ANGLO-AMERICAN CARDIOLOGY

Samuel A Levine's first world war encounters with Mackenzie and Lewis

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Abstract

Samuel Albert Levine was a key figure in modern cardiology in the United States. During the first world war he was one of a select group of United States medical officers assigned to the British Military Heart Hospital where he encountered the "British medical giants"—Clifford Allbutt, William Osler, James Mackenzie, and Thomas Lewis. Levine's diary, written when he was a young medical officer during the first world war, presents crisp character sketches of James Mackenzie and Thomas Lewis. The autobiographical vignettes he wrote later in life were more gracious and polished retrospectives.

The Levine perspectives, separated by a half century, contribute to our understanding of the developing fabric of Anglo-American cardiology.

In October 1917 Lieutenant Samuel A Levine wrote from the British Military Heart Hospital, Colchester, England to his Chief, Dr Henry Christian, at the Peter Bent Brigham Hospital, Boston, Massachusetts, USA:

We have a group of nice men, most of whom you know; Frank Wilson of St. Louis, Rufus Morrison of the Rockefeller, B. S. Oppenheimer and Marcus Rothschild of the Mt. Sinai, William St. Lawrence of New York, besides two Canadians, Thomas Cotton and Ross Jamieson. Dr. Lewis is down here from Monday to Friday and then returns to London. Sir William Osler is to make ward visits with us for the next two days.

Levine (fig 1) was one of a select group of United States and Canadian medical officers assigned "to the British Heart Hospital, in Hampstead, where I worked from August until October 1917. Then the unit was transferred to Colchester, in Essex, where we occupied the old Sobraon Barracks."

Levine recalled this period and his experience with the "British medical giants",¹ the brothers Regii—Allbutt and Osler,² and the subjects of the present article—Mackenzie and Lewis—in a series of autobiographical vignettes written late in life. The senior Levine (fig 2) used his 1917 wartime diary to recall his initial impressions; this provided a fresh glimpse of these men seen through a half century perspective.

Figure 1 Samuel Levine: United States medical officer, first world war, at the British Military Heart Hospital. (From the personal collection of Dr S A Levine.)

Figure 2 Dr Samuel Levine, consultant: As a visiting professor at The Ohio State University in 1959.

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Figure 3 Sir James Mackenzie: From the Illustrated London News 31 January 1925, p 165 (with permission of the Illustrated London News Picture Library).

Levine's first world war diary sketches were crisp, at times brusque, brimming with the certainty and criticism of youth. Conversely, the vignettes written later in life were gracious, polished retrospectives, intended for publication.

James Mackenzie "a tall burly man with all the directness of the North"³ (figure 3)

When Levine encountered Mackenzie in 1917 he was Sir James Mackenzie, a consultant in London, nearing the end of his active medical practice. He graduated from Edinburgh in 1878; 28 years of practice in industrial Burnley followed. Lewis noted that it was in Burnley that "He (Mackenzie) became by his own impulse and while engaged in the busy routine of a large practice, medical, surgical and obstetrical, an ardent and wholly self-trained investigator of outstanding merit."⁴

The intensity of the man and the extent of his accomplishments during the Burnley experience were best described by Bramwell: "One cannot but marvel at such achievements. The hours for research were literally snatched from the rush of general practice. But in a man of Mackenzie's temperament, the urge to contribute to knowledge and to the welfare of his fellow men is overwhelming and, no matter how extensive his other commitments might be, that urge prevails."⁵

Mackenzie's clinical observations in patients with heart disease and his innate curiosity provided the stimulus for the development of the first world war British Military Heart Hospital.⁵ He was supported in this activity by William Osler, Regius Professor of Medicine at Oxford, and Clifford Allbutt, Regius Professor of Medicine at Cambridge. As the war progressed and an ever increasing number of soldiers presented with peculiar disorders of the heart,⁶ government policy and health insurance expenditures, the manpower needs of the armed forces, disability determinations, and the economics of pensions became major concerns in the United Kingdom.

When the Heart Hospital came into existence early in 1916 Osler and Allbutt joined

Mackenzie as consultants and Thomas Lewis was the medical director.

JAMES MACKENZIE: A CHARACTER SKETCH FROM SAMUEL A LEVINE'S WARTIME DIARY WRITTEN IN THE AUTUMN OF 1917

We then visited Sir James Mackenzie and had a very interesting talk with him for an hour. Several points stood out quite definitely. Sir James, I believe, is growing old and therefore refractory and stubborn in his ideas. He seems to be bitter against Sir William Osler, his book of medicine and his teachings. As Sir James asked what the various men in the States, whom he knew, were doing, he always remarked 'barren soil' or 'that won't lead him anywhere', etc. Other peoples' work did not seem important in the least. He thought that medicine was retrogressing. People were giving up chloroform for ether because they did not use chloroform properly. 'We in Edinburgh never had any difficulty with chloroform'.

Medical research is not conducted properly. A man should have ten years general practice before he enters a research laboratory. One great mistake that Mackenzie makes is that he judges all medicine and medical men, in general, from his own experiences. He has done an epoch making piece of work in the last thirty years while carrying on a general practice. In fact, I think that he stands out as one of the very great men in clinical medicine of the past century. However, similar repetitions are apt to be very rare. In spite of my difference of opinion to his views, it is most interesting to hear such unorthodox opinions expressed by such a leading figure.

SIR JAMES MACKENZIE: LEVINE'S RECOLLECTIONS LATER IN LIFE

The third consultant at the British Heart Hospital and one of the giants of the British school of cardiology of that era was Sir James Mackenzie. Dr. Mackenzie was quite different from the other two men (Allbutt, Osler) I've described.² He was a Scotsman and was somewhat dour and given to broad philosophic generalization. He frowned on the introduction of instrumentation in the diagnosis of disease despite the fact that he developed the ink polygraph machine (known more familiarly as a lie detector machine). This device recorded certain physiologic responses as represented by mechanical or electrical impulses, such as pulse waves, breathing movements, and blood pressure, and was of great benefit to the medical profession.

His resentment may have been enhanced when such a patient would be sent abroad to "convalesce" at a health spa such as bad Nauheim or Baden-Baden. Probably he was distressed at the idea of English folk spending British pounds in a foreign country. In fact, Mackenzie had something of a "chip on his shoulder" regarding the rich. During one of our more intimate conversations after he had returned from London, he said that he would go to London every so often to earn some good guineas from the rich and spend them on the poor of St. Andrews.

Before leaving the question of the good or harm that might come from using the stethoscope, it must be appreciated that heart disease may be present for many years (especially in patients suffering from valvular disease) before heart failure occurs. Auscultation allows one to detect the murmurs indicative of valvular regurgitation when no symptoms are apparent. Only years later will the history reveal that the heart is beginning to fail. Patients and their physicians should know this information, even if there is no need for digitalis or

restriction of activity, because certain measures may be taken or advice given that will prevent or delay future difficulties.

PERSPECTIVE

Mackenzie's biographies were written by R McNair Wilson and Alex Mair. *The Beloved Physician* by Wilson was contemporary, romantic, and written in the heroic mode. Mair's extensive biography was an authorised version, written as he noted, "under the spell."

A more critical biographer might have analysed Mackenzie's paradoxical behaviour. While Levine held him in high regard—"At that time probably the most outstanding cardiologist in the world"—Levine succinctly noted several of the paradoxes. One was Mackenzie's view of technology and instrumentation. Despite his international reputation based on the translation of bedside physiology with the polygraph and the resultant ability to record, define, and analyse arrhythmias, Mackenzie thought technology inappropriate and distracting for the practitioner. Lawrence analysed the origins of this recurrent theme, the distrust of technology, a persisting concern in British medicine in his description of the "new cardiology" in Britain from 1880–1930.⁷

Levine addressed another paradox—Mackenzie's approach to auscultation. Although he was a product of the auscultatory era, his long experience at Burnley stimulated him to emphasise functional capacity and "to overthrow the dictatorship of the stethoscope which dominated cardiology for nearly a hundred years." Mackenzie was motivated by the noble impulse to avoid invalidism in civil life. When Mackenzie's dogma about ignoring apical systolic murmurs was put in practice at the Heart Hospital, however, the result was long term confusion in understanding the frequency and course of mitral valvar regurgitation.

