THE GENIUS OF WILLIAM BOWMAN.

BEING THE BOWMAN LECTURE TO THE OPHTHALMOLOGICAL SOCIETY ON APRIL 3RD, 1930.

BY

SIR ARTHUR KEITH, M.D., F.R.S.

LET me, by way of introduction, refer to an incident from the life of Sir William Bowman which brings us at once into close touch with his personality. In 1863 the fiery but warm-hearted surgical dictator of the time, James Syme, Regius Professor of Clinical Surgery in the University of Edinburgh, and father-in-law of Joseph Lister, had publicly condemned the operation of iridectomy proposed by von Graefe for the relief of glaucoma in 1857. In 1863 Bowman was 47 years of age, and although he was Syme's junior by 17 years he was the acknowledged leader among the ophthalmic surgeons of England. He had already a wide experience of iridectomy, and, although he could not explain the rationale of the operation, he found it the only "certain and indispensable" treatment for acute glaucoma. Had Bowman been a "natural" man he would have rushed into print and trounced Syme in public for misleading the profession, but being master of himself and knowing that truth could be vindicated in a better way he wrote Syme a very direct personal note. The merits of iridectomy, he told him, were based on "facts which were numerous and positive"; the "rules for its application were precise"; "its results were capable of being anticipated with as much certainty as can be done in any department of our uncertain art." Syme replied that his condemnation of iridectomy was founded "on serious consideration of the anatomical, physiological, and pathological conditions in question," and that he foresaw unlimited dangers to the eyes of patients were the profession in general to practise the operation. To this Bowman replied that he had no wish to influence opinion except by sound reason." The answer from Edinburgh was brief. "Iridectomy," wrote Syme, "whatever may be its value for cure of blindness, will never interfere with the respect and regard which I entertain for yourself," and promptly dispatched the correspondence for publication in the *British Medical Journal*,¹ where his condemnatory statement had first appeared. I quote from this brief correspondence not only because it reveals the character of those two eminent Victorians in a favourable light, but also because it permits me at the outset of my address to illustrate the exceptional personality of the man who was invited to be president of this society when it was founded just fifty years ago.

What was the secret of the high regard in which Sir William Bowman was held by his contemporaries? In his youth, as we shall see, he made brilliant discoveries in anