JOHN GRAY M'KENDRICK, PHYSIOLOGIST (1841–1926)

by

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IN 1859 The British Association met in Aberdeen. A letter[1] circulated in February of that year, asked for contributions to the Natural History exhibition suggesting that '... if tolerably complete (as a little exertion may easily make it) will prove very interesting and instructive.'

M'Kendrick was then an indentured clerk in a lawyers' office, and had assembled a marine aquarium in his lodgings. Sixty years later he wrote a short autobiography,[2] privately printed 'for children and friends', where he describes his own contribution to the meeting.

> A conversazione was held in the Music Hall and to my great delight my patron Redfern suggested to Mr. Hardy Robinson, a manufacturer in the city, that my aquarium might be shown. It was duly transported to the hall and fitted up, the anenomes behaved well, and in particular a creamy white *Dianthus* anenome found in a pool at the foot of the Burn of Muchalls, near the sea, expanded with great magnificence. I stood beside and gave any desired explanation. I then saw Gould, famous for his works on the Birds of Asia; Owen, the comparative anatomist; Huxley, then blossoming forth as a great naturalist; Sir Roderick Murchison, then the leading authority in Geological Science; and, I think, Michael Faraday. This was my first introduction to scientific society.

The *Aberdeen Journal*[3] noted the displays at the conversazione in a brief comment: 'The garden, the mountain, the wilderness and the sea contributed their botanic treasures.'

In his book, M'Kendrick pays generous tributes to the many people who helped him. Orphaned, he was brought up in Aberdeen and Perthshire in varying circumstances which included a six months' 'fee' when he was twelve, as a shepherd. A fifteen-hour day, and a diet of porridge and milk was turned to advantage—'I had no books to read but I had nature to appeal to.'[4] The friends included the Parish minister of Braco, who gave him a timely dose of castor oil[5]—for a cough and cold—and *The Life of Benjamin Franklin;* the various teachers who helped him to later complete a stiff course of French, Latin, Mathematics, Greek; Dr. Galen,[6] who introduced him to the microscope and telescope; and Peter Redfern, then a lecturer at Marischal College and who suggested a medical career for his protégé.

In 1861 he began studies in the newly formed University of Aberdeen, an amalgamation of King's and Marischal Colleges and incidentally resulting in an unfortunate redundancy when James Clerk Maxwell left his chair.[7] The four crowded years are well described. His work in the office continued until he stayed too long at a Jenny Lind concert[8] and was dismissed. He made a brief visit to Belfast looking for work, thence to Edinburgh and employment with the *Daily Review;*[9] studied in the University there, and a gold medal in Anatomy from John Goodsir, tubercular illness and graduation

'honourably distinguished' at Aberdeen in 1864. His last job was in the King's College Library with fortunately few hours and a summer where he records reading 'a good deal of Herbert Spencer'.[10]

If fortunate in his friends—and in a tough constitution—this was no mean achievement, even by the standards of the Scottish 'lad of parts'. It is clear that his education was not merely a grind—there was time for music, the church and sport.

After graduation, there followed five years of hospital and dispensary appointments in Chester, Whitechapel and Fort William. His activities in the Belford Hospital were remembered later by his successor.[11] 'I remember his wonderful array of meteorological apparatus in the grounds of the hospital. I remember his enchanting lecture with diagrams of wild animals delivered to the children of the Free Church School.' M'Kendrick's own account of this period appeared in 1908.[12] Light duties allowed time for botanical studies, a collection of animals and his meteorological observations which, as he observed, 'attracted more attention than my medical reports'. An early publication shows the useful combination of these interests; the paper in 1868 describes the unfortunate effects of a remarkable summer temperature on a young shepherd—104°F measured on his own instruments in the hospital.[13] It was at this time that he began popular lecturing.[14]

> My début as a lecturer was made in Fort William. It is true that about twenty years before that date, and before I became a student of medicine, I had the temerity to give a paper on the brain, illustrated with diagrams to a number of lads in a society connected with the Young Men's Christian Association, Aberdeen, but my first actual lecture was given in the Freemasons' Hall in Fort William. It was on coal tar, and in it I traced the history of the origin of the coal-tar products from tar through naphtha, nitrobenzol, aniline and other bodies to the gorgeous pigments then revealed to the world by Perkins. Specimens in the solid state and in solution were exhibited. The next lecture was on very elementary chemistry, in which I demonstrated some of the properties of oxygen, decomposed water and interested my audience by a few other simple experiments.
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> One of these was to decompose water by the action of metallic sodium, and to collect and explode the hydrogen set free. During a rehearsal in the forenoon at the hospital, the bit of sodium burst and my face was deluged with a strong solution of caustic soda to the peril of my eyesight. Fortunately, however, no damage was done, while the dramatic and alchemistic effect of a bandage over the brow surmounted by a black velvet smoking cap was received with applause by the audience at the theatre.

