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Historical Vignette

Clifton Briggs Leech: First Director of the Pediatric Cardiac Clinic at The Johns Hopkins Harriet Lane Home for Invalid Children

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Abstract The history of Helen Taussig is well known. Contrary to popular belief, however, she was not the first director of the pediatric cardiology clinic at the Harriet Lane Home for Invalid Children. She was second director, succeeding Clifton B. Leech. Edwards A. Park, Chief of Pediatrics at Johns Hopkins, appointed Leech the first director of the pediatric cardiac clinic in the fall of 1928. In this vignette, I summarize the contributions of Clifton Leech to the development of paediatric cardiology.

Keywords: Clifton Leech; Edwards Park; Maude Abbott; Helen Taussig

> The idol of today pushes the hero of yesterday out of our recollection; and will, in turn, be supplanted by his successor of tomorrow
>
> —Washington Irving

Edwards Park established the first academic subspecialty clinics in paediatrics in North America at the Harriet Lane Home of Johns Hopkins University (Fig. 1) in the late 1920s. Park developed clinics in tuberculosis, endocrinology, seizure disorders, psychiatry, and cardiology, and he selected young faculty members to head them.[1] He appointed Clifton B. Leech (Fig. 2) to head the cardiology clinic, making the appointment in September, 1928. Leech's passion for cardiac disease in children and adults resulted in notable contributions to both care of patients and to the medical literature. During his two years at Johns Hopkins, he organized the pediatric cardiac clinic, and published articles on congenital heart block, treatment of rheumatic fever with aspirin, and endocarditis produced by Streptococcus viridans.[2–4] In the summer of 1930, Clifton Leech departed Baltimore for Providence, Rhode Island. His research interests endured. Based on work during his directorship, he published, in 1932, an article devoted to lesions producing right-to-left shunting, and in 1935 a notable review of congenital cardiac disease.[5,6] He continued productive academic work over the next three decades. Despite his initial eminence, there are no published reports about Clifton Leech. Thus, I composed his story mostly from primary documents contributed by his surviving family members, and material provided by archivists at the Alan Mason Chesney Medical Archives at Johns Hopkins, the Osler Library at McGill University, and the Rockefeller Archive Center.

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Early biography

Following the death of Paul Dudley White in October, 1973, Clifton Leech penned a condolence letter to Ina, the widow of his old friend.[7] He wrote:

> "My first contact with Paul was as a member of the first class in electrocardiography which was about 1922. I think there were about six young doctors in the class…. One of my recollections is that when I had returned from two

Figure 1.
The Harriet Lane Home for Invalid Children, to the left, pictured around 1928.

> years of study as a Commonwealth Fund Fellow at the Johns Hopkins Hospital and had a rather lengthy paper on statistical study of congenital heart disease shown in the autopsied cases at the Johns Hopkins Hospital, Paul was instrumental in having it published…. I recall with pleasure his relating to me a few years ago his disapproval of an English cardiologist friend of his who had retired 'to his farm in Wales' – Paul pointed his finger at me and said 'Don't ever retire.' I need not say how deeply I sympathize."

Clifton Leech heeded the advice given by Paul Dudley White. When he died three years later, on November 29, 1976, in Fort Lauderdale, Florida, Leech was 81, and still seeing patients.

Clifton Briggs Leech was born in Winthrop Center, a small town in Maine, on February 17, 1895. His father, Sewell, was a Methodist minister. His mother, Eva Estelle Cutter, was a native of Providence, Rhode Island. His parents had met and married in Boston, where Sewell had moved for work, later finding employment as streetcar conductor. Sewell and Eva returned to Maine, where Sewell worked as a labourer before he entered the ministry. Following his ordination, the family lived in several Maine communities, as assignments to churches changed every few years. Clifton's only sister was born December 24, 1899, but she died the next day on Christmas, likely leaving an impression on almost five-year-old Clifton. Moving from town to town was difficult for Clifton. But despite the moves, his classmates recognized him for "being smart" at an early age. At ten, he stood up to a school bully while living in Kennebunkport, further burnishing his reputation.[8]

Clifton graduated from Bridgton High School in 1911. Afterward, he attended the college preparatory

