practice. He became a consultant in nervous diseases, the most eminent and probably the greatest that this country has produced. In the postwar period his reputation became world-wide; he was made an honorary or corresponding member of many foreign societies. He was happy with the respect of his colleagues and friends until, in 1872, his mother died, followed two years later by his sister Elizabeth. He could not tolerate the loneliness. In 1875 he married Mary Cadwalader. She proved a perfect helpmate, and their daughter added the patter of little feet to his household.

As his practice grew, he had a great number of patients who suffered from "nerves" but had no organic lesions of their nervous systems. In the rapid expansion of the economy following the war, many patients, especially women, found themselves with much money, but without the talents to find occupations for themselves. Mitchell became very much interested in them and in what might be done for them.

This led him into two lines of endeavor: serious scientific studies of neurotic patients, and literary portrayals of their characters. From boyhood he had been, like his father, interested in writing but, except for anonymous poetry, had held this desire in check, on the advice of his friends that a reputation as a writer would injure his practice. Now he felt sufficiently secure to indulge openly in this passion. The result was a series of seventeen novels which, whatever their merit as literature, contain vivid pictures of pathological characters. One of them, *Hugh Wynne, Free Quaker*, has for long been considered the most accurate picture ever written of Philadelphia at the time of the Revolution, and is standard reading in American literature courses. Its historical accuracy has been abundantly proven.

For the understanding of neurotic patients, Weir Mitchell had serious handicaps. He was a patrician, with all the prejudices and inhibitions of that status in a Quaker environment. His studies give the impression today of being quite superficial. However, for their time they were useful. His rest cure became very popular throughout

the world and his books *Wear and Tear* and *Fat and Blood* went through many editions. His main contribution, perhaps, was to persuade physicians to give up treating these conditions with drugs. He demonstrated that better results could be obtained by nonmedicinal treatments, such as rest, isolation, overfeeding, and massage. Of course, he was accused of being a charlatan, especially since his practice increased by leaps and bounds.

In spite of criticism, Mitchell continued upon his way. His prestige, coupled with a certain arrogance and lack of humor, enabled him to get many things done which were to the advantage of medicine. He tangled with the Catholic Church, but was able to force the sisters to wear suitable dress in the operating room. He harassed his colleagues until he got a new building for the College of Physicians. He was instrumental in establishing the Franklin Club. He served for many years as a trustee of the University of Pennsylvania.

His literary pursuits brought him many friends—notably Oliver Wendell Holmes, James Russell Lowell, and William Osler. He was given honorary degrees by Harvard, Edinburgh, Princeton, and Toronto. He was commissioned to represent the Smithsonian Institution and the National Academy of Sciences (to which he had been elected in 1865) at the Eight Hundredth Anniversary of the University of Bologna. His summers he spent at Little Boar's Head on the Maine coast, with frequent fishing forays farther afield. Secure in his fame, his practice, his family, and his friends, he reached nearly the end of the nineteenth century when, in 1898, fate struck him a heavy blow. His daughter died of the same disease which had taken his first wife.

Mitchell continued to work, to write, and to live much as before, but the zest of life was gone. He became somewhat irritable, dictatorial, and dogmatic. His trials were increased in 1906 when a large trust company, of which he was a director, failed. To repair the damage he pledged a large part of his fortune. He was much encouraged during this period by the faithfulness of his friends. Also, his son, an able physician, remained by his side, refusing the offers of

responsible positions elsewhere. Mitchell's eightieth birthday was happily celebrated. More honors were showered upon him and then, swiftly, came the end. He fell ill of influenza and died on January 4, 1914.

Knowing how deeply the tragedy of the Civil War had affected him, one can only rejoice that he was spared the agony of the First World War. With him passed a gracious epoch in the history of our country, of which he is a principal ornament.

