SPECIAL ARTICLE

A Letter from Sir James Mackenzie to Dr. Carter Smith, Sr.

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SUMMARY
A letter from Sir James Mackenzie to Dr. Carter Smith, Sr., is presented. The letter contains autobiographical information, medical philosophy relating to the value of clinical research in general practice and some advice about heart block. Additional biographical information about Dr. Mackenzie is included and his many contributions to medicine are emphasized.

Additional Indexing Words:
Letter Heart block

IN 1924, Dr. Stewart Roberts, Clinical Professor of Medicine at Emory University, assigned each student in the Sophomore Class a subject on which to write a thesis. I was assigned the topic, ”Heart Block.” In searching the literature for information on this subject I found that Sir James Mackenzie (fig. 1) was most knowledgeable on the subject. I then decided to write him directly for first hand data concerning heart block.

The subject of this paper is his letter of response to my request. The original copy of this letter is in the Calhoun Medical Library of the Emory University School of Medicine. Close scrutiny of his handwriting indicates that it was probably dictated by him to a secretary. He then corrected the letter and signed it with his own hand (fig. 2). A summary of his professional accomplishments is contained in his letter. However, I am including in this paper more intimate details of his life, taken largely from The Beloved Physician by R. M. Wilson, must reading for students of Sir James Mackenzie. Material was also taken from Ralph Major's Classic Description of Disease.

He was born on a farm in Pickstonhill in the Parish of Scone in 1853 of ancient Highlander stock. He attended the village school and at the age of twelve he was sent to the ancient grammar school of Perth for three years. He was a poor student and his experience there was an unhappy one. He could not understand why students were rewarded for memory rather than understanding. He considered himself a “dunce” and left this school when fifteen years of age to enter an apothecary shop. He continued work there until age twenty-one, and it was in this apothecary shop that his interest in medicine began. He entered the Medical School at the University of Edinburgh and, with none too brilliant an academic record, was graduated in 1878 at the age of twenty-six. He then interned one year in the Edinburgh Royal Infirmary.

In 1879 he was offered an opportunity to do general practice with Dr. William Briggs in Burnley, a town in Lancashire. He spent the next twenty-seven years there and became a partner in the office of Briggs and Brown.

His medical character was molded largely by his association with Dr. William Briggs, an astute clinician with remarkable powers of observation and deduction. Dr. Mackenzie was awed by the ability of Dr. Briggs in clinical diagnosis and, in particular, prognosis. During this association Mackenzie concluded that Dr. Briggs' skill came from his keen observation and the experience gained by following patients over a long period of time, thus watching the unfolding of the clinical picture from the beginning until the end. This wait and see philosophy then became the impelling force that motivated Mackenzie throughout his professional career.

About 1883 he began a systematic study of his patients by recording their symptoms and making serial observations of their arterial and venous pulses. His basic objectives were to understand the
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A picture of Sir James Mackenzie. This picture accompanied the original letter to Dr. Smith.

mechanism of the symptoms and their prognostic significance. His interest in heart disease was kindled by the sudden death of a young woman who abruptly developed congestive heart failure while he was attending her delivery. Mackenzie asked himself, "Would this death have occurred if I had had a better knowledge of heart afflictions?" He adapted the Dudgeon sphygmograph and the Marey tambour to make tracings of the arterial pulse and used gummed straws for venous recordings. The apparatus was bulky and required smoking of strips of paper with fumes of burning camphor. In addition it was slow and the recordings were limited by the size of the drum. Nevertheless he carried this device in his buckboard around the countryside to make numerous recordings. In the 1890s he collaborated with Mr. Shaw, a watchmaker in Burnley, to produce the instrument that became famous as "Mackenzie’s ink polygraph." This consisted of a piece of clock work, a long roll of smooth paper and three pens attached to rubber tubes that could convey pulsations from the neck veins, heart and arterial pulses. The tracings were clear, did not require varnishing, and could be recorded at great length. With an instrument now perfected to record arterial and venous pulse waves, the challenge was now even greater to be able to interpret correctly the meaning of these waves. Mackenzie’s recording and interpretation of these waves remains today the greatest contribution that anyone has made in this area of cardiology. Mackenzie was never particularly proud of his reputation as the inventor of the polygraph for he despised the worshipping of instruments, including the sphygmomanometer, stethoscope, electrocardiograph and X-ray machines. He considered these instruments solely as an aid to diagnosis and yet they were often accorded a veneration that they did not deserve.

