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THE EIGHTH JAMES MACKENZIE LECTURE

JAMES MACKENZIE AND GENERAL PRACTICE TODAY*

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James Mackenzie was born in 1853. This was less than fifty years after the introduction of the stethoscope for general use by Laennec. He died in 1925 when the revelation of the electrical current, in the contracting heart muscle by the string galvanometer had been studied for twenty-five years or so. He was as sceptical of conclusions based on the uncritical use of the stethoscope as of the early estimates of the value of electrocardiograms. His scepticism was not the refusal of a narrow mind to accept new material. It was based on the fear that evidence from a well functioning instrument might limit the attempt to understand early underlying changes in function.

Mackenzie was the third child of a farmer in Perthshire where the family had been established for some generations. He and his three brothers followed a long established pattern in their choice of work. The eldest followed his father as farmer, each of the remaining three was trained in one of the three senior faculties of the mediaeval universities, theology, law, and physic. It is to be remembered that the Scottish universities have all developed on mediaeval foundations intellectually.

His brothers seem to have studied for their professions without delay. The next below him in age took a degree in theology, and was moderator-elect of the Free Church of Scotland at the time of his death from coronary thrombosis. The younger became a lawyer, was later drawn into other fields of work, and is better known as the first Lord Amulree.

James Mackenzie left school at fifteen, apparently at his own request. It was an undistinguished and uneventful school career. It seems that he found the normal method of learning, largely by rote, both difficult and without any stimulus to his mental appetite. Whatever the cause he lost confidence in his intellectual capacity.

*Given in the Great Hall of Tavistock House, London, on 24 November, 1961. Reproduced by courtesy of the Editor of the *Practitioner*.

It is recorded that he returned from his first day at school saying "I have done with my education" and left 10 years later with relief, and without any wish to pursue it further.

The early end to his schooldays disposed of plans for higher education in spite of the family tradition. He was apprenticed to a pharmacist for the full term of five years in the city of Perth. These five years might well seem a waste of time and frustration of development. Probably their value in his life was the very opposite of this. They may have been of advantage in the slow maturing of his mind away from the dogmatism of school teaching of that period. In addition to allowing him an interval to develop his own intellectual independence, it gave time for the growth of a large frame and powerful physique. The actual technique of his craft must have developed deftness of hand. This he applied for many years in using the polygraph of his own modification with which he recorded pulses in veins and arteries, and so came to understand and relate disordered functions of the chambers of the heart. In these years, too, he was trained in exactness and precision, so that approximation in measurement could not be tolerated. Fine exactitude in data must have become essential in his thought processes from this time on.

It may be, too, that contacts between the young apprentice in the pharmacist's shop and the customers that came to it, emphasized the load of physical troubles that beset them. Perhaps when he started his medical training he had a greater awareness of human disability and suffering than the average student.

The outward sign of his maturity and growth was the decision to enter Edinburgh University to study medicine. He appears to have come to this decision shortly before completing his term of apprenticeship, but he was definite in his wish to put in one year of work as a qualified pharmacist which he did in Glasgow. This meant that he was nearly twenty-one when he entered the Medical School, and some 3 or 4 years older than the majority of students of his year.

He shared a room with his younger brother who was studying theology. This may have expanded still further his interest in human beings in the round, to a degree unusual for his age and university year, and added there to a taste for logic and philosophy.

The first years of training were not punctuated by any prizes or academic successes. The dogmatic element in the training of medical students may have been as unrewarding for his maturer mind as the teaching at school. His co-ordination and skill with a ball was noteworthy, and this skill and pleasure he retained throughout his

life, until limited by angina in his last years.

With the work in the wards, however, his ability and his interest in human beings became apparent. He won two medals, and was offered a position as demonstrator of pathology. This he refused owing to the necessity for financial independence. His friend Sims Woodhead obtained the position.

The opportunity to spend six months as houseman at Edinburgh Infirmary ranked him as a graduate of adequate quality. This was followed by a few weeks as locum in a Durham colliery village, and stimulated his inclination to make general practice his work.