KEY TO ABBREVIATIONS

- Am. J. M. Sc.=American Journal of the Medical Sciences
 Am. J. Nursing=American Journal of Nursing
 Am. Med.=American Medicine
 Arch. Scient. & Pract. Med.=Archives of Scientific and Practical Medicine
 Atlan.=Atlantic Monthly
 Boston M. & S. J.=Boston Medical and Surgical Journal
 Brain=Brain, a Journal of Neurology
 Brit. M. J.=British Medical Journal
 Bull. M. & Chir. Fac. Maryland=Bulletin of the Medical and Chirurgical Faculty of Maryland
 Cent.=Century Magazine
 Charleston M. J. & Rev.=Charleston Medical Journal and Review
 Chicago M. Rev.=Chicago Medical Review
 Internat. Clin.=International Clinics
 J. A. M. A.=Journal of the American Medical Association
 J. Nerv. & Ment. Dis.=Journal of Nervous and Mental Disease
 Lipp. Mag.=Lippincott's Magazine
 M. & S. Rep.=Medical and Surgical Reporter
 M. News=Medical News
 M. News & Abstr.=Medical News and Abstract
 M. Rec.=Medical Record
 Med. Contemp.=A Medicina Contemporânea (Lisbon)
 New York M. J.=New York Medical Journal
 No. Am. M. Chir. Rev.=North American Medico-Chirurgical Review
 Philadelphia M. J.=Philadelphia Medical Journal
 Philadelphia M. Times=Philadelphia Medical Times
 Proc. Biol. Dept. Acad. Natur. Sc.=Proceedings of the Biological Department of the Academy of Natural Sciences
 Therap. Gaz.=Therapeutic Gazette
 Tr. A. Am. Physicians=Transactions of the Association of American Physicians
 Tr. Am. Neurol. A.=Transactions of the American Neurological Association
 Tr. Coll. Physicians Philadelphia=Transactions of the College of Physicians of Philadelphia
 Tr. M. & Chir. Fac. Maryland=Transactions of the Medical and Chirurgical Faculty of Maryland
 Univ. M. Mag.=University Medical Magazine

SCIENTIFIC BIBLIOGRAPHY

1852

- Observations on the Generation of Uric Acid, and Its Crystalline Forms.
 Am. J. M. Sc., n.s., 24:121-25.

1854

The Relations of the Pulse to Certain States of Respiration. *Am. J. M. Sc.*, n.s., 27:387-98.

1855

A Case of Vicarious Secretion of Milk. *Am. J. M. Sc.*, n.s., 30:83-85.

1858

Observations on the Blood Crystals of the Sturgeon. *Proc. Biol. Dept. Acad. Natur. Sc.*, Philadelphia, March, 1858, pp. 2-4.

On the Inhalation of Cinchonia and Its Salts. *Proc. Biol. Dept. Acad. Natur. Sc.*, Philadelphia, December, 1858, pp. 21-23.

Report on the Progress of Physiology and Anatomy. *No. Am. M. Chir. Rev.*, 2:105-31.

1859

With W. A. Hammond. An Experimental Examination of the Toxicological Effects of Sassy Bark, The Ordeal Poison of the Western Coast of Africa. *Charleston M. J. & Rev.*, 14:721-40.

With W. A. Hammond. Experimental Researches Relative to Corroval and Vao—Two New Varieties of Woorara, the South American Arrow Poison. *Am. J. M. Sc.*, n.s., 38:13-60.

Notes upon the Effect of Alcohol, Glycerine, Water, Gum, Ammonia, and the Vacuum upon the Exposed Hearts of Frogs, Snapping-Turtles, and Sturgeons. *Am. J. M. Sc.*, n.s., 37:343-48.

Improved Spirometer. *Am. J. M. Sc.*, n.s., 37:378-79.

1860

On the Production of Cataract in Frogs by the Administration of Sugar. *Am. J. M. Sc.*, n.s., 39:106-10.

Researches upon the Venom of the Rattlesnake, with an Investigation of the Anatomy and Physiology of the Organs Concerned. In: *Smithsonian Contributions to Knowledge*, Vol. XII (Washington, D. C., Smithsonian Institution), pp. 1-145.

1861

On the Treatment of Rattlesnake Bites, with Experimental Criticisms upon the Various Remedies Now in Use. *No. Am. M. Chir. Rev.*, 5:269-311.

1862

Experiments and Observations upon the Circulation in the Snapping Turtle, *Chelonura Serpentina*, with Especial Reference to the Pressure of the Blood in the Arteries and Veins. Philadelphia, C. Sherman & Son. 14 pp.

1863

A Case of Protracted Sleep. Tr. Coll. Physicians Philadelphia, n.s., 3:37-44. With G. R. Morehouse. Researches upon the Anatomy and Physiology of Respiration in the Chelonia. In: *Smithsonian Contributions to Knowledge*, Vol. XIII (Washington, D. C., Smithsonian Institution), pp. 1-42.