He had previously corresponded with Professor John Hughes Bennett, and met him when he came to the Belford Hospital to see a patient. In the spring of 1869, M'Kendrick was offered the post of assistant to Bennett in Edinburgh and began his career as a physiologist. The Edinburgh years were productive: lecturing included the 'ladies' classes' where one of his students was the turbulent Sophia Jex-Blake.[15] An interest in the emancipation of women apparently developed at this time, and was acknowledged when he took the chair at a suffrage meeting in Stonehaven in 1912.[16]

Of considerable importance was a meeting at the Veterinary College, when James Dewar introduced himself: 'You and I should know each other, Dr. M'Kendrick.'[17] Dewar was then chemistry demonstrator at the University, and Professor at the Veterinary College. A meeting in the University quadrangle followed, and Dewar suggested an investigation into the effect of light on the eye.

> Dewar usually came to my house in Castle Terrace soon after ten p.m., and we then went to the laboratory and worked till two or three in the morning. On one occasion we had the company

> of Thomas Huxley, who was spending the winter in Edinburgh. On one occasion, one clear night, we took part of the apparatus into the street, the galvanometer being in a little room above the laboratory; we had a frog's eye staring at the full moon, to the light of which there was an electrical response.
> Our joint researches were such as could be most efficiently carried out by a combination of a physicist with a physiologist. In a way it marked an epoch in the lives of both of us. Other investigations followed. In particular we examined the physiological action of the chinoline and the pyridene bases, and we laid the foundation of which led to the invention by the Germans of not a few artificial chemical compounds now used in medicine, such as antipyrin etc.

Huxley was in Edinburgh in 1875 replacing Professor Wyville Thomson, who was a member of the *Challenger* expedition.

The work with Dewar was published initially in 1874 by the Royal Society of Edinburgh,[18] and acknowledgement made to similar work of Holmgren in Sweden. Other work published at this time included a joint paper on Ozone,[19] on Cerebral Hemispheres of Birds,[20] and the first of his many works on sound.[21]

M'Kendrick was one of four collaborators of Dewar, who later became Professor at Cambridge and prominent in the activities of the Royal Institution. Dewar lectured on the work on the eye,[22] and H. E. Armstrong later noted 'the second lecture was probably the most carefully prepared, certainly the most logical discourse he ever delivered.'[23]

Another important event was a three-month continental tour in 1872, as a companion to an epileptic boy.[24] M'Kendrick visited a number of physiological laboratories and met 'many remarkable men'; these included Du Bois-Reymond and Helmholtz.[25] An experience of a different kind was as consultant in a Court of Session case over a disputed estate in 1871.[26] The cause of death was a significant factor, and M'Kendrick advised counsel by the aid of diagrams and the dissection of a sheep's heart—apparently successfully as he describes: 'It amused me to hear Mr. Shand, as if he had been a physiologist and physician asking glib questions about the action of the valves and bothering such men as Professor Douglas Maclagan and Patrick Heron Watson.'

The sober official record does not mention M'Kendrick directly and *The Scotsman*[27] was more interested in the legal battles of Miss Jex-Blake and the Tichborne baronetcy case. M'Kendrick received a substantial fee of nearly £100: this paid for his Fellowship fees at the Royal College of Physicians, and a silk dress for his wife which shared a box with a skeleton. The value of the estates under discussion was over £350,000.

M'Kendrick's apprenticeship as a teacher of science was a varied one, and he made a virtue out of necessity by supplementing a small income with tutoring medical boarders—'almost invariably the sons of English medical men',[28] other coaching activities and filling Professor Bennett's place between 1870–1873. He was not appointed to succeed Bennett, but bought £500 worth of equipment from him, moved it to the Veterinary College and secured a class of 'one hundred and fifty ladies at two guineas a head.'[29] As lecturer in the extra-mural school and at the Veterinary College, he remained until his appointment to the chair of 'The Institutes of Medicine' in Glasgow University in 1876.