John Browne, the junior partner in a long-established practice in Burnley was few years senior to Mackenzie, had been demonstrator at the medical school at Edinburgh, and had noted the large-framed and older student with the impressive head. A student junior to Mackenzie described him as a "gaunt, gauche, determined ambitious youth, who worked like a nigger"¹. The acquaintance-ship with Dr Browne resulted in an invitation to assist in the Burnley practice. The senior partner, Dr Briggs, was a bachelor living with his sister over the surgery, and the assistant lived with them on the top floor.

The twenty-eight years that followed were spent in this same practice. Almost the whole of his research into the problems of the failing circulation and the mysteries of referred pain were carried out here. And this while he was undertaking a range of work that is no longer suitable today. General surgery, often on the kitchen table and for major operations, was pursued alongside an enthusiasm for midwifery. In the later years surgery became more restricted, but by then his reputation had brought him increasing invitations to work in consultation over a widening area.

The accumulation of records and tracings, and the time spent in pondering, in reading, and in contacts and friendships with scientists in medicine, were all fitted into general practice. By the time that Mackenzie made the decision to move to London in 1907 at the age of 54, all the foundations of his life's work had been laid, though much remained to do in the application and publicizing of it. The record is the more remarkable when considering the modest estimate of the young doctor's abilities, both in his own mind, and those of others when he arrived in Burnley in 1878.

In the words of Sir John Parkinson who was Mackenzie's first assistant in the cardiac department of the London Hospital²

"Up to this time (1878) neither he himself nor others had much confidence in his powers or promise; his was a brain that developed slowly. The stimulus proved to be the shock of realizing his ignorance, his inability to deal with the

painful problems that faced him later. . . We cannot doubt that deep feeling has often been the spring of medical research."

Because this remarkable man did so much while working in general practice, it is worth an attempt to estimate the circumstances that favoured it.

His inheritance was a sound one; his childhood and youth (for he travelled daily into Perth) were lived under healthy, pleasant, though no doubt arduous, conditions, owing to financial stringency. His father seems to have been a steady and very hard-working individual, his mother with more farsightedness and ambition for her family.

The interesting negativeness of his school record, and to some extent of his university career, is to my mind important in considering the development of his powers. Dogmatic and systematic learning was the basis of secondary, and of much higher education at that time. It can be a valuable basis, but is sometimes intolerable to those of an enquiring nature. Whether inattention, distaste, or frank inability to learn by heart is at the bottom of this failure, it has the enormous advantage of leaving space uncluttered by rote and blind acceptance of facts. Mackenzie accepted nothing simply because he had been told it, but only after proving patiently to himself that it was reasonable to do so.

In his own words in a letter to a junior colleague "The great hinderance to the advance of medicine is the absence of the critical spirit, and the presence of 'faith'".⁴ Faith, in this context, appears from the rest of the letter to be the acceptance of information because taught by tradition.

The introduction to his book on *Symptoms and their interpretation* is a fascinating study of the value of observations when studied by a mind uncrowded by easily acquired habits of absorbing information uncritically. School education in Scotland in the mid-nineteenth century was essentially a linguistic and classical one, and if he gained nothing else, Mackenzie has the very essence of it in his valuation of words and their meaning. His efforts to describe an observation in terms that do describe it, and it only, bears the stamp of simplicity that appears repeatedly in Harvey's *De Motu Cordis*.

He was a ceaseless inquirer. "An inquirer should keep his mind ready to review his most cherished beliefs."⁵ "This tendency to embody warranted or unwarranted assertions in the record of a fact, impedes the progress of medicine", and again to his young correspondent Dr Guthrie "Your faith in Hypod: inj: of Strych: is quite as superstitious as the old woman believing in a personal devil—there is as little evidence in the favouring of the one superstition as the other."

Though these words are written in his middle years the attitude, scarcely conscious perhaps, must have been present when he joined Doctors Briggs and Browne in practice.

Dr Briggs was a graduate of University College Hospital, probably in his sixties in 1878, and therefore a student in the very early days of the medical school in Gower Street. Few people remember that University College Hospital was accurately named, for it was founded not for humanitarian purposes to bring hope for the sick and comfort to the dying, but with the very deliberate plan of providing clinical material for teaching purposes. Those of us who have known and loved the hospital throughout our own professional lives are aware that in it humanity and understanding of the man and woman in pain and sickness is and has ever been second to none. But its original purpose for teaching and research may well have produced an unusually alert and critically minded general practitioner as principal for young Dr James Mackenzie.