1864

With G. R. Morehouse and W. W. Keen. Gunshot Wounds and Other Injuries of Nerves. Philadelphia, Lippincott. 164 pp.
 Inquiry into the Correctness of the Belief that Prof. Bibron Was the Inventor of the Antidote Which Bears His Name. *Am. J. M. Sc.*, n.s., 48:420-22.
 With W. W. Keen and G. R. Morehouse. On Malingering, Especially in Regard to Simulation of Diseases of the Nervous System. *Am. J. M. Sc.*, n.s., 48:367-94.
 With G. R. Morehouse and W. W. Keen. Reflex Paralysis, the Result of Gunshot Wounds, Founded Chiefly upon Cases Observed in the United States General Hospital, Christian Street, Philadelphia. Surgeon-General's Office Circular, no. 6 (March). Washington, D. C., Surgeon-General's Office. 17 pp.

1865

Arsenical Albuminuria. *New York M. J.*, 1:169-74.
 With W. W. Keen and G. R. Morehouse. On the Antagonism of Atropia and Morphia, Founded upon Observations and Experiments Made at the U.S.A. Hospital for Injuries and Diseases of the Nervous System. *Am. J. M. Sc.*, n.s., 50:67-76.

1866

The Case of George Dedlow. *Atlan.*, 18:1-11.
 Paralysis from Peripheral Irritation, with Reports of Cases. *New York M. J.*, 2:321-55; 401-23.

1867

- Fibroid Thickening of Pyloric Half of Stomach, Peritoneal Ulcers, etc.
Am. J. M. Sc., n.s., 53:436-38.
- On Retrogressive Motions in Birds Produced by the Application of Cold
to the Cervical Spine, with Remarks on the Use of that Agent as an
Aid in Physiological Investigations. Am. J. M. Sc., n.s., 53:102-16.

1868

- Experimental Contributions to the Toxicology of Rattlesnake Venom.
New York M. J., 6:289-322.
- Microscopical Examination. Tr. Coll. Physicians Philadelphia, n.s., 4:224-
28.
- On the Production of Reflex Spasms and Paralysis in Birds by the Appli-
cation of Cold to Definite Regions of the Skin. Am. J. M. Sc., n.s., 55:
25-31.

1869

- Acute Pericarditis. Am. J. M. Sc., n.s., 58:439.
- On Certain Forms of Neuralgia Accompanied with Muscular Spasms and
Extravasations of Blood, and on Purpura as a Neurosis. Am. J. M. Sc.,
n.s., 58:116-22.
- On the Insusceptibility of Pigeons to the Toxic Action of Opium. Am.
J. M. Sc., n.s., 57:37-38.
- Researches on the Physiology of the Cerebellum. Am. J. M. Sc., 57:320-38.

1870

- Observations on Poisoning with Rattlesnake Venom. With Microscopical
Notes by J. G. Richardson. Am. J. M. Sc., n.s., 59:317-23.
- On the Effect of Opium and Its Derivative Alkaloids. Am. J. M. Sc., n.s.,
59:17-33.
- On the Use of Bromide of Lithium. Am. J. M. Sc., n.s., 60:443-45.
- Ulceration of the Skin as an Effect of the Use of Bromides. Tr. Coll.
Physicians Philadelphia, n.s., 4:347-50.

1871

- On the Growth of the Nails as a Prognostic Indication in Cerebral
Paralysis. Am. J. M. Sc., n.s., 61:420-22.
- Phantom Limbs. Lipp. Mag., 8:563-69.
- Wear and Tear, or Hints for the Overworked. Philadelphia, Lippincott.
59 pp.

1872

Injuries of Nerves and Their Consequences. Philadelphia, Lippincott.
377 pp.

1873

With W. Thomson. Cases Illustrative of the Use of the Ophthalmoscope
in the Diagnosis of Intra-cranial Lesions. *Am. J. M. Sc.*, n.s., 66:91-105.
The Influence of Nerve Lesions upon Temperature, as Illustrating the
Mode in Which Nerves Act to Control Thermal Conditions. *Arch.*
Scient. & Pract. Med., 1:351-53.
The Influence of Rest in Locomotor Ataxia. *Am. J. M. Sc.*, n.s., 66:113-15.