One other aspect of M'Kendrick's Edinburgh life is of interest—membership of the Round Table Club. This small group flourished until the 1880s and the members were mainly medical men with a 'primary quality for good fellowship'.[30] In the *Annals*,[31]

which M'Kendrick published in 1908, it is noted that a third of the members became professors, and that; 'it was a wise movement to found this Club by which good feeling and comradeship were fostered among men some of whom were almost certain to be appointed when vacancies occurred.'[32]

M'Kendrick was a product of a largely theoretical system of medical education. His own comment on Edinburgh: 'There were then no practical classes to amplify lectures and give first-hand knowledge; we had few demonstrations; there was no familiarity with apparatus; practically no histology, nor exercise in the use of the microscope.'[33]

When he began work at Glasgow, newly established on Gilmorehill, conditions were hardly adequate.

> When I obtained the chair there was nothing that could be called a laboratory; there were a few old microscopes, a few ancient diagrams, and a sphygmograph. It is said that one day he [Buchanan] showed the class a large modern microscope all bright beautiful brass work, with mysterious screws and movable stage. He enlarged on the novel instrument, which was, he said, of the most modern construction and he added, 'Look at it, gentlemen, but do not touch it'. An irreverant voice came from a back bench. 'Then what the devil did you bring it here for?'[34]

It says a lot for M'Kendrick that he follows this story with a generous tribute to Professor Buchanan as a friend and scholar.

His own interest in experimental work may be illustrated by the short paper [35] published in 1873, where a simple apparatus is shown to provide measurable respiration for one or two animals with air or oxygen mixtures using an 'electro-magnetic machine worked by four or six Bunsen's elements'.

Shortly before M'Kendrick obtained his Glasgow chair he became involved in the one event of his varied career which has found a place in medical history. The use of chloroform and ether in anaesthesia was well established by the 1870s, and there had been substantial developments in both the agents used and in the means of administration. At the annual meeting of the British Medical Association in 1875 a committee was set up 'to inquire into and report upon the use in surgery of various anaesthetic agents and mixtures of such agents: that it be part of the object of such Committee to collect and summarise the experience of British practitioners as the relative advantages of chloroform, ether, nitrous oxide gas and other agents.'[36] Members of the Committee included J. T. Clover and M'Kendrick. Two years later the suggestion was made of 'one really competent investigator to do the work thoroughly well bearing the full responsibility and taking the credit which is due to work well done'.[37]

In the event, Ramsay (later replaced by David Newman), Joseph Coats and M'Kendrick as chairman, were appointed as a sub-committee. After two preliminary reports, a final report appeared in December 1880.[38] The Committee had experimented on animals with a variety of materials, and later concentrated on chloroform, ether, and ethidene-dichloride. Fifty patients in the Western Infirmary had been given chloroform, ethidene or a mixture of the two. These were administered in the traditional Edinburgh method of a towel.[39] The Committee concluded: 'as regards comparative danger the three anaesthetics may be arranged in the following order: chloroform, ethidene, ether; and the ease with which the vital functions can be restored

may be conversely stated thus: the circulation is more easily re-established when its cessation is due to ether than to ethidene; and when the result of ethidene, than when chloroform has been used. The advantages which chloroform possesses over ether—in being more agreeable to the patient and more rapid in its action in the complete insensibility produced by it, and the absence of excitement or movements during the operation—are more than counterbalanced by its additional dangers.'

In suggesting further studies, the Committee asked for further information:[40] 'They especially think it desirable to get specific information from America, as they have found it impossible to get cases of ether administration in this country sufficiently numerous for the purposes of comparison.' And in a final footnote; 'They were not aware at the time of writing this report that the use of ether is rapidly making way in this country and that it is now solely used in several large provincial hospitals'.

The small number of patients used in the report is in considerable contrast to Clover's report of many cases of the use of ethidene reported in May 1880.[41] It is also odd that the evidence about the extensive and increasing use of ether in British hospitals —for example in 1875[42]—should have apparently been unknown to the Committee. Opinion of the significance of the 'Glasgow Committee' has included the comment that it: 'did no more than reassure both those who used ether and those who used chloroform and confirm them in their separate ways.'[43]

M'Kendrick, Coats and Newman later wrote on the next major controversy to arise —the two 'Hyderabad Commissions'.[44]

M'Kendrick's scientific interests were varied. At the Royal Institution,[45] for example, he described work with J. J. Coleman's equipment, amongst the first to be used commercially in ships. 'A number of large diagrams and a complete model were shown, showing the general construction of the cold air machines used for importing meat into Great Britain.'

British Association reports of his work are numerous—marine research in Scotland,[46] asphyxia in mines,[47] and the Committee work reported at several meetings[48] on uses of the phonograph for medical purposes and dialect recording. The interest in the phonograph is shown variously, and he wrote the first account for *Encyclopaedia Britannica*.[49] As chairman of the Royal Society of Edinburgh in December 1896 he spoke on a musical prodigy and an 'improved phonograph recorder',[50] and was awarded the Makdougall Brisbane prize for his work on sound. These experiments did not go unnoticed in Stonehaven where M'Kendrick had become notable as a regular visitor and protagonist of the healthy features of the developing seaside resort. A leader in the local paper linked his name with Edison, and reported 'musical recitals' in his holiday home.[51] One of his last scientific papers appeared in 1911,[52] illustrated with a photograph of his improved machine 'enclosed in a wooden cloth lined box'. His experiments in improving the tone of music by an 'acoustical filter' of fifty-four feet of tubing, full of zinc fragments and peas, and a circular reflector, resulted in an improved sound, less friction noise and a more natural tone. He described the total effect by an artistic illustration—'like passing from one of Etty's huge pictures to a delicate and beautiful Messonier [*sic*] in which one sees and appreciates every detail in an area of small dimensions.'

Much of M'Kendrick's later work appears in the *Proceedings of the Glasgow*

Philosophical Society, and papers reflect all sides of his interests: memoirs of physiologists; a note on a simple electrometer,[53] with a characteristic final comment that the equipment could be easily made by students, and other papers including a review of modern physiology,[54] in which he notes an experiment in Stonehaven 'with the electric organ of the common skate (*Raia batis*) with the use of delicate thermopiles and a sensitive galvanometer, I was able to detect an evolution of heat in the electric organ on stimulating the nerve supplying it.' In the same volume (1890) is an interesting experiment in historical time charts,[55] originally prepared for Royal Institution lectures in 1883. *Cyclophyllum M'Kendrickianum*[56] had joined scientific literature in 1880!

The subjects of the Society's meetings are varied. In the 1890/91 session there were papers in oyster fishing, poems of Beowulf, ventilation, meteorology, and the nature of heredity.[57]

M'Kendrick should be considered as a tireless lecturer, and as a writer. A comment in his autobiography is significant.[58]

> At one time or another I have given many lectures in Glasgow and its vicinity. This I did because I wished to do what I could to diffuse scientific knowledge among the people and also because I enjoyed the work. Looking back on these days I admit that perhaps I devoted too much time and attention to this kind of work, not only because it was fatiguing, but more because it diverted my attention from research. Research work, however, I always carried on at the University and the results were duly registered in scientific periodicals; but I confess I did not give the whole-hearted devotion to research that I might have done. I also paid much attention to lectures to my class, and especially I saw to it that they were fully illustrated. I always considered the chief part of my duties was to teach effectively.

His interest in the Royal Institution was one aspect of this. His appointment as Fullerian professor was in 1881, and the first lecture on the results of research for the 'Glasgow Committee'. He describes the occasion:[59]

> Professor Tyndall was very kind. Before he walked in with me, I recollect, he whispered in a persuasive voice: 'Would you like a drop of Irish whiskey?' This was respectfully declined, and a moment thereafter I was before a sea of faces. The R.I. officials gave the lecturer every appliance and facility for experiments and illustrations. I have often remarked that if you required the presence of an elephant by way of illustration, the men of the R.I. would endeavour to produce him from the Zoo or elsewhere.

As did an eminent predecessor, M'Kendrick commented on the audiences and their occasional eccentricities. He wrote on the R.I. several times in the *Glasgow University Magazine*. As a believer in total abstinence he did not mention Tyndall's offer![60]

> There is a terrible little room, that may well be called the 'funking' room, in which the unhappy lecturer is imprisoned till the last moment, unless he is cool enough, in the circumstances to enjoy the reception in the library. As a rule experiments go off well, because the assistants are very skilful and are adept especially in the art of projection by the electric lantern. A man must be vivacious and fresh, neither too profound nor too shallow.

Several of M'Kendrick's lectures were published. One of particular interest was to the Physiology Section at the British Association meeting in Glasgow in 1876.[61] He mentioned the vivisection controversy; 'The great majority of our people of both sexes are perfectly capable of reasoning and of forming sound opinions. What they

require is knowledge, evidence and representations strong enough to overcome the bias of prejudice.'

On scientific education, he predicted Huxley's 'sure place in the thoughts of posterity.'