In 1907 at the age of 54 he moved to London and there he rapidly achieved great national and international reputation as a cardiologist. He was knighted "Sir James" and was active in teaching clinical medicine in addition to his lucrative consulting practice which earned him over 8000 pounds in one year. His rise to fame after the move to London brought him into professional conflicts. The so-called "Giants of Medicine" who were the occupants of the "Ivory Tower" of medicine at this time were loath to accept Mackenzie, the country practitioner, within their inner circle. They did not agree with his clinical research and his wait and see method of learning the answers to the many unsolved medical problems of that time. They were primarily laboratory researchers and professors, and so taught their students with this technique of medical education. After a time, however, his contributions were recognized and he was finally accepted by these professors. Despite the initial rejection, Mackenzie’s basic ideas of clinical research never changed. His famous book, The Pulse,3 in 1902, was followed by his even more valuable publication, Diseases of the Heart,4 which was published in three editions, in 1908, 1910 and 1918.

His family life: In early 1887, Miss Frances Bellamy Jackson, a governess in the home of one of his patients, called Dr. Mackenzie to visit a sick child. It was then that he met his bride-to-be.

The courtship was a rapid one and they were married in September of the same year. His brother, Sir William Mackenzie, was his best man. After a honeymoon in Italy they returned to Burnley. Their marriage was a nearly perfect one throughout the rest of their lives. As Dr. Mackenzie once said, "She is everything to me... everything. We shared it all from the very beginning." When Mrs. Mackenzie was asked to tell a little about their married life, she replied, "No woman ever had such generous love and companionship given her."

Two daughters were born to them. The eldest,
while still very small, suffered an illness which caused muscular wasting, resulting in a severe physical handicap. This illness and its tragic sequence was bravely accepted by Dr. and Mrs. Mackenzie and they did much to help overcome her handicaps. The second daughter was much like the father and was his very close companion. They often took long walks together to various interesting places in London. She attended Queens College when sixteen years of age. Shortly thereafter she developed meningitis and died within a few days. For a long time Dr. and Mrs. Mackenzie’s lives were overshadowed by this tragedy.

Humility was a major character trait in this great man. He still sometimes thought of himself as a “dunce.” He once said, “If you ask what is the first step in the search for truth, I say humility. If you ask what is the second, I say humility. And the third, I answer the same — humility.” The opening sentence of the present letter, “Your request somewhat tickles me, so I send you a few lines in reply,” is an example of this humility, considering this response from one of medicine’s greatest physicians to an unknown foreign medical student.

In spite of his success in London in both reputation
and income, Mackenzie was not happy in this "Ivory Tower" setting. He decided to go back to the country, and so moved to the Scottish town of Saint Andrews and founded the James Mackenzie Research Institute.

For thirteen years he lived and worked with ever worsening angina pectoris. He said, "I am not afraid of death. A man with angina pectoris is like one of the old martyrs confined in a room, the walls of which gradually fold inward and crush him." In early 1924 the angina became so severe he spent most of his time in bed. It was during this time he wrote the letter to me. He subsequently left Saint Andrews due to the cold climate and returned to London. The angina pectoris continued to increase in severity, and in one last seizure (probably massive myocardial infarction) he died on the night of January 25, 1925.