1874

Des Lésions des Nerfs et de leurs Conséquences, tr. by M. Dastre. Paris,
Masson. xlviii + 408 pp.
On the Use of Bromide of Lithium. *Tr. Coll. Physicians Philadelphia*,
n.s., 4:350-52.
Traumatic Neuralgia; Section of Median Nerve. *Am. J. M. Sc.*, n.s.,
68:17-29.

1875

Notes on Headaches of Adolescence and the Decline of Life. *M. & S. Rep.*,
32:101-4.
On Rest in the Treatment of Nervous Disease. In: *A Series of American*
Clinical Lectures, Vol. 1, ed. by E. C. Seguin (New York, Putnam),
pp. 83-102.
Spinal Arthropathies. *Am. J. M. Sc.*, n.s., 59:339-48.

1876

Cases Illustrating Local Injuries of Nerves and Their Trophic Conse-
quences, with Comments. *Tr. Coll. Physicians Philadelphia*, s.3,
2:115-38.
Headaches from Eye Strain. *Am. J. M. Sc.*, n.s., 71:363-73.
Neurotomy. With an Examination of the Regenerated Nerves, and Notes
upon Neural Repair, by R. M. Bertolet. *Am. J. M. Sc.*, n.s., 71:321-34.
On Functional Spasms. *Am. J. M. Sc.*, n.s., 72:321-33.

1877

The Annual Oration. *Tr. M. & Chir. Fac. Maryland*, 79th Annual Session,
April, 1877, pp. 51-68.

- Fat and Blood, and How to Make Them. Philadelphia, Lippincott. 101 pp.
 On the Transmission of Electric Influence across the Middle Line of the
 Body. *Tr. Am. Neurol. A.*, 2:196-200.
 The Relations of Pain to Weather, Being a Study of the Natural History
 of a Case of Traumatic Neuralgia. *Am. J. M. Sc.*, n.s., 73:305-29.

1878

- Address Dedicatory of the New Buildings Erected by the University of
 Pennsylvania for Its Dental School and Medical Laboratories. Phila-
 delphia, Lippincott. 16 pp.
 Fat and Blood and How to Make Them. 2nd ed. Philadelphia, Lippincott.
 109 pp.
 On a Rare Vaso-Motor Neurosis of the Extremities and on the Maladies
 with Which It May Be Confounded. *Am. J. M. Sc.*, n.s., 76:17-36.
 Some of the Lessons of Neurotomy. *Brain*, 1:287-303.

1879

- Clinical Observations upon Paralysis Following Typhoid Fever; Pseudo-
 Hypertrophic Muscular Palsy; Amyotrophic Unilateral Spinal Sclerosis;
 and other cases at the Orthopaedic Hospital, Philadelphia. Boston M. &
 S. J., 100:245-51.
 The Cremaster-Reflex. *J. Nerv. & Ment. Dis.*, n.s., 2:577-86.
 Orthopaedic Hospital, Philadelphia: Cases, with Clinical Remarks. Boston
 M. & S. J., 100:444-48.
 Spasmodic Disorders of the Legs. *M. Rec.*, 15:601-5.

1880

- Clinical Notes on Duchenne's Disease. Philadelphia M. Times, 10:419-25.
 Neurasthenia, Hysteria, and Their Treatment. Chicago M. Rev., 1:155.
 The True and False Palsies of Hysteria. *M. News & Abstr.*, 38:65-71;
 129-36.

1881

- Lectures on Diseases of the Nervous System, Especially in Women. Phila-
 delphia, H. C. Lea's Son & Co. xii + 238 pp.

1882

- Clinical Remarks on Facial Neuralgia, Treated by Neurectomy. *M. News*,
 40:257-59.

Clinical Remarks on Musculo-Spiral Paralysis. Delivered at the Orthopedic Hospital and Infirmary for Nervous Diseases, Philadelphia. *M. News*, 40:288-89.

1883

Cases of Lesions of Peripheral Nerve-Trunks, with Commentaries. *Am. J. M. Sc.*, n.s., 86:17-31.

Du traitement méthodique de la neurasthénie et de quelques formes d'hystérie, tr. by Oscar Jennings. Paris, Berthier. lx+172 pp.

Nevralgia do Nervo Maxillar Inferior; Secção do Nervo; Recidivia; Segunda Secção o Obturação do Canal com Cimento Dentario. *Med. Contemp.*, 1:331.

With E. T. Reichert. A Partial Study of the Poison of *Heloderma Suspectum* (Cope)—the Gila Monster. *Tr. Coll. Physicians Philadelphia*, s.3, 6:255-66.

With E. T. Reichert. Preliminary Report on the Venoms of Serpents. *M. News*, 42:469-72.

Remarks upon Some Recent Investigations on the Venom of Serpents. *Lancet*, 2:94.

1884

Case of Erythromelalgia. *J. Nerv. & Ment. Dis.*, n.s., 9:638-41.

Fat and Blood: An Essay on the Treatment of Certain Forms of Neurasthenia and Hysteria. 3rd ed. Philadelphia, Lippincott. 164 pp.

Unilateral Swelling of Hysterical Hemiplegia. *Am. J. M. Sc.*, n.s., 88:94-98.

1885

Fat and Blood: An Essay on the Treatment of Certain Forms of Neurasthenia and Hysteria. 4th ed. Philadelphia, Lippincott. 166 pp.

Lectures on Diseases of the Nervous System, Especially in Women. 2nd ed. Philadelphia, Lea Bros. 287 pp.

Singular Case of Absence of Adipose Matter in the Upper Half of the Body. *Am. J. M. Sc.*, n.s., 90:105-6.

1886

With M. J. Lewis. Physiological Studies of the Knee-Jerk, and of the Reactions of Muscles under Mechanical and Other Excitants. *M. News*, 48:169-73; 198-203.

With E. T. Reichert. Researches upon the Venoms of Poisonous Serpents. In: *Smithsonian Contributions to Knowledge*, Vol. 26 (Washington, D. C., Smithsonian Institution), pp. 1-186.

With M. J. Lewis. *The Tendon-Jerk and Muscle-Jerk in Disease, and Especially in Posterior Sclerosis*. *Am. J. M. Sc.*, n.s., 92:363-72.
Vertigo. In: *A System of Practical Medicine*, ed. by William Pepper, V:416-28. Philadelphia, Lea Bros. & Co.

1887

Centennial Anniversary of the Institution of the College of Physicians of Philadelphia. Commemorative Address. *Tr. Coll. Physicians Philadelphia*, 60:cccxxxvii-cclxvi.
Doctor and Patient. Philadelphia, Lippincott. 177 pp.
Neuralgic Headaches with Apparitions of Unusual Character. *Tr. Coll. Physicians Philadelphia*, s.3, 60:175-81.
Painless Tic of the Face, Treatment by Freezing with Rhigolene Spray. *M. News*, 51:253-55.
The Treatment of Spastic Paralysis. *M. News*, 51:85-88.
Wear and Tear, or Hints for the Overworked. 5th ed. Philadelphia, Lippincott. 76 pp.

1888

Fat and Blood: An Essay on the Treatment of Certain Forms of Neurasthenia and Hysteria. Philadelphia, Lippincott. 166 pp.
Locomotor Ataxia Confined to the Arms; Reversal of Ordinary Progress. *J. Nerv. & Ment. Dis.*, 15:221-24.
Mary Reynolds: A Case of Double Consciousness. *Tr. Coll. Physicians Philadelphia*, s.3, 10:366-89.
On the Muscular Reactions Known as Tendon-Jerks and Muscle-Jerks. *M. News*, 53:677-85.

1889

Aneurism of an Anomalous Artery Causing Antero-Posterior Division of the Chiasm of the Optic Nerves and Producing Bi-Temporal Hemi-anopsia. *J. Nerv. & Ment. Dis.*, n.s., 14:44-62.
An Improved Form of Suspension in the Treatment of Ataxia, etc. *M. News*, 54:399-400.
The Poison of Serpents. *Cent.*, 37:503-14.
Subjective False Sensations of Cold. *Tr. A. Am. Physicians*, 4:189-200.
Treatment of Pott's Paralysis by Suspension, etc. *Am. J. M. Sc.*, n.s., 97:439-49.

1890

Counterfeiting Death (Letter to the Editors). *Univ. M. Mag.*, 2:568.
The Path of Motor and Sensory Reinforcement. *M. News*, 56:297-99.

- Some Disorders of Sleep. *Am. J. M. Sc.*, n.s., 100:109-27.
 Suspension in Locomotor Ataxia. *Univ. M. Mag.*, 2:341-45.
 With C. W. Burr. Unusual Cases of Chorea, Possibly Involving the Spinal
 Cord. *J. Nerv. & Ment. Dis.*, n.s., 15:427-31.