Future potentialities mentioned included pharmaceutical developments. 'May we not hope to see the day when such a substance as quinine, or a substance having similar therapeutic properties, may be produced artificially; or may we not obtain an anaesthetic as potent and even less dangerous than those at present employed?'[62]

He noted the work of Lister: 'Slowly but surely this system—the greatest advance in surgery since the days of John Hunter—is winning its way in this country, on the continent, and in America.'

The conclusion was not without interest:[64] 'Let me observe that it would save not a little heartburning and might possibly remove acrimony from various scientific and social controversies could we only remember that it is not very probable that we, in this 19th century have arrived at the final solution of many problems which have puzzled wise men from the earliest times. Probably we have got nearer the truth; but it is presumptuous to suppose that we have reached the ultimate truth. In the meantime it is our duty vigorously to prosecute research in all departments pushing ahead fearlessly and with that enthusiasm which is the prime mover in all great deeds.'

A speech to medical graduates in 1893 assessed progress in the 'thirty years war against disease and suffering' and contained a word on one continuing problem for medical students.[65] 'On the whole the period of life spent at college is a very happy one. The only dark and anxious days in it are those associated with examination times when the mind is oppressed by a surfeit of ill-digested facts and when forebodings and fears make life miserable.'

As a churchman his views on Sunday observance were predictable.[66] 'I have always found it a great refreshment to lay aside physiology and science generally on Sunday, and in the spare hours to read in some other department of human thought or activity.' His confession that the long sermons of stern puritan relatives led to his feeding the church mice is a nice touch.

His final valedictory address at Glasgow University contained generous tributes to the work of Goodsir and Hughes Bennett.[67] If a sad note may be expected in this particular occasion, he had something to say. 'Many of the dreams of youth have faded away and even bits of work that seem to be solid achievement in science pass into comparative insignificance as time rolls on. Even the greatest workers in science add only a little to the fabric of the great temple but it is a joy to a man of scientific spirit to put in even a simple stone.'

Later he dealt with research:[68] 'There is undoubtedly a great volume of research work poured into physiological science every year. Much of it has however struck me as of a transitory and incomplete nature. There seems to be a feverish haste to publish, a determination to produce by hook or crook what is regarded as original work. Time is needed for all solid work and you can no more create by artificial means a researcher than you can make a poet. Great researchers are born not made; and what we should aim is to give them when we discover them, every facility for doing their work. Science, and I include physiological science more especially in relation to the chemistry

of vital processes, would I believe, be benefitted if the workers scrutinised and revised their work and published nothing for the next five years.'

M'Kendrick wrote several books—an early work in the Chambers' elementary science manuals;[69] the substantial two-volume work on physiology completed in 1889;[70] and a short book for the Home University Library, reprinted in 1928.[71] The biography of Hermann von Helmholtz has survived in bibliographies, and was one of the Masters of Medicine series.[72]

In the preface,[73] M'Kendrick pointed out that: 'Helmholtz was one whose private life was known only to a few and he would have instinctively recoiled from biographical revelations of a purely personal character'. The book is an account in considerable detail of the work of the scientist as he moved from one university to another. Personal flashes are not absent, however, nor are broad perspectives.[74]

> At last an epoch arrives, and with it the men. The epoch ushers in new ideas, new modes of looking at things, new generalisations of far reaching character affect the views of scientific thinkers, and with this new period we usually associate the name of one man, such as Copernicus, Galileo, Newton, Linnaeus, Darwin. Great individually as such men were, in estimating their work we must remember that they were not only highly endowed but they were also the children of good fortune. They came on the world's stage at the right time, they caught up all the impressions of the science of their day. They added to this the product of their own labour and thus they gave a new impetus to scientific progress.

M'Kendrick was interested in his subject not only as a scientist but as a musician—he first saw him at a Mendelssohn concert—and as a teacher. 'There can be no doubt that one of the secrets of the marvellous activity in research of Helmholtz was that there was the most intimate connection between his function of a Professor, whose duty it was to teach, and that of an original investigator. He was obliged year after year to take a general survey of his science; he was always associated with the young, and there is nothing more inspiring for a teacher to have to satisfy young and ardent minds.'[75]

M'Kendrick contributed to a volume of reminiscences[76] of his old teachers in Aberdeen, published in 1899. Parts were reprinted in 1961. There are many vivid descriptions in the volume—William Mackenzie's sketch of James Smith-Shand, Professor of Medicine, is a good example.

> His lectures were the carefully sifted notions of the great physicians; selected by the action of prolonged experience, cleared of dross by reflection, illuminated by cases from daily practice. Smith-Shand lived in equilibrium. His outlook on the world was calm, speculative, intellectual. He was collected, lucid, accessible and these three qualities win every student in the end.
> In the classroom from three to four of the afternoon a voice was heard reading placidly, without halt or haste, without feeling: pens were scratching in many pitches of sound. Now and again a foot would scrape on the floor—the phrase was repeated, then the current ran on again. Once more a foot scraped, sometimes many feet—the phrase was repeated, and once more it was pens and a voice. The hour struck; the voice was just ceasing; the professor folded his papers, bowed slightly and passed back to his room. We on our part shut our notebooks, pocketed our inks, undid our pens and rose to go.

M'Kendrick's work is not on this level, but effective in its own way. About Professor George Ogilvie, the physiologist, he notes his dry delivery.[79] 'Usually he lectured without notes. The matter was carefully arranged; the sentences were well constructed; the method was critical as well as expository. There was conspicious fairness in

criticism, and evident desire to be just and a careful balancing of probabilities.' Later, he notes Ogilvie's religious views and incidentally his own.[80] 'The mind of the Creator is still reflected in His works but we now see so far into His method as to recognize that He did not work, or rather does not work, in uniformity with a few typical ideas, but that there is an orderly progression from form to form in obedience to the influence of external forces, all of which, however may, by the devout mind, be still regarded as manifestations of the Divine energy.'

M'Kendrick became a Fellow of the Royal Society in 1884 (and later a council member), and was involved in Francis Galton's second enquiry into the background of scientists in 1904. His own account is vague about time, but illuminating.[81]

> Long ago Francis Galton distributed a circular among a hundred fellows of the Royal Society requesting information as to the facts of heredity observed by and in themselves. I filled up the circular, but had next to nothing to record. I had no wonderfully talented parents, no clever uncles and aunts, no distinguished brothers or sisters; all whose names I could register were honest, hardworking, respectable people. After studying my circular, Galton wrote a kind letter to me in which he remarked that he must regard me as what Naturalists would call—*a sport!* A 'sport' is something that in a sense, occurs accidentally in the evolution of a living being, but I prefer to agree with Hamlet and to trace all the steps in the evolution of my life to the silent workings of that
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> 'Providence that shapes our ends
> Rough-hew them how we will'

Not all the Fellows who received Galton's questionnaire were as punctilious as this, although his fears about the possible reception of the first circulars were unjustified. (He describes following Buffon's example of putting on his best suit in times of difficulty.)[82] That two busy men should have corresponded in this way tells us much about them as people. Galton appears frequently in the pages of *Nature* at this time on a variety of subjects. M'Kendrick also is there—a short letter about the controversial 'Blondlot rays' with Walter Colquhoun;[83] a botanical comment; book reviews.

When he retired in 1906, a portrait was presented and money raised towards the new psychology laboratory.

There is however, an intriguing postscript to his career. In 1895 he had built a large sandstone house in the town which he had visited for years—Stonehaven. By 1906 he was quoted in a guidebook under the firm heading: 'A Professor's Opinion':[84] 'It would be difficult to find a place better adapted to serve as a health resort for all comers. Every visitor is struck with the bracing climate, that soon brings colour to the cheeks, sharpens the appetite and stimulates to active muscular exercise without fatigue.'

He stood for the Council in 1910 and was able to recall his first venture into municipal affairs when he had spoken in favour of the creation of an amalgamated burgh under the new Local Government Act in 1889.[85] Top of the poll, he was at once elected Provost and inherited a problem of considerable complexity in the harbour. The fusion of the old fishing town and 'Newtown', originally a planned grid of wide streets by Robert Barclay-Allardice,[86] the agricultural improver, and developed 'uphill' during M'Kendrick's many visits, had not been entirely happy. Harbour improvements had proceeded intermittently for years, and from 1905 with Government help, hindered by a dispute with contractors. Whether further improvements

were desirable was in doubt. In the first issue of the local paper in 1911, a note appeared:[87] 'Professor M'Kendrick has caused to be posted to the fishermen in the town and to all interested in the harbour, a copy of the *Glasgow Herald* with supplement of 30th December, their attention at the same time being directed to an article on auxiliary oil engines for fishing boats.' In the same issue, is printed an article—'contributed'—on the harbour issue:

> The recently announced handsome offer of the Treasury towards the extension of the harbour coming as it has somewhat late in the day, has taken the community not a little by surprise. The attitude of the bulk of the townspeople towards the fishing industry and harbour trade has hitherto been one of indifference. It cannot be denied that the townspeople as a whole have been in a state of Rip Van Winkle-ism. They have acted like the man in the biblical parable who was given only one talent. Because the harbour was not deep enough to float a Dreadnought, because the railway station was not planted at the pierhead, and because the rocks did not crumble into sand, the community made up their minds to ignore the harbour almost entirely.

The article argues that Stonehaven is conveniently placed for good fishing grounds, and that other towns in the North East had made considerable strides in harbour improvement and support to a modernized fishing industry. Whether this article was one of the many attempts M'Kendrick made to influence the issue is not known, and that he should have used 'Rip Van Winkle' in a *Nature* review[88] (as an example of a speech curve) may well be coincidence. In speeches and in two statements on the harbour[89] published during the year, he emphasized the point that the holiday industry was a variable asset and already changing in character. M'Kendrick's approach is what one might have expected of a scientist—assembling facts about the history and financial state of the harbour, using expert advice, and visiting a number of towns to see for himself what had been done.

The opposing views can be summed up in the words of one letter-writer: 'The tendency now is concentration in every branch of commerce'[90] and in the technical objections to insufficient depth for increasing size of vessels. The grant and loan were accepted, however, and improvements went ahead.

In the busy round of municipal activity M'Kendrick was able to urge changes in other directions. At a dinner in the Bay Hotel in 1912 he spoke of abundant water power:[91] 'The rushing streams in the counties might be utilised to drive turbines and dynamos that would give power and light to the whole of Angus and the Mearns (Kincardineshire). Now when it is possible to store and distribute electricity so easily much might be done in promoting industries where men would be able to earn a livelihood.'

He also mentioned aluminium, afforestation and the conservation of top soil.

He was obliged to give up the office of Provost in 1913. In his final remarks to the Council he noted recent changes in the town:[92] 'I hope the fishing industry will be revived when the improvements on the harbour are completed and that our fishermen will look alive and provide themselves with motor boats and other appliances up to date. To enable them to do this they must be assisted in some way with capital and I hope that our local capitalists will invest and that Stonehaven will follow the example of almost every small town on the Moray Firth.'

By 1914, a tentative start had been made in providing motor boats in the town. The

annual reports, however, of the Fishery Board for Scotland record the steady decline of the fishing industry, and some success of new industries in Stonehaven.[93]

If it is possible to argue with M'Kendrick on points of detail, there can be no doubt that he was right in seeking a diversified economy for the town in which agriculture, industry, the seasonal holiday trade, and fishing had their place.

One of the most intriguing aspects of the fishing situation were the local differences —an article years before had given one view of the communities: '. . . perched on jutting crags, promontories or nestling and hidden in valleys abutting on sandy bays. Inventions, social progress, social improvements neither endanger their interests nor act as stimulus to their exertions.'[94] The truth probably is that a complicated combination of factors must be taken into account to explain completely the great variation in the fortunes of the fishing industries in the North East of Scotland at the time—including local custom and enterprise. M'Kendrick's shrewd analysis of the situation included comparative figures of population. He was also no doubt aware of one powerful argument for harbour improvement—the safety of sailing vessels on a rocky coast, and some of the first moves towards better harbour provisions stem from official inquiries into the results of a disastrous storm.

Any attempt to evaluate John M'Kendrick's contribution to science must be a tentative one. When the obituary writers made the attempt in 1926, the results varied.

In the *Royal Society Proceedings*[95] the comment was made that much of his work had appeared in the Edinburgh Society's publications; 'Unfortunately the circulation of this publication in which so much valuable work has appeared is all too limited and his investigations hardly received the attention they deserved.' The Edinburgh Society's notice was downright:[96] 'His published researches were neither numerous nor of exceptional importance but his work was thorough and his experiments were characterised by ingenuity.' *Nature*[97] credited him with a scientific 'first' in his work with Dewar and the retina and electric current.

It would seem more reasonable to attempt an evaluation of the work M'Kendrick himself considered most important—that of teacher, both of students and of the general public. How one evaluates the work of a teacher is an unsolved problem. To every measure there are exceptions—a popular man may be inefficient; the stern aloof man may be a superb teacher. Some great scientists have been fine teachers, but not all.

There is no shortage of material on the evaluating of lecturing techniques. An article on one of Faraday's lectures at the Royal Institution[98] in 1845 ended by the comment on his: '. . . agreeable manner and ready and easy utterance. He is a perfect master of his subject, and seizes on illustrative examples with happy facility, and as his experiments always succeed, his audience is not wearied with idle delays. In listening to him the writer recognized the truth that the best lecturers are always the simplest; they make no display of turgid or mysterious phraseology, but appeal directly to the reason and common sense of their hearers.'