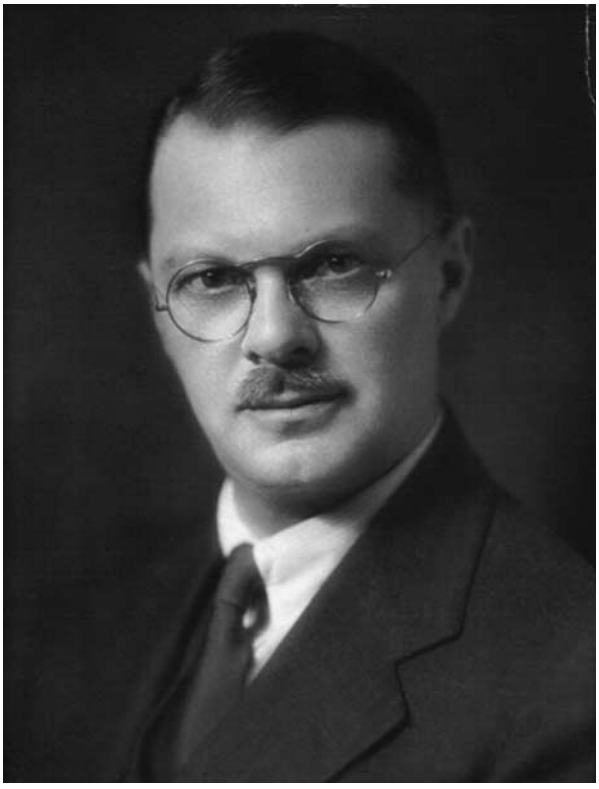

Figure 2.
A portrait of Clifton Leech from around 1930.

academy, Kents Hill School in Augusta, Maine, for its standard one-year rigorous curriculum. After Kents Hill, Clifton matriculated at Boston University, where he completed undergraduate and medical education. His Army service in 1917, during World War I, interrupted his schooling. Following his honourable discharge, Leech received his medical degree from Boston University in 1919. He began his postgraduate medical experience on the staff of Union Hospital, now Charlton Memorial Hospital, in Fall River, Massachusetts.[8]

In 1922, Clifton went to Boston for a month of postgraduate training with Paul Dudley White, learning how to use a revolutionary new device, the electrocardiographic apparatus.[8] It is unclear what drew Leech to study with White. Possibly his engineering mind and love for mechanical gadgetry, later exemplified by several patented inventions, guided him to cardiology.

The tutelage from White received by Leech and his electrocardiographic classmates resulted in them becoming among the first clinical cardiologists in the United States of America. White had graduated from Harvard Medical School in 1913. He travelled to London to study cardiac physiology with Thomas Lewis. Lewis was a pioneering cardiologist, and an early proponent of the string galvanometer developed

by Einthoven for recording electrocardiograms in patients. Lewis also was among the first to publish his electrocardiographic results. It was the experience with Lewis that had propelled White into cardiology.[9–11]

White returned to Boston and Massachusetts General Hospital in 1914 with an electrocardiograph machine, one of only a handful in the United States of America. The first World War halted his early experience with clinical electrocardiography. Following his wartime service, however, White became a faculty instructor at Harvard. In 1921, he began organizing formal electrocardiography classes, with Clifton Leech becoming one of his first students.[9,10]

In 1923, under the leadership of White, Leech and his early colleagues in cardiology instituted the process that resulted in the creation of the American Heart Association in 1924.[10] Also in 1923, Clifton married Dorothy Newton of Fall River. Their first child, Clifton Jr., known as Chippy, was born in March, 1924. Leech practised cardiology in Fall River for several years, but soon unexpected events jolted his life. Dorothy died in February, 1927, one year following the birth of their second child, Teddy. Her death certificate cited uraemic coma and congestive cardiac failure, protracted complications possibly secondary to pregnancy.[12] Adding to Clifton's pain, Teddy died of chronic encephalitis 11 months later, in January 1928.[13]

The shock of these deaths may have motivated Leech to pursue medical research. By May, 1928, correspondence between Edwards Park and Lewis Weed, dean of Johns Hopkins Medical School, noted the wish of Park that Leech head the paediatric clinic.[14] In September, 1928, Clifton left Fall River for Johns Hopkins to be part of a fellowship programme supported by the Commonwealth Fund to study cardiac disease in children, under the visionary leadership of Edwards Park.