1891

- The History of Instrumental Precision in Medicine. The Presidential
 Address at the Opening of the Congress of American Physicians and
 Surgeons, Washington, Sept. 23. *Boston M. & S. J.*, 125:309-16.
 Permanent Headaches. *Internat. Clin.*, 3:269-81.
 The Treatment of Obstinate Sciatic Pain by Splint-Rest and Cold. *Inter-
 nat. Clin.*, 1:277-84.

1892

- Address on Opening of the Institute of Hygiene of the University of
 Pennsylvania. Philadelphia, Univ. of Pennsylvania Press. 16 pp.
 Crossed Paralysis of the Thermal Sense without Other Sensory Loss. *Tr.
 A. Am. Physicians*, 7:332-34.
 The Early History of Instrumental Precision in Medicine. New Haven,
 Tuttle, Morehouse & Taylor. 42 pp.
 Hysterical Rapid Respiration, with Cases; Peculiar Form of Rupial Skin
 Disease in an Hysterical Woman. *Tr. Coll. Physicians Philadelphia*,
 s.3, 14:228-37.
 Precision in the Treatment of Chronic Diseases. *M. Rec.*, 42:721-26.

1893

- Choreoid Movements in an Adult Male, Probably of Hysterical Origin:
 Relationship to Habit-Chorea. *M. News*, 62:231-35.
 Erythromelalgia—Red Neuralgia of the Extremities—Vasomotor Paraly-
 sis of the Extremities—Terminal Neuritis (?). *M. News*, 63:197-202.
 Hysteria; Psychic Anaesthesia for Touch; Psychic Anosmia; Psychic
 Blindness in Its Variations, with Comments. *M. News*, 62:101-4.
 Post-Hemiplegic Pain; Pre-Hemiplegic Pain; Post-Hemiplegic Joint-
 Disease; Post-Hemiplegic Nodes. *M. News*, 62:421-23.
 Three Cases of Remarkable Spinal Anterior Curvature with Mental
 Aberration. *M. News*, 63:656-59.
 The Treatment of Sciatica. *M. News*, 63:1-7.

1894

- Concerning the History of the Discovery of Reflex Ocular Neuroses, and
 the Extent to Which These Reflexes Obtain. *M. News*, 64:449-52.

Motor Ataxia—Ataxia in a Child of Three Years, with Retained Muscle-Reflexes. Hysterical Ataxia, with Retained Muscle-Reflexes. *M. News*, 65:1-6.

Notes on Surface-Temperatures as Affected by Posture of Limbs. *M. News*, 64:6-7.

1895

With J. S. Billings and D. H. Bergey. The Composition of Expired Air and Its Effects upon Animal Life. In: *Smithsonian Contributions to Knowledge*, Vol. 29 (Washington, D. C., Smithsonian Institution), pp. 1-81.

Hysterical Contractures. *M. News*, 67:197-206; 232-36.

Memoir of John Call Dalton, 1825-1889. In: National Academy of Sciences, *Biographical Memoirs*, 3:177-85. Washington, D. C., National Academy of Sciences.

Pseudocyesis—Spurious Pregnancy. *M. News*, 66:393-94.

Wrong Reference of Sensation of Pain. *M. News*, 66:281-82.

1896

The Effects of Anhalonium Lewinii (The Mescal Button). *Brit. M. J.*, 2:1625-28.

On the Exceptional Effects of Bromides. *Tr. A. Am. Physicians*, 11:195-205.

Vivisection: A Statement in Behalf of Science. *Science*, n.s., 3:421-26.

1897

An Analysis of Three Thousand Cases of Melancholia. *J. Nerv. & Ment. Dis.*, 24:738-46.

Clinical Lessons on Nervous Diseases. Philadelphia, Lea Bros. & Co. 305 pp.

With J. H. W. Rhein. A Clinical Re-Examination of the Motor-Symptoms of Chorea. *Tr. Coll. Physicians Philadelphia*, s.3, 19:168-77.

With A. H. Stewart. A Contribution to the Study of the Action of the Venom of the *Crotalus Adamanteus* upon the Blood. *Tr. Coll. Physicians Philadelphia*, s.3, 19:105-10.