Levine appreciated the clinical wisdom that Mackenzie mined at Burnley through analysis of "the careful records of his patients (which) revealed the significance of symptoms." He recognised Mackenzie's contributions to the understanding of the natural history of certain cardiac conditions, and the emphasis placed on functional capacity ("a heart is what a heart can do"). Many of these attributes found expression in Levine's clinical practice and medical writings.

Thomas Lewis: background

Thomas Lewis (fig 4) burned with a clear blue flame—extraordinary energy and intelligence focused through an incredible intensity. Although Lewis has not as yet had a definitive biographer, there is a great deal of information available about his wartime experience at the Heart Hospital of "soldier's heart". Howell analysed the soldiers heart story in detail—the redefinition of heart disease in soldiers that took place at the Heart Hospital and the contribution of the foundation of the specialty and its technology to the process.⁶ Thomas Lewis stood at the centre of these activities, conceiving and directing the beginnings of scientific inquiry into the classification of car-

Figure 4 Thomas Lewis (right) with Ross Jamieson in 1917 (from the personal collection of Dr S A Levine).

diac disease and the pathogenesis of functional cardiac disorders that took place at Hampstead and at Colchester. Lewis's further evolution as a clinical scientist proceeded along different pathways after the war, in part as a result of these experiences.

THOMAS LEWIS: A CHARACTER SKETCH FROM SAMUEL A LEVINE'S WARTIME DIARY WRITTEN IN THE AUTUMN OF 1917

Dr. Lewis impresses one as having rare qualities and a perfectly sound intellect. He hardly displays evidence of genius. But like many men of ability, he is apt to be stubborn in his opinions and refractory to other peoples' views. By doing intensive and laborious work of a fundamental nature on the physiology of the heart, he has been able to make quite a distinct contribution to our knowledge. One is immediately impressed by his writings and his conversation as to his clearness of thought and expression. He always seems to have a reasonable explanation for the points he maintains. He is quick in getting at the kernel of a discussion. In general, he is a skeptic of most scientific work and this trait, although generally helpful, frequently leads him astray. A frequent error that men of prominence make is to consider their opinion in other subjects as authoritative as that in the one which has been their main work. Dr. Lewis, I believe, is apt to make this mistake at times.

His accuracy of statement is supreme. But there are times and things, about which it is just as improper to talk in the most accurate terms as it is to weight out a milligram on a crude balance. It is rather disturbing if one has ever to be cautious about the remarks one makes in his presence. This feeling has not come up in my personal experience but with others it has. One never feels he has come close to Dr. Lewis's inner personality. He does not open out his self very widely. He does not make you admire or love him, but rather respect him and stand in awe before him.

There are very few things about which he does not know a great deal. He has a deep interest in birds and photography, both of which he has combined most appropriately. The art that is mixed up in his soul is of a rare type. It mingles with the artistic a peculiar pragmatic and materialistic strain that is not commonly seen. Above all, he is an extremely keen man.

SIR THOMAS LEWIS: LEVINE'S RECOLLECTIONS LATER IN LIFE

The fourth of the British giants attached to the British Heart Hospital was Thomas Lewis (later Sir Thomas). He was an amazing young man—energetic, frank, brusque, and quick in his manner—and had a most keen intellect. We had been warned that he was “not an easy man to live with.” However, this did not appear to be the case regarding us Americans. He took a fancy to us and was always kindly disposed. In fact, he and I became fast friends and remained so throughout his life. Lewis had firm opinions and convictions on many subjects. I was even courageous enough to differ with him, even though I was only a young physician. In fact, we sometimes engaged in rather heated medical discussions, each taking a diametrically opposite view.

He was the only man I knew who remained a civilian throughout the war and yet held a responsible post as chief of a military hospital. He never joined the army and never wore a military uniform. How he was able to do this with the government's consent is not clear. It must have required a good deal of courage, since many a man would have felt uneasy about strangers regarding him as a slacker during those trying war years. He was only about 40 years old at the time. Perhaps he feared that if he joined the regular Royal Army Corps he might be sent to Mesopotamia, Egypt, or some other place where he would be forced to do work that he was not particularly qualified to perform. In his unique way, he succeeded in obtaining just the right post to do his job and to benefit the war cause best.