Edwards Albert Park, born in December, 1877, attended the College of Physicians and Surgeons at Columbia University in New York. After graduation, Park trained with L. Emmett Holt Sr. at the Foundling Hospital of New York City, where Park first met an inspiring young faculty member, John Howland. In 1912, John Howland, then Chief of Pediatrics at Hopkins, invited Park to join the faculty at the Harriet Lane Home. His first tenure at Hopkins lasted until 1921, when Yale recruited him to start a pediatric department.[15,16]

Following the death of John Howland in 1926, Park was invited back to Hopkins, assuming the Chair of Pediatrics in July, 1927.[17] His vision was to create the first university-based multispecialty pediatric clinics in the United States of America. In the United States, others had developed cardiac clinics for children in the early 20th century, such as William St. Lawrence, May Wilson, and Charles Hendee Smith in New York City; Rachel Ash in Philadelphia; Stanley Gibson in Chicago, Hugh McCulloch in St. Louis, and Max Seham in Minneapolis.[18–24] But shortly after his arrival at Hopkins, and despite faculty resistance, Park created distinct pediatric clinics in several disciplines, namely tuberculosis, endocrinology, seizure disorders, psychiatry, and cardiology. Edwards Park and his freshly minted fellows and faculty launched a new standard for specialized paediatric care and paediatric medical education (Fig. 3).

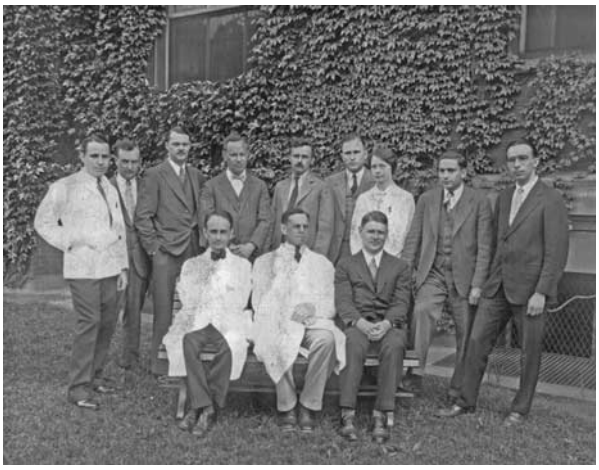

Figure 3.
Edwards Park, pictured with his faculty and fellows in front of the Harriet Lane Home, around 1929.

The photograph taken around 1929 (Fig. 3), with the group in front of the Harriet Lane Home, captured the young faculty members and fellows who went on to help found paediatric specialties, contribute to paediatric research, or lead academic paediatric departments. Standing from left to right are Mitchell Rubin, a founder of paediatric nephrology and later Chief of Pediatrics in Buffalo; Laslo Kajdi, who developed the ketogenic diet; Clifton Leech; Rustin McIntosh, Later Chief of Pediatrics at Babies Hospital in New York City; Hugh W. Josephs, who later worked with Kenneth Blackfan in haematology; W.W. Swanson, who worked in metabolism; Harriet Guild, who helped found paediatric endocrinology at Johns Hopkins; David H. Shelling, a contributor to the field of metabolism; and Edward M. Bridge, an early paediatric neurologist. Seated left to right are Bengt Hamilton, a leader in metabolism and the chemistry of rickets; Edwards Park; and L. Emmett Holt Jr., later Chairman of Pediatrics at New York University.[15,25–32]

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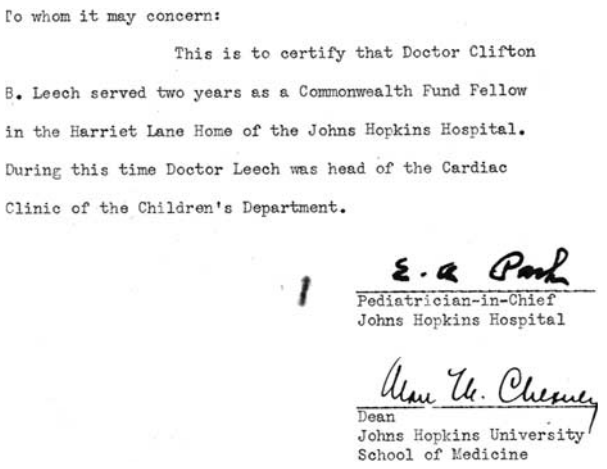
The first cardiac clinic at the Harriet Lane Home, and the contributions of Clifton Leech to paediatric cardiology

At the request of Edwards Park, the only cardiologist at that time in the Department of Medicine, Edward P. Carter, attempted to establish a clinic for rheumatic fever based on the general dispensary in the winter of 1927. This was disbanded midway through 1928.[33,34] Carter placed one his fellows, Benedict R. Harris, in charge of this short-lived operation.[35] Helen Taussig, a recent graduate from the medical school at Johns Hopkins, had spent a year learning cardiology from Edward Carter between July, 1927, and June, 1928.[36] Taussig also worked with Benedict Harris during the few months of operation of the clinic based on the dispensary.[37,38] Harris left for New Haven in spring of 1928, later becoming a professor of cardiology at Yale.[38,39]