The Relations of Nervous Disorders in Women to Pelvic Disease. *Univ. M. Mag.*, 9:389-93.

1898

A Contribution to the Study of the Effect of the Venom of *Crotalus Adamenteus* upon the Blood of Man and Animals. In: National Acad-

emy of Sciences, *Memoirs*, No. 2. Washington, D. C., National Academy of Sciences.

Fat and Blood: An Essay on the Treatment of Certain Forms of Neurasthenia and Hysteria. 7th ed. Philadelphia, Lippincott. 177 pp.

1899

With W. G. Spiller. A Case of Erythromelalgia with Microscopical Examination of the Tissue from an Amputated Toe. *Am. J. M. Sc., n.s.*, 117:1-13.

Wear and Tear, or Hints for the Overworked. 9th ed., thoroughly rev. Philadelphia, Lippincott. 76 pp.

1900

Practical Tests by State Boards (Letter to the Editor). *Philadelphia M. J.*, 5:1105.

1902

Fat and Blood: An Essay on the Treatment of Certain Forms of Neurasthenia and Hysteria. 8th ed. Philadelphia, Lippincott. 236 pp.

The Muscular Factors Concerned in Ankle-Clonus. *J. Nerv. & Ment. Dis.*, 29:257-59.

Nurses and Their Education. *Am. J. Nursing*, 2:899-907.

1903

The Relation of Neuralgic Headaches to Storms. *Am. Med.*, 5:1023-24.

Reversals of Habitual Notions, Backward Pronunciation of Words, Lip Whispering of the Insane, Sudden Failures of Volition, Repetition of Impulses. *J. Nerv. & Ment. Dis.*, 31:193-203.

1904

With W. G. Spiller. A Case of Uncomplicated Hysteria in the Male, Lasting Thirty Years with Post-Mortem Examination. *J. Nerv. & Ment. Dis.*, 31:625-38.

Doctor and Patient. 4th ed. Philadelphia, Lippincott. 177 pp.

The Evolution of the Rest-Treatment. *J. Nerv. & Ment. Dis.*, 31:368-73.

1905

Of Ailurophobia and the Power to Be Conscious of the Cat as Near, When Unseen and Unheard. *Am. Med.*, 9:851-53.

Fat and Blood, and How to Make Them, ed. by John K. Mitchell. Philadelphia, Lippincott. 236 pp.

Some Personal Recollections of the Civil War. Tr. Coll. Physicians Philadelphia, s.3, 27:87-94.

1906

Sudden Paralysis of Pharynx; Artificial Feeding for Four Years. J. A. M. A., 47:1967-69.

1907

Fat and Blood: An Essay on the Treatment of Certain Forms of Neurasthenia and Hysteria. 8th ed., ed., with additions, by J. K. Mitchell. Philadelphia, Lippincott. 236 pp.

Some Memoranda in Regard to William Harvey, M.D. Tr. A. Am. Physicians, 22:737-63.

1908

The Treatment by Rest, Seclusion, etc., in Relation to Psychotherapy. J. A. M. A., 50:2033-37.

1909

Address Delivered before the Medical and Chirurgical Society of Maryland on the Occasion of the Dedication of Its Building. Bull. M. & Chir. Fac. Maryland, 1:220-27.

Address of Welcome (Delivered on the Opening of the New Hall of the College of Physicians of Philadelphia, November 11, 1909). Tr. Coll. Physicians Philadelphia, s.3, 31:443-49.

Address to the American Neurological Association. J. Nerv. & Ment. Dis., 36:385-401.

A Case of Progressive Muscular Atrophy with Remarkable Improvement. J. Nerv. & Ment. Dis., 36:294-98.

Memoir of William Thomson, M.D. Tr. Coll. Physicians Philadelphia, s.3, 31:lxix-lxxi.

1910

Concerning Nervous Disturbances Following Surgical Operations and Anesthesias. Tr. Coll. Physicians Philadelphia, s.3, 32:262-65.

1912

The Medical Treatment of Epilepsy. Therap. Gaz., s.3, 28:153-56.

1914

The Medical Department in the Civil War. *J. A. M. A.*, 62:1445-50.

1917

Biographical Memoir of John Shaw Billings, 1838-1913. In: National Academy of Sciences, *Biographical Memoirs*, 8:374-83. Washington, D. C., National Academy of Sciences.