The practice appears to have been carefully organized, so that time was available daily for exercise as well as for study. The new assistant seemed to have been impressed by the older man's acumen in spot diagnosis and to have analysed it as the results of experience, based on critical observation with accumulation of knowledge. Here surely is an undocumented influence at an important period in the development of mind and spirit of James Mackenzie.

Perhaps, too, the vigour of the inhabitants of the northern town was favourable to the remarkable work done in the next stretch of years. The spirit that keeps it as the smallest town in the first division of league football, may have had other expressions 80 years ago. In addition, it was an urban area but not too large, nor too diffuse, nor merging with other centres, but with a well defined edge. This, with the greater stability of population at that period, must have offered continuity in the long-term study of ill health among the inhabitants. An additional facility was his position as physician to Victoria Hospital in the town.

As to temperament, he must have been cool and disciplined even at this stage. He started publishing papers as early as 1883, after proceeding M.D. in 1882. Parkinson has written of him ". . . it was a calm and hard-headed man who carried that unquiet and inquiring mind".⁶ These words were applied to the acknowledged master of his subject early in this century, but calmness and hard-headedness must have been important when he started to plan his system of research which was already underway in his middle thirties.

It may be worth considering his achievements from three points of view:—first the impulse leading to the decision to undertake his

life's work of the study of symptoms: next, the capacity for undertaking sustained research and the techniques that he developed: and lastly, the publication and publicizing of the results. This involved far more than the production of papers and books. It required a fundamental alteration in his way of life, both personal and professional.

Undoubtedly compassion was effective in directing his intellectual interest to symptoms and to the changes in body function and structure provoking them. "Mackenzie was not interested much in what was known, but in what was lacking in the understanding of a subject or of a patient".⁷ In a young man this must grow out of intellectual humility. I have tried to show that this was indeed an essential of his mind owing to the unusual early years of development. Mackenzie is world-famous for his work in cardiology. Behind the work lay his concern for sufferers from pain and especially visceral pain. The earliest published papers are about lesions of the central nervous system, including the pain of angina pectoris as part of a larger whole. In the early 1890's his papers appeared in *Brain* elaborating the sensory expression of visceral disease as the viscerosensory reflex—just preceding the publications of Head on the same subject. His interest in the whole range of visceral symptoms extended to the end of his life. It is elaborated particularly in his book published in 1909 *Symptoms and their interpretation*.

In addition to his sense of compassion for suffering was his intense concern over death in a younger person. The story of his horror at the unanticipated collapse and death of a young woman from heart failure in labour is well known. Undoubtedly experiences such as this appalled him by his ignorance of prognosis, and focussed the special interest in cardiology as a channel of investigation from the head waters of the study of symptoms in general. As well as this, he was distressed by the unnecessary invalidism imposed by doctors when signs thought to be indicative of heart disease were considered without relation to symptoms and efficiency, and without critical assessment of their cause.

"The nature of the early symptoms and the prognosis of disease are amongst the least understood matters in medicine. I have endeavoured to utilize the opportunities of a general practitioner to study the earliest symptoms of disease, and the bearing of the disease upon the patient's future life".⁸

These words were written in maturity, but they could never have been written unless the purpose behind them had been active long before.

His ability as a good family doctor to help his patients was apparent in his excellent relationship with them. He understood especially their need to have an estimate of the future so far as their

own and their dependents' lives were concerned. Thus he valued an accurate history, both as part of the research material, and also as part of the service he could give them. This in itself must have impelled him to the long term planning which give his conclusions such substance and lasting value.

"In addition to recognizing the meaning of any abnormal sign or symptom we should endeavour to acquire a knowledge of what bearing it has upon the future history of the patient. This knowledge can only be obtained by watching how patients withstand the storm and stress of life".⁹

These words are the key to his plan of research. He related it to general health, but increasingly to cardiology, for pain, fatigue, and dyspnoea are all readily reported by patients, and the final course of illness only too obvious.