Edwards Park decided then to create a new and distinct cardiac clinic for children within the Harriet Lane Home, rather than in the general dispensary, located some distance away. Some faculty criticized Park for developing such a clinic apart from the general dispensary.[40] But Park persisted. He wanted to link specialized-outpatient paediatric care to inpatient care for children. He received a grant of $3800 from the Commonwealth Fund in January 1928 to finance the pediatric cardiac clinic.[41] Anna Harkness had established the Commonwealth Fund in 1918. She was heir to her husband, Stephen Harkness, an original investor in the Standard Oil Company established by John D. Rockefeller. The monies provided by the Commonwealth Fund supported a social worker and the salary of the director of the paediatric cardiac clinic.[42] Clifton Leech was in Fall River, Massachusetts, practising cardiology and recovering from the deaths of his wife and second child when Edwards Park recruited him to become the first director of the new clinic (Fig. 4).

It is unclear why Edwards Park selected Clifton Leech. It was not due to the connections between Leech and Paul Dudley White. In June, 1928, White had written a congratulatory letter to Leech about his appointment to Johns Hopkins in which he noted he knew about the position, but did not think it was one Leech would enjoy. The letter, however, suggested the availability of the position was known outside of Hopkins.[43] Leech did have contacts at the Rockefeller Institute of Medical Research in New York City, as he had spent time studying there in fall of 1924, and Edwards Park was familiar with the work of Alfred Cohn and Homer Smith in rheumatic fever carried out at the Rockefeller Institute.[44,45] Park wrote to Alfred Cohn in June of 1928 indicating his anticipation


To whom it may concern:

This is to certify that Doctor Clifton B. Leech served two years as a Commonwealth Fund Fellow in the Harriet Lane Home of the Johns Hopkins Hospital. During this time Doctor Leech was head of the Cardiac Clinic of the Children's Department.

E. A. Park
Pediatrician-in-Chief
Johns Hopkins Hospital

Wm. H. Welch
Dean
Johns Hopkins University
School of Medicine

Figure 4.
The certificate appointing Clifton Leech as director of the clinic for paediatric cardiology.

that, "We will obtain, I hope, an extremely able man, Dr. Leech of Fall River, Massachusetts, to head our cardiac clinic."[8] Park's letter does not indicate that he learned of Leech through Alfred Cohn. It does show that Park was recruiting Leech.

Leech did have experience caring for children. He was chief of the cardiac departments at Fall River General and Union Hospitals. At Union Hospital, during the years 1925 and 1926, Leech had conducted a cardiac clinic for children that was larger than the one for adults.[8] Leech was also a physician to the Plain Street Maternal and Child Welfare Clinic in Fall River.[8] At that time, there were few with the passion for cardiac disease, and the newfound desire of Leech to pursue cardiac research, coupled with the need of Edwards Park, may have simply matched.

In November, 1928, two months after Leech assumed the directorship of the paediatric heart clinic, Park requested an extra grant of $1400 from the Commonwealth Fund to support the operations of the clinic. Park wrote, "The Department of Pediatrics furnishes a special building, known as the middle pavilion of the Harriet Lane Home, for the outpatient work of the cardiac clinic. The medical work is supplied by Dr. Leech, who is on a $2,000 fellowship from you, and by the interns of the departmental staff. The Department also supplies nursing support to the clinic. The laboratory work in connection with the clinic is done by the Pediatric Staff in the Pediatric Laboratories. The electrocardiographic work and the development of the films is done by the hospital." The Commonwealth Fund approved the extra appropriation.

Following the year spent by Helen Taussig with Edward Carter, she undertook her pediatric residency at the Harriet Lane Home from July, 1928,

until June, 1930.[36] In February of 1929, Park wrote an interesting letter to Taussig. Park indicated he wanted Taussig, with her experience in paediatrics, to head the paediatric cardiac clinic, but only if Leech returned to Fall River in the summer of 1929. In the same letter, Park also held out a possible directorship for 1930, should the department have sufficient funds.[46] Almost simultaneously, Park wrote to Leech, asking him to continue for another year, which he did.[47]

Leech wrote a lengthy letter to the Commonwealth Fund in June of 1929, updating the goals and accomplishments of the cardiac clinic. The summary of his goals were, first to improve the care provided to the patients, second to improve teaching, third, to collect data for research, fourth, to develop research questions worthy of investigation, fifth, to investigate pharmacologic therapy, and sixth, to determine the value of exercise testing. These aims are similar to any programme of the 21st century involved with paediatric cardiology. Leech further wrote, "It was decided to conduct the clinic three afternoons a week and to let two of the house officers conduct the clinic a definite day, so that six house officers conducted, each week, three clinics under my supervision.... We now have about 150 active patients in the clinic.... Clinical material is accumulating in regard to the evidence concerning the allergic nature of certain rheumatic manifestations.... One rare and interesting case of complete congenital heart block has been reported in full, with a survey of the literature, and will be published shortly.... We are now completing an analysis of all the instances of congenital heart disease which have come to autopsy in this hospital.... This series constitutes, I believe, the largest number of such cases ever collected from one hospital.... Our program for the coming year is merely that of carrying on the work which we are now doing. It is my feeling that our clinic has made an excellent start, is now accepted as a permanent unit in the Harriet Lane Home, and is in a position to do valuable work for the patient and the profession."[33]

In September of 1929, Park wrote to Leech proposing a monograph on "viridans endocarditis." Park further suggested Leech collect clinical data from Boston Children's Hospital and from Yale.[48] Leech wrote back, "In regards to the monograph on viridans endocarditis in children, I will be glad to attempt it.... If you will send letters to Blackfan and the New Haven people I will be glad to visit both places..." Uncertain if he was up to the challenge, he continued "However I think only Maude Abbott or someone of her knowledge could do justice to the subject."[49] Park composed letters of introduction for Leech to Kenneth Blackfan at Harvard and Grover Powers at Yale. Park wrote to Blackfan, "This letter introduces Dr. Leech who is extraordinarily well qualified to make the study in question."[50] The American Journal of Medical Sciences published the finished article in November 1930.[4]

Simultaneous to his study on endocarditis produced by Streptococcus viridans, Leech compiled information for another work on congenital heart block, published in January of 1930.[2] Even Maude Abbott, the founder of the morphologic basis of paediatric cardiology, requested a copy.[51] Also in January 1930, Leech wrote a letter to Park in which he noted his association with Helen Taussig. Leech wrote, "I have read with interest the articles which you checked in the October number of the Archives of Diseases in Children. I shall see that Doctor Taussig has an opportunity of reading these articles....". He concluded this letter "Thank you very much for sending the magazine to me. I shall ask Doctor Taussig to return it to you when she is done with it."[52] Thus, before Taussig became the director of the paediatric cardiac clinic in the summer of 1930, she had worked in the clinic, then under the leadership of Clifton Leech.

Life was not easy for Leech during his years in Baltimore. He was a widower, and he and his five-year-old son, Chippy, boarded with another family, the Fultons, at 5005 Roland Ave, about four miles from The Johns Hopkins Hospital.[53] But then Clifton met Helen Beattie in 1929, and the two were married in May 1930 at Tiverton, Rhode Island.[8] Helen kept a diary. For May 25, 1930, she entered, "Sun. Got up late. Went to Park's on a picnic. All of H.L.H was there. Then back to Dr. Park's house for an interminable game of baseball."[8] Possibly for family reasons, Leech left Johns Hopkins for Providence, Rhode Island, in the summer of 1930, and Edwards Park appointed Helen Taussig director of the cardiac clinic. In Providence, Leech set up a private practice in cardiology, just as the country was plunging into the Great Depression.

From Providence, in May of 1931, Clifton wrote his old friend Edwards Park, "On the whole I am making a very satisfactory progress. The economic depression is affecting the profession here and probably is making it a little harder for me to get going.... Mrs. Leech and I both have a great yearning for Baltimore at this time of year. We were married a year ago yesterday. I expected to visit Balto. [*sic*] long before this and I still mean to do so...."[54]

Before he departed from Hopkins, Leech started to compile data from all autopsies performed because of paediatrtic cardiac disease at Johns Hopkins from 1889 onwards. At the suggestion of

Edwards Park, Leech was asked to present his preliminary findings at the New York Academy of Medicine in April 1931.[8,54–56] From 1931 to 1935, Leech, Park, and Abbott exchanged many letters about the article on congenital cardiac disease.[57–59] Park and Abbott provided superb critiques that enhanced the significance of the work.[60,61] Leech even met with Maude Abbott at the home of Paul Dudley White in Boston to finalize the manuscript. In the entry of the diary of Maude Abbott for January 3, 1935, she entered, "Clifton Leech came over from Providence to work on the paper."[62]

The work was published in December of 1935.[6] Among the noteworthy results was an estimation of the prevalence of congenital cardiac disease at 1.29%. No previous article, based on such a large number of autopsies, had approximated this number. It would be years before another work, as extensive, demonstrated the prevalence of congenital heart disease at approximately 1% of the population.[63]

The years after Johns Hopkins

Through the decades following his departure from Johns Hopkins, the academic output of Leech remained robust, and his innovative mind active.