Careful preparation seems to have been a feature of the Professor's work from his early efforts in Fort William to the lecture in 1911 to Red Cross Workers on food and cookery,[99] where he 'proceeded to give the food values of various kinds of foodstuffs illustrating his remarks by various scientific experiments.'

More systematic attempts to measure the 'consumer' reaction to teaching methods

are now popular. It is hardly surprising that student opinion tends to put clear logical exposition—and audibility—high on the list of desirable attributes.[100] Student comment on their teachers is not new, and a detailed examination of student magazines might well give some clues. This apparently simple process must be undertaken with care. Editorial staff changes frequently, and the style of production with them. A few examples from *Glasgow University Magazine* are given here; it is unfortunate that James Bridie[101] was beginning his medical studies at the time of M'Kendrick's retirement.

In 1878 there is a comment that the 'throng of fair women invades not only our quadrangle, not only our common rooms but even our classrooms. Physiology is, it seems, the most largely attended class of all. This, of course, may just be because Dr. M'Kendrick is the favourite professor.'[102] Two articles on the 'Physiological Basis of Will' were contributed by him at the same time.[103]

In two volumes for 1895–1897 there are a few references to M'Kendrick, but he neither seems to have incurred the unfavourable comment of students, as in one or two other cases, nor the status of a major eccentric. John Buchan, Professor Gilbert Murray, and Professor John Cleland, the anatomist, are more prominent.

There are however, two other articles by M'Kendrick, printed under the title 'Glimpses of Science',[104] and apparently the 'substance of remarks made in the class of Physiology 13 January 1896.' The first deals with recent developments in Physics, and apparently resulted from a visit to the Royal Institution. The second article begins with the sentence: 'It was while I was in London that the startling intelligence came from Würzburg that Professor Röntgen of the University of that town, had discovered a new form of radiation, a new kind of "light that never shone on land or sea"; at all events, a radiation that is invisible to our eyes and yet is capable of acting on a photographic plate.'

It is an interesting reflection that the increased use of television has made it easier to assess to some extent the prowess of the teacher. One feels that M'Kendrick might well have responded enthusiastically to the potentialities of this medium, and to radio.

If opinions on his scientific position varied, there was little doubt about his other qualities when he died in 1926. 'One of the pioneers of the modern teaching of physiology, he had the gift to an unusual degree of holding a popular audience and the ingenuity and success always delighted his spectators.'[105] The *Nature* notice[106] described him as 'one of the most agreeable scientific lecturers Scotland has produced: his discourses had all the charm of a tale pleasantly told.' The *Lancet*[107] referred to early 'pathetic struggles', and made the interesting comment that: 'he was a real Naturalist in the sense given to that term by his friend Sir William Gairdner "a humble reverent and exact follower and student of nature." He followed with almost boyish delight the various advances in science and as no one ever professed the art of graphic description in a more marked degree, it was a treat to listen to his interpretation of the latest discoveries of science '

There are several interesting possibilities in looking in more detail into various aspects of M'Kendrick's life. He may have been, to some extent, overshadowed by the many distinguished men he knew; he may have spread his own scientific interests too broadly to make any great impact on any specific field, in the busy years of varied

academic activities. When Francis Galton's biographer[108] wrote on the 1904 enquiry into the Royal Society, he pointed out the considerable range between the scientific genius and the 'professional scientist in no way more able than the normal man in any profession who makes a living by his calling.'

If M'Kendrick is no more than a competent professional man of wide interests and considerable sympathies, one is left with the impression of a genial energetic man whose enthusiasm shines through a long life, from the earnest young naturalist to the bearded municipal reformer.

He was buried in the cliff-top chapel of St. Mary's between Muchalls and Stonehaven.[109] On the gravestone is the inscription:

WHAT IS THERE TO FEAR? NOTHING.

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News, Notes and Queries

NEW DIRECTOR OF THE WELLCOME INSTITUTE OF THE HISTORY OF MEDICINE

The Wellcome Trustees are pleased to announce the appointment of Dr. Edwin Clarke, M.D., F.R.C.P., as Director of the Wellcome Institute of the History of Medicine. Dr. Clarke is Reader in the History of Medicine at University College London. He will succeed Dr. F. N. L. Poynter on 1 October 1973.

Dr. Clarke is to be the new editor of *Medical History*, beginning with the issue for January 1974.