Letter From Sir James Mackenzie

New Park
St. Andrews

April 22nd 24

Dear Mr. Smith,

Your request somewhat tickles me so I send you a few lines in reply. I was born in 1853, my father was a farmer in the county of Perth, I received a good elementary education & graduated in Medicine in 1878 from the University of Edinburgh. I had an undistinguished career at school and college, and the only thing for me was to go as an Assistant in General Practice in the manufacturing town of Burnley in Lancashire. After a year I was taken into partnership and stayed in Burnley until 1907. After being a few years in practice, I realised how little I knew about medicine. I couldn’t tell the nature of a single symptom from which my patients’ suffered, such as, pain and irregular heart. A search through medical literature revealed that the nature of such symptoms was unknown. I started their study. In regard to pain I sought for all the tissues which give rise to pain when they were stimulated. I found some tissues would not respond to such stimulation as punching, cutting, tearing, burning, while other tissues responded with varying degrees of pain. I then sought for the reason of this difference and found it in their nerve supply. Certain structures gave rise to pain which were insensitive to this mechanical stimulation. I therefore concluded some vital process must be concerned & this lead [sic] to the recognition that the most violent pains are due to muscle contraction as in the colics, labour pains and angina pectoris. I then sought the nature of the stimulation and today I am concerned about the cells that receive the impulses in the cortex of the brain which give rise to pain. It is now possible in a great many people from the situation of the pain described clearly by the patient we can tell the seat of disturbance & not only this but in many cases the actual morbid condition. In the course of these observations I recognized the areas of hyperalgiesia which are so common in affections of the abdomen and whose diagnostic significance & the method of detection has not yet been grasped by the medical profession.

At the same time, over 40 years ago I started the enquiry into pulse irregularities. The first matter I took in hand was to find out the chambers of the heart that participated in the irregularity. By means of a pocket polygraph that I devised I was able to recognise the movements of 3 and sometimes of 4 chambers, & from this time onwards I was gradually able to differentiate the different forms of heart irregularities. Although this polygraph is not now in fashion it far exceeds the electrocardiograph in the amount of information that it yields. As regards heart-block, in which you are interested, the first record was made by Galabin in 1875. (See also Morey’s ‘Coarctation du Sang’ p 216 Fig 112 — the 6th type in complete heart block.) The next record was by Chauveau in 1885. In the nineties of last century I was able to obtain records not only of complete heart block but also of partial block. The first case was one of delay in the passage of the stimulus from auricle to ventricle. You will find it on page 263 fig. 153 in the 3rd edition of my book on Diseases of the Heart. I am engaged on writing a new edition of this book & I am at present writing the chapter on heart block and on going over my notes I find the 1st record of partial block (was) the dropping out of beats, was taken by me in 1898 from a patient aged 18, recovering from a mild attack of rheumatic fever. The irregularity resembled that of figs 155 & 156 on pages 264 & 265. Fig 154 page 264 & fig 158 were from a patient under the influence of digitalis and these are the first records of partial block having been produced by digitalis. They were taken in 1903, after that time everyone was on the hunt for heart-block.

Although I had been writing and describing my results I found that few people took any notice of my work either on pain or on irregular heart action. So I determined to leave Burnley and go to London, which I did in Dec. 1907. The first year in London I spent in writing the 1st edition of my book on diseases of the heart. I had published in 1902 a book on the pulse, but very few copies were sold. When the book on "Diseases of the Heart" was published it sold very rapidly and excited a good deal of interest and I gathered round me in London a number of young eager spirits including Thomas Lewis, John Parkinson & A. E. Cohn [unable to decipher], I was appointed first to the Mount Vernon Hospital & then to the London Hospital where I started departments for the study of the heart. These were going very strong, but the War broke out when they were closed down.

I had acquired a very large consulting practice in London seeing people from all parts of the world, & I was struck with the absence of any sound principle on which a diagnosis and prognosis and treatment could be based. This impression was greatly increased during the war. At the instance of the Government I made a report upon the soldiers who were invalided because of their hearts. This was in 1915 when there were some 10,000 cases in the hospitals in London. On the examination of 400 I was able to draw attention that to 90 per cent were not cases of heart affection, — the heart symptoms being secondary to the other conditions chiefly infections & on my recommendation the Government started special hospitals for the investigation of these conditions.

I was appointed consultant, & I at once saw that little good would come out of this work because there were no principles which guided the research. I may add that notwithstanding the enormous amount of research in this matter undertaken by every nation little progress was made beyond the stage that the American surgeons had reached at the end of their Civil War (1862).

In 1918 I gave up my practice in London & came here to start an Institute specially devoted to Clinical Investigation. During that time we have devoted ourselves chiefly to the phenomena which we recognise as ill-health in order to find a principle
which would guide research in medicine based upon the laws which govern the production of symptoms in place of the haphazard methods which are used today. In this endeavor we have recognised a principle which throws a new light upon every department of medicine. The present day knowledge for instance of the heart beat is so imperfect that the interpretation of any movement in the heart fails to recognise the real agents that are at work. For instance the condition which is called auricular fibrillation was first recognised by me 25 years ago & I then called the condition "paralysis of the auricle." It was later found that in this condition the auricle was fibrillating and since then the belief has been held that the condition is due to the auricle, whereas, under the new method of investigation it is shown to be due to a cessation of the activity of the sino-auricular node.