In the early 1930s, besides his contributions to the medical literature, Leech developed a saw for cutting plaster casts. In October, 1930, Leech wrote to the secretary of Edwards Park, Miss Richards, "…the cast-cutter is making its bow this week at the Surgical Congress in Phila. and the reports I am getting of its reception there are gratifying."[64] Leech also published articles on quinidine sulfate, the Austin Flint murmur, a modification to Southey tubes for removal of subdermal peripheral oedema, acute cardiac failure, and shoulder pain in coronary arterial disease.[65–69] Of these articles, the ones relating to the Austin Flint and acute cardiac failure were published in the New England Journal of Medicine. The report of shoulder pain in coronary arterial disease was among the first to note this association. Further, Leech kept up his interest in congenital cardiac problems. As already mentioned, he published a study of lesions producing right-to-left shunting in 1932.[5] He also completed his study of the autopsies performed for congenital cardiac disease, and presented the work at meeting of the International Association of Medical Museums held in New York City in April of 1935.[70,71]

By the 1940s, a decade and half after Helen Taussig began her directorship of the paediatric cardiac clinic, Alfred Blalock performed the first systemic-to-pulmonary arterial shunt. This was based in part on experimental work Blalock had previously undertaken in Nashville, supported by the surgical skills and input of Vivien Thomas, stimulated by the belief of Taussig that creation of an artificial arterial duct could ameliorate the cyanosis seen in patients with tetralogy of Fallot.[72] Patients flocked to Johns Hopkins for surgery, making Blalock and Taussig medical celebrities. Reporting on a Canadian child that had undergone early construction of a shunt, a Winnipeg newspaper carried the following headline for February 21, 1946, "Doctors Cure 'Blue Baby'."[73] On July 30, 1946, from his retirement home in Cape Breton, Nova Scotia, Edwards Park penned Clifton Leech the following, "My dear Clifton, may I thank you for your part in honoring me and giving me pleasure when I laid down my directorship of the H.L.H…. It was terribly nice of you not to forget your years at the H.L.H. and with it your old friend…. You must have been amused over the publicity your old clinic at the H.L.H. has rec'd [*sic*] recently, too much both for the merit of the work done and the equilibrium of those concerned."[74] Considering all that has happened since, the comments of Park serve as an interesting assessment by a contemporary to this historic event.

In the 1950s and 1960s, Clifton Leech continued to make contributions. He published articles on cardiac syphilis, surgical mitral valvoplasty, treating arrhythmias, and the use of digitalis preparations for different ages including infants.[75–78] He moved his family, now including four more children, to Fort Lauderdale, Florida, in 1954. Just before the move, Leech received a patent on a new electrocardiographic electrode that had self-applying paste.[79] He founded the cardiac clinic at Broward General Medical Center in 1954, and at 75, in 1969, he became the director of the first coronary care unit at Holy Cross Hospital, in Fort Lauderdale. Throughout his career, he continued his correspondence and friendship with his mentor, Paul Dudley White. On April 17, 1975, his wife, Helen, died, and he followed her in death on November 29, 1976.[8]

Conclusion

Clifton Briggs Leech played an important part in the early history of paediatric cardiology, albeit that his contributions have become shrouded over time. Stimulated by the passion of Edwards Park to establish specialty clinics in paediatrics at Johns Hopkins University, Leech was recruited to develop the first paediatric cardiac clinic within the Harriet Lane Home, separate from the general outpatient dispensary. In this vignette, I have sought to add new information by emphasising his contributions made through published works about the era, his own published works, and from archived primary sources.

Donatella Lippi coined the term "Evidence Based History of Medicine" in a presentation at the meeting

of the International Congress on the History Medicine held in 2006.[80] History does not lend itself to prospective double-blind investigations. Primary sources, nonetheless, can provide objective historical information that may affect historical lore previously based on aphorisms. I have found such primary sources to be invaluable in understanding the contributions of Clifton Leech to paediatric cardiology.

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