In searching for methods of physical notation of disordered heart action he evolved the ink polygraph. This was a simplification of a bulkier machine, already designed by Dudgeon. Mackenzie's own variation of it could only have been devised by one who had pleasure in small and accurate measurement. In its early form, pillbox tambours were placed on the venous pulse in the neck, the radial pulse at the wrist, and the pulsations recorded by straw levers on moving smoked paper. In 1885 this was perfected with the help of a brilliant watchmaker to record in ink on a moving strip of paper. The machine is famous, and was soon so well known and so much associated with his name that Mackenzie was dismayed. He knew the risk involved by neat recordings being valued for themselves. Throughout his publications he is insistent that it is the consideration, the analysis, the correlation of the recordings in the light of all the other evidence that is important. He regarded the stethoscope in the same way. The sounds conducted by that simple instrument had often blighted a young and healthy life because accepted as evidence of disease without further thought.

Undoubtedly he had great pleasure in using his polygraph. There was of course the delight of obtaining records to support or refute the hypotheses that he was working on. But, surely, he must have enjoyed the deftness with which he assembled and applied it. The sense of skilled handwork was a relic of his years in pharmacy. Perhaps this pleasure brought a lighter element to the years of observations. It was only one example of his belief in the use of the doctor's senses.

The risk of giving up observations before conclusions were substantiated was great. The risk of being submerged by the accumulation of recorded data was greater still. His observation of the first onset of auricular fibrillation in a particular case was made in 1898, although he had defined and was working on the condition by 1890. In 1892 the effect of heart block in a case of fibrillation was

first noted. His first book *The study of the pulse* was published in 1902. This is a long period in which to accumulate histories, clinical observations and pulse tracings and to evolve clear arguments because of, not in spite of, the abundance of material. "Here was a genius for taking pains, but a common sense that kept technique in its place as a servant and not as a master"¹⁰ wrote Parkinson who knew him so well.

An aspect of his work which interests me especially is the rare capacity for intellectual detachment within the clamour and insistence of general practice as a family doctor. There is no doubt at all about his close identification with his patients as human beings in trouble and illness. He could remove his mind daily to the consideration of problems detached from the complexity of tissues and social reactions that is man. "I never knew how far it was love of truth or how far love of humanity that quickened his mind and spirit,"¹¹ wrote Parkinson for the centenary in 1954 of Mackenzie's birth.

He has been described by one who knew him well as hard-headed and calm. Background as well as inheritance and character must affect calmness. His marriage in 1887 was by all accounts a supremely happy one, giving companionship and devotion throughout his life. His two daughters were a source of the greatest happiness, though of great sorrow. The younger, his constant companion, died of meningitis at the age of 16, shortly after the move to London. The elder was seriously disabled by poliomyelitis as a small child, but dominated her disability with her father's endless support and stimulus. His quiet, blunt humour was always near the surface. He used his mind widely and was working at French and German throughout these years in Burnley. And, too, his body functioned well. He enjoyed skill with his hands, perhaps he enjoyed the toil of writing too, and he revelled in his physical outlets in golf and billiards. He played chess. All in all he was a happy man.

The twenty-eight years in practice in Burnley resulted in conclusions some proved and some still awaiting proof that were becoming widely known. He was invited by neighbouring colleagues to consult over cases in an ever widening neighbourhood. He was making friends with men who were the scientists in medicine, and with a few of the great clinicians. Arthur Keith and Leonard Hill among the first, Clifford Allbut and Osler among the second. Strangers came from Europe and from America to meet this family doctor in the north of England. Sunday afternoons were devoted to the examination and recording of interesting problems among his patients. Increasing numbers of medical visitors came to the house in Bank Parade, Burnley, for that weekly session.

How much one longs to know about his decision to move to

London. To leave the background of his work must have meant a conviction that he had already extracted sufficient value from studying the lives and bodies of his patients, and would gain less from remaining. To go to London meant a belief in his conclusions so great that he was convinced of the need to publish them as widely as he could achieve. This meant financial and professional uncertainty, and loneliness. There were two great assets, the first his family happiness, and the moral support they would give, and secondly the absence of self-seeking or place-seeking in his own outlook.

The family moved to London, to a roomy house in Bentinck Street, in 1907. His second book *Diseases of the heart* was published in 1908. This was already largely written before leaving Burnley, and timed no doubt to follow his own arrival closely. It is interesting, too, that his first published contribution on medical education was an address at the opening of a postgraduate course in Leeds in 1907, which made a considerable impression on teachers and medical scientists far outside that city.

The impact of his second and much larger book, together with the support of his friends, essentially scientists, made this courageous move a success. After a few months patients came in increasing numbers to consult him, and solved the practical side of the new life.

Mackenzie was soon appointed to the staff of Mount Vernon, and the West London hospitals. His position as lecturer in cardiac research at the London Hospital from 1911 is renowned for the sagacity of Lord Knutsford, who made the appointment. But Lord Knutsford's sagacity was based upon the advice of the scientist friends of Mackenzie in the Burnley days, Arthur Keith, Leonard Hill, and Professor Bulloch. This suggests an important effect of Mackenzie's work. Though he was working largely in solitude at first, it was predominantly the medical scientist that he interested and impressed by his methods, and by the close reasoning that led to his conclusions. These friendships began 10 or 15 years before the appointment of the Royal Commission on University Education in London in 1910.

The report of the Royal Commission published in 1914 recommended the establishment of professorial units in medical schools to integrate the scientific and the clinical sides of medicine more closely than could be achieved solely in the existing and at times haphazard system of teaching by honorary members of the hospital staff.

One country in Europe had already progressed to this stage. In Germany a university clinic was established as early as 1878 at

Munich, another in Leipzig in 1892.

It is interesting in this relation to learn from Parkinson that the first copy of *Diseases of the heart* that he saw was a German translation open in the wards of a German hospital for constant reference by the staff of all levels in 1909.

It was from Germany that visitors came most often to England in order to meet the almost unrecognized doctor in Burnley. Hard on their heels came doctors from America, where the first university centre of a kind comparable to the German clinics had been founded in 1899. It was from America that Flexner's influential memorandum reached the Royal Commission. The report of the Commission advocating the integration of scientific and clinical work in medical teaching was published at a time when Mackenzie had been practising and preaching this doctrine for years.

The opening words of Chapter I of his book on *Symptoms and their interpretation* are "Medicine has not attained that position in Science which of right belongs to her. She is often content to pursue an erratic course of her own".¹² He had designed his programme on scientific lines himself. He had been his own technician in the work on cardiac arrhythmias and murmurs and the study of cardiac failure. He had sought out the scientists in physiology, anatomy, and pathology as his friends, and they had often sought and found him. He valued laboratory methods in advance of his time, though always fearful lest laboratory findings alone could be misleading. Though the Royal Commission advocated the union of scientific with clinical observation in teaching, Mackenzie was critical of over-sights in their method and report. There was so little enquiry into the results of medical education in equipping doctors for their work. He complained that no single general practitioner was called to give evidence in this respect.

In coming to London and working as consultant and teacher he left behind him the study of patients in length. He brought with him the results of nearly thirty years of laborious observations on changes in the bodies of men and women as years passed, as stresses accumulated and disease progressed. He gained in London the opportunity of working in width, of accumulating evidence on many cases with a team co-operating on a designed programme.

Mackenzie began to work in the wards of Mount Vernon Hospital soon after arriving in London. Here in co-operation with Cushny and a group of younger men work was begun to estimate the value of digitalis, particularly in relation to the conclusions reached from Mackenzie's own work on the arrhythmias of the heart and the nature of cardiac failure. The final report filled a whole number of the

journal *Heart*. Those who worked with him have emphasized the demands that Mackenzie made upon them. "The process of observation was slow and tedious and the results were only to be obtained by the most painstaking observation of the minutest detail."¹³ Cushny has said "more progress was made in fifteen years than in the preceding century".¹⁴ The conclusions remain virtually unchallenged today.