Lewis always had a happy family working under him at the British Heart Hospital. Most of the medical officers were Americans, although there were a few British, Canadians, and occasionally other colonials. Eventually, they would leave the Sobraon barracks at Colchester and join the American forces in France. This arrangement proved valuable to us Americans and was also of great help in staffing the hospital for the British. The hospital also proved to be a training ground where we Americans learned something about soldier's heart, or what was later called neurocirculatory asthenia (NCA).⁸

One incident illustrates Lewis's independence of mind. On this occasion I was sitting beside him at our mess table at luncheon when a messenger brought him a note requesting that he see some military official who had just arrived. We finished our lunch in our customary unhurried fashion and walked out to an adjoining sitting room, where I found Lewis talking to a staff officer. Later I learned that the officer was the Inspector General of the British Medical Corps. It so happened that just before lunch, Lewis had asked Frank Wilson and me if we would like to go out for a bird walk after our meal, and we had eagerly accepted the invitation. Standing beside Lewis and the Inspector General was Captain Thomas Cotton, regarded as second-in-command of the professional staff at our hospital. I overheard Lewis say that he was sorry not to be able to accompany the Inspector General on the tour of inspection but he had a previous appointment and that Captain Cotton would be his guide instead. Had he been in the military, I doubt whether he could have avoided complying with the wishes of the Inspector General just to take a bird walk with two American lieutenants.

During one of our medical discussions, Lewis made a remark that left a strong impression on me. He stated that in most cases, before a research project was begun, he could fairly well predict what would eventually prove to be the essential conclusions of the study. What he meant was that the investigations were planned in order to prove something he already thought to be true.

Another time we had a brisk debate regarding the relative importance of valvular and muscular factors in the progress of chronic rheumatic valvular diseases. He insisted that it did not matter much whether the valve was slightly or markedly deformed; the important determinant was the health and strength of the heart muscle. His reasoning was that on postmortem examinations, valves are at times only slightly distorted and at other times markedly so. I took the opposite view, maintaining that except for the acute stage of active rheumatic carditis, seen particularly in children, the degree of valvular deformity was all important and that the heart muscle played a secondary and comparatively unimportant role. In fact to bring this opinion clearly in focus, I stated that if one could introduce a purse-string suture around the mitral valve to cause significant and progressive constriction of that valve, one could reproduce the clinical features of heart failure seen in cases of mitral stenosis without introducing elements such as infection or a change in the coronary blood flow. In a word, I propounded the view that mechanical narrowing of the valve in itself was of primary significance.

In further discussions, I recall asking whether patients who had rheumatic infections during childhood would develop progressive congestive heart failure many years later from heart muscle disease if there were no valvular defects. If the heart muscle was so important in causing heart failure in chronic rheumatic valvular disease, we ought to see middle-aged people with heart failure with no valvular disease who had rheumatic fever in childhood. Clearly, except during the acute stage of rheumatic carditis (really pancarditis), late chronic heart failure does not occur as a consequence of rheumatic infections when the valves are not involved. The exceptions are when an independent factor such as hypertension or coronary artery disease is present.

Another argument offered was that when the valvular deformity was very slight and the patient died, the cause of death was some other disease or condition, such as bacterial endocarditis, pulmonary or arterial embolism, coronary artery disease, or an infection. In more recent years, since the introduction of modern cardiac valvular surgery, the importance of the valvular element in rheumatic heart disease has been definitely established. Interestingly, Mackenzie's view was similar to that of Lewis.

About six years later, Dr. Elliott C. Cutler and I reported the first case of mitral stenosis in medical history in which the patient, a young girl, underwent operation, improved, and lived for 4½ years. The operation was performed by Dr. Cutler at the Peter Bent Brigham Hospital on May 20, 1923. I sent a reprint of our article to Mackenzie, and in his reply he indicated no enthusiasm for the possible value of surgery and, in fact, hinted that not much was to be expected from correcting the valve defect, since the main trouble was muscular rather than valvular. This remained the predominant view among British cardiologists for many years thereafter.