We are profoundly ignorant of the diseases and disturbances of the conducting system. Even heart block is so imperfectly understood that it is only the grosser kinds of disturbance which are recognised. In every disturbance of the rate and rhythm of the heart this system is involved, & we have made but little progress yet in recognising this fact. If you take up, in future years, this subject you will find it a most fruitful field, for it promises to reveal not only many important matters connected with the heart but with the principles which govern the vital processes of other organs. Thus we are breaking new ground, and you would do well to make yourself familiar with the work we are doing in St. Andrews.

I have employed my researches into pain to throw light upon angina pectoris and about a year ago I published a book on this subject. I have myself been suffering from this complaint for the past dozen years & it has now advanced so far that I have to give up all active participation in research, & I contemplate leaving Scotland in the autumn because the cold winters cause me a good deal of suffering & I intend to take up my residence again in London.

I trust this outline may be of use to you, the chief object being to impress upon you that in general practice in places remote from laboratories and hospitals there is a great field for observation & research, and until this field is explored the progress of medicine will be hampered.

With best wishes
Yours sincerely
/s/ J. Mackenzie

Comments Concerning the Letter

Although this letter contains no new material about Mackenzie, it is interesting to review the thoughts of this master clinician a half century after the letter was written. Mackenzie remains a great inspiration to any aspiring clinician for he was passionately devoted to improving his prognostic ability by understanding the signs and symptoms of his patients. He accomplished this by the straightforward yet enormously arduous task of observing his patients for hours, recording their arterial, venous, apical and hepatic pulses, and laboring endlessly to correlate his puzzling tracings with the clinical symptoms.

His observations on heart block in his book, Diseases of the Heart, reveal a very clear understand-

of the pathophysiology, physical findings and diagnosis of the various degrees of conduction disturbances that would be in relative accord with current concepts. Several of the figures mentioned in his letter are reproduced to illustrate the fine quality of his recordings (figs. 3 and 4).

His major accomplishments included his influence on such great cardiologists as Thomas Lewis, John Parkinson, and Karel Wenckebach, his studies on angina pectoris and the illness of "soldier's heart" that filled the military hospitals during World War I, and of course his numerous clinical observations and recordings. His most important teaching, however, was his conviction that physical findings such as murmurs, bruits, and extrasystoles were not prima facie evidence that established the presence of severe heart disease. Prior to Mackenzie’s teachings it was common practice to restrict activities or forbid childbirth, sports, and heavy exertion when any murmur or pulse irregularity was noted. Mackenzie lamented this practice and insisted that these findings were significant only when they resulted in a limitation of response to effort. This concept revolutionized medical practice then and continues to be the basis for our clinical staging of heart disease to the present.

If Mackenzie were to comment on his letter today, it is likely that he would be pleased with the recent interest in heart block and the new understanding of the conduction system. He would almost certainly point out, however, that the interval of 50 years has not

Figure 3

The tracings illustrate the venous and arterial pulses recorded in a patient with 2° (Wenckebach) A-V block.
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Fig. 161. Here the tracing from the neck shows sometimes three auricular waves (a) to one carotid wave (c). In the last two periods there are but two auricular waves, and the a-c interval is longer than in the periods when there are three auricular waves, because in the former case the conductivity has not had so long a time to be restored.

Fig. 162. Tracing from a case of heart-block. There are four auricular beats to one ventricular (4:1 rhythm).

Fig. 163. Tracings from a patient with aortic regurgitation and partial heart-block. The waves a are regular, and the difference in their appearance is due to their time relation to the large carotid pulse (2:1 rhythm).

Figure 4
Graphic recordings of high degree A-V block.

brought forth very much observation and research "in general practice in places remote from laboratories and hospitals." Perhaps he might wonder if the structure of medical publication today does not encourage this kind of investigation. He would probably point to the current scramble for the natural history of angina pectoris and say again:

One special function of a consultant is to foretell what is going to happen to a patient if treated, or if left untreated. To obtain this knowledge it is necessary to see patients through the various stages of disease, and this can only be done by the individual who has the opportunity.

References
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