He valued observations by patients, whether spontaneous or as answers to questions, providing information as to well-being or the reverse, and as clues to temperament and behaviour. This is illustrated by a story told me by his nephew. Mackenzie was making a weekend visit to his university city of Edinburgh. A surgeon invited him to give his opinion on the circulatory condition of a woman in a ward at the infirmary, awaiting cholecystectomy. She was found to have anomalous heart sounds. This had aroused doubt in the surgeon's mind about the wisdom of operating. The news of Mackenzie's visit had spread. A crowd of staff and students gathered in the ward. He talked to her about her home. It was on the top floor of a house in the Lawn Market. Did she shop for her family of six? Of course, who else? And carry it up the stairs? Indeed, yes. And how many times in the day did she climb those stairs? Countless times. And did she find them trying? Why should she. Mackenzie turned to the surgeon and told him to operate with confidence so far as the function of the heart was concerned. The crowd drifted away disappointed at seeing nothing of the famous man's renowned skill in examining a patient. This can be criticized as a story of ostentatious exhibitionism, which was out of character with all that was known of Mackenzie. Rather, it was an opportunity seized to demonstrate the importance of estimating function, and the value of the patient's own report. The "work force" of the heart were words that he often used.

Certainly Mackenzie took every opportunity to teach the value of combining the individual's account of himself and his feelings of ill health, with all relevant investigation into function and evidence of disease. This was the line of approach when the unit to investigate "The Soldier's Heart" was established at Mount Vernon at the request of the War Office in the latter half of the 1914—18 war. The scheme was initiated by Mackenzie himself, who with Albutt and Osler visited it regularly. The staff of younger doctors (all names well-known since then) studied the population of young men, ineffective in the fighting forces on account of fatigue, palpitations, and breathlessness. While planning the unit, Mackenzie wrote to Parkinson that the symptoms of most of these young men were "simply part of the general condition of weakness affecting chiefly

the vasomotor system and brain”¹⁵. The conclusions, the forms of rehabilitation devised, and the results of a further forty years’ observations have confirmed his original estimate of the problem.

From 1907 to 1917 Mackenzie worked in London, at first unknown, but within a very short time recognized for the qualities of his mind, as well as for the importance of his work in the long preceding years. He taught and preached his views, designed and was leader in programmes of research. He established the cardiac department at the London Hospital. He was largely responsible for the launching of the journal *Heart* within a year of his arrival.

The clinicians acknowledged his work with membership of the Royal College of Physicians in 1910, to be followed by the fellowship in 1912. The scientists recognized his achievement when he was made a Fellow of the Royal Society in 1915. He was knighted in the same year.

Throughout these 10 years of arduous work he was anxious lest his achievements in one specialty, cardiology, should deflect attention from his conviction that it was the whole body with the interaction of structure and of function that mattered. “The economy is so arranged that the function of each organ is necessary to the due action of the whole”¹⁶. This was fundamental to all his work, and constantly expressed in varied wording.

Mackenzie’s work on the viscerosensory and visceromotor reflexes, in the absence of any published work on cardiology would have made him a noteworthy scientist. His book, *Symptoms and their interpretation* was published only one year after that on *Diseases of the heart*. The two must have been written almost in parallel. Translations and editions of the volume on symptoms were fewer. It represents in many ways a statement of outlook, philosophy, and hypothesis, always in the background of the more specialised treatises. *Diseases of the heart* caught the attention of public and profession alike more readily. It dealt with matters of life and death, even if through the processes of exhaustive observation and technical investigation. But behind the larger volume lay the principles on which he had studied the subject since the early years of practice. In the introduction to the fourth edition of *Diseases of the heart* rewritten just before he died, are the words “The main duty of a doctor engaged in treating the sick is to combat ill health and death. To do this with a prospect of success it is necessary to know the nature of ill health and the conditions which lead to death”¹⁷.

Mackenzie had expressed views like this in many publications. Some critics thought that he exaggerated the importance of early

symptoms and the existence of basic natural laws in failing health. He demonstrated the study of detail combined with awareness of the whole bodily reaction both in the single-handed study while in family practice and also in the team work behind the comprehensive report on digitalis. With this appreciation of exact observation of detail and the need to investigate the end results of disease he never overlooked the importance of early dysfunction. "You don't seem to admit patients to hospital until they are incurable", was his notable exclamation when he began work at the London Hospital. His influence was one of many to bring about a change in this respect.

It is of course to be expected that he valued above all the work of general practitioners in exploring the beginnings of disease. "His opportunities as the family physician enable him to become acquainted with the lives of a number of people before disease attacks them and during the whole course of its development."¹⁸ It is characteristic that he expected a family doctor to be acquainted with his population in health as well as in sickness. And again. . .

"To achieve the aim of medicine it is to recognize disease and understand all the phases of its life history. It is evident that only one class of individual has the opportunity for acquiring this knowledge, and he is the general practitioner."

Mackenzie was 64 in 1917. He had worked tremendously hard in studying and guiding his patients. He had succeeded in establishing principles for prognosis and treatment of cardiac disease. He had influenced medical education. He had initiated clinical research by teams, working to a prepared plan. He had done all this in the space of 10 years. But he was still dissatisfied.

"He determined to study afresh the nature of symptoms as met with in practice, so as to learn of disease in its early and perhaps curable stage. As time went on he foresaw that the phenomena of disease might be governed by simple laws, which he formulated as basis for further examination by his colleagues."¹⁹

In these words Thomas Lewis described Mackenzie's plan when he left London, fame, and a large income to go to St. Andrews, Fife. Hippocrates said that "The physician who is also philosopher is the most nearly divine". Perhaps the clinician and philosopher almost co-existed in those few remaining years of his life.

St. Andrews was chosen for several reasons. It was a static community in a well defined area with an almost complete range of social classes living in reasonably healthy conditions. The small city contained a famous university, and the medical school was in nearby Dundee. All the local general practitioners were ready to co-operate—and it had a very famous golf course. Mackenzie had hoped to review the population in breadth, through their calls on their family doctors, and to continue observation in length, throughout their lives on lines agreed and to some extent standardized.

No conclusive work emerged from this experiment. The time left for Mackenzie to lead it was short, and no doubt his physical powers were failing even at the beginning. His first prolonged attack of angina occurred in 1909, though he still enjoyed playing golf for two or three years after the move to Scotland. The aims were probably too extensive, the plan of work too ill-defined in the short time that the Institute existed. But it was an original conception and in some ways the first idea of a Health Centre. He was well backed by the practitioners of the little city, and he himself believed that some principles along which to work, were emerging. Probably the motive power to organize and maintain work on a diffuse programme must needs be even greater than that required for the concisely designed digitalis survey several years before, when he had driven his juniors almost intolerably hard, and himself harder still. Severe angina pectoris sent Mackenzie back to London in 1924, away from the harsh winds of the east coast. He died in January 1925 from a massive coronary infarct.

Many features of this great man's work are familiar, almost as a popular tale. I fear that I may have repeated much that is only too well known in trying to throw light on those parts that are of particular interest to us in general practice today.

The fact that he could initiate, carry through, and publish his researches on the action of the heart during the years in general practice from 1878 to 1907 is a magnificent stimulus to us all. That alongside this detailed work on the circulation he conceived and applied the doctrine of viscerosensory and visceromotor reflexes, never losing full awareness of his patients' needs in the whole field of discomfort and disease makes his researches greater still. Let us not delude ourselves that Mackenzies exist unrecognized and unhailed in any number among the general practitioner section of the profession at any time. We are in fact proud to acclaim a precious few at work today. I believe that major qualities of intellect and character, though always rare when matched with emotional stability, are always acknowledged sooner or later. The continuity of his work, his power of sustained thought throughout interruptions (and he was particularly fond of midwifery) are remarkable. His method of working to a hypothesis and rejecting it when facts disproved it are an example to any who struggle in the field of clinical observation. "An inquirer should keep his mind ready to review his most cherished beliefs."²⁰

The principles upon which he worked are set out in the introduction to *Symptoms and their interpretation*, and again in *The Future of medicine* published 10 years later, in 1919. This begins: "To be successful in any endeavour it is necessary to have a clear

idea of the object towards which we strive." In the thirty-five years since his death, though much has been achieved, these opening chapters still stand as admirably sound advice to those who undertake any clinical and human ecological investigation.

Mackenzie demonstrated too the value of work achieved by a team of doctors working on patients to a well-designed plan, and definition of objective. In this field our College of General Practitioners has pursued these lines from the very beginning of its schemes of research. If the lone research worker of outstanding quality is rare, the team of workers willing to co-operate is a system available for very many. May it continue to develop and come to include workers in all fields of medicine.

Mackenzie's achievement in crossing the gulf from family to hospital practice was less spectacular in his own lifetime than it would be today. Future opportunities are now under consideration. His professional life remains a model to be studied by reason of the way he made the change, and the difficulty that he gave himself in choosing to do so only at the highest level. All who knew him agree in saying that personal ambition was utterly remote from his outlook and his life. He was supremely ambitious that his work should be recognized and applied because he was convinced of its value to human beings. "He was a fighter for his opinions and he had to be"²². "He was intolerant of authoritative statement and traditional utterance, combating in argument, yet open to conviction"²³.

Then, too, Mackenzie demonstrated as few, if any, others have done, the importance of listening to the patient, and evaluating the evidence that only the patient can provide. He was well aware of the somatic expression of psychological unease, and valued it as an expression of dysfunction of the body. He applied this in the work on the soldier's heart. With his exactness of study of cardiac arrhythmias, of the significant and non-significant alterations in heart sounds he was able to release those with functional symptoms only from the shackles of fear and of invalidism.

His writings on the value of the viscerosensory and the visceromotor reflexes, in elucidating the causes of the patients' symptoms, are a superb study for the family doctor. Though much has been incorporated into routine technique in examination along these lines, one can still read the first edition of *Symptoms and their interpretation* with stimulus and refreshment.

In medical education he held pronounced views. He would be one of the first to support this College. He would have approved the recent resolution of the British Medical Association that some awareness of general practice is of value to the medical student,

whatever section of the profession he plans to work in. The value of general practitioners themselves both as critics and advisers on the curriculum, and as teachers, was clear to him.

He was an enthusiast for extended teachings of physiology so that students should start their clinical work with a full appreciation of normal function, and he advocated the attendance of physiologists during ward teaching. He was critical of therapeutics throughout his publications, and ahead of his time in criticism of the current prescribing. He urged "the recognition of the diseased state before it has produced gross structural change, and the condition that predisposed to or induced disease"²⁴ and claimed that senior staff and all facilities for investigation should be available in outpatient departments. This was the exception in the 1920's, but has become the rule today. He would be satisfied too, by the increasing habit of medical schools to support attachment of students to selected general practitioners—for "a teacher of practical matters must be one who has experienced what he teaches."

He might put out a warning today that postgraduate study is not an end in itself, but only a means for stimulating, not for satisfying, the enquiring and critical mind of the true postgraduate student. Facts and accumulated information can clog unless questioned. "What is today accepted as axiomatic, may be shown tomorrow to be but a part of truth," he wrote in the introduction of *Symptoms and their interpretation*.

His endless insistence on the importance of prognosis is valuable to us. "The nature of the early symptoms and the prognosis of disease are amongst the least understood matters in medicine".²⁵ This was the backbone of his work in cardiology and of his continuing interest in pain as a symptom. "Sometimes our profession as a body does not sufficiently recognize its responsibility in regard to prognosis". It represented to Mackenzie an intellectual discipline, an exercise of judgment by which a doctor could ultimately determine the correctness of his observations and conclusions. He believed it to be above all a duty owing to every patient that he or those responsible for him should be informed of the prognosis of his disability, acute or chronic. Today his criticisms would still hold in my opinion. It is of interest that complaints, whether brought to the civil courts or within the framework of the National Health Service, refer more often to errors in prognosis, to mistakes in estimating, the significance of symptoms or signs than to mistakes in diagnosis.

This College is fortunate indeed to have chosen as an ideal, the life and work of James Mackenzie. The more I have read of his own writing and what is written about him, the more pertinent it

seems to our daily work and to our planning as a group. His outlook was wide, his professional ambitions and his ideals were great, and his influence far-reaching. In the years since he died some of his ideals have been fulfilled. We plan that work done by this College, individually and in the fullest co-operation may fulfil them still further.

The advancement of learning depends on the deliberate cultivation of the imaginative activity of the mind. There is no substitute for it. . . Scientists are not cold and calculating men whose business it is to crank the machine of discovery which will give them the right answers. Research is a most passionate enterprise.²⁶

Mackenzie would have enjoyed and agreed with those words of Professor Medawar, spoken only a few weeks ago. We can delight especially in the answer that he gave to some visiting physicians from the United States. During the discussion of a particular patient of his in the Burnley years, an American (puzzled, perhaps, by Mackenzie's intimate knowledge of the circumstances) asked at what point he had been called in consultation. Mackenzie turned to him in surprize, saying "I was never called in, I was the *family doctor*".

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