PERSPECTIVE

Dr Levine's vignette of Lewis is the most personal of his recollections of the “four British giants”. Levine obviously enjoyed his contact with Lewis, the intellectual stimulation, and was impressed by Lewis's sense of indepen-

dence. The entire Heart Hospital experience left deep impressions on the young Levine.

The vignette of Lewis also allows us a view of the young Sam Levine with the juices flowing, engaging one of the best minds of the era, enjoying the contest, and delighting in the debates, discussions, and controversy.

Levine also reflected on the next leap forward, the Cutler-Levine 1923 cardiectomy and valvotomy for mitral stenosis. This was, as Allbutt said, "a bold enterprise," but one for which both Mackenzie and Lewis had little enthusiasm.

The participation of Thomas Lewis,⁹ James Mackenzie,¹⁰ Clifford Allbutt,¹¹ and William Osler¹² in the Heart Hospital experience was a focal point in modern cardiology, and a junction between the "old" and "new" cardiology in Great Britain.⁷ Later in the war the Heart Hospital served as "a training ground," a contact point between the more senior British cardiologists and their young United States and Canadian counterparts.

Samuel A Levine's recollections of the interactions among the first world war British and the United States medical officers give us a glimpse of events that became cornerstones for future relations between British and American cardiology for the rest of the century.

Anglo-American cardiology

Anglo-American cardiology had its origins during this era. William Osler brought Canadian, United States, and British medical experiences and ties to the establishment of the British Military Heart Hospital. Allbutt travelled and lectured in the United States and Canada and delivered the invited Lane lectures on the cardiovascular system in San Francisco in 1898. Mackenzie also travelled extensively in the United States as a tourist in 1885 when he was a general practitioner; he was an international figure when he returned to North America in 1918 as a member of a British wartime delegation. Mackenzie and Allbutt brought the wisdom of decades of medical practice and reputations as consultants and authorities in early cardiovascular medicine to the development of the Military Heart Hospital.

Lewis visited the United States in 1914, gave the Herter lectures in Baltimore, the Harvey lecture in New York City, and was a visiting professor at the Peter Bent Brigham Hospital in Boston. Burchell traced the extraordinary impact Lewis had on American cardiology.¹³

Krikler spoke of Anglo-American links that resulted when Alfred E Cohn worked with Thomas Lewis in 1909, returned to the United States, "brought the first string galvanometer to the Western Hemisphere," and joined the staff of the Rockefeller Institute for Medical Research in 1911.¹⁴ Francis Fraser, a University of Edinburgh graduate, travelled in the

other direction; he worked with Cohn as a British research fellow at the Rockefeller and later returned and served with Lewis at the Heart Hospital in Hampstead. Paul Dudley White and Jonathan Meakins were in Lewis's laboratory just before the war. Samuel Levine worked with Cohn at the Rockefeller before his British Military Heart Hospital experience with Lewis.

Lewis's laboratory at the University College Hospital, London, and the Heart Hospital at Hampstead and later at Colchester were centres for Anglo-American exchange during the first two decades of the 20th century. Samuel Levine, Frank Wilson, Bernard Oppenheimer, Marcus Rothschild, Paul Dudley White, Thomas Cotton, Ross Jamieson, Jonathan Meakins, Hubert Starling, John Parkinson, Francis Fraser, Rufus Morrison, William St Lawrence—met, interacted with, or were influenced by each other and their contacts with the "four British giants". All these experiences were part of the developing fabric of Anglo-American cardiology: old physicians and young; contacts, impressions, strong imprints; teachers and mentors; shared experiences, associations, collaborations, friendships; bright young minds encountering the legends of their time. These are the roots of the United States and Canadian cardiology that may be recognised 80 years later.

Mrs Samuel A Levine and Dr Herbert Levine allowed us to review, select, and edit material from Dr Samuel Levine's first world war diary and from his autobiographical vignettes written later in life for inclusion in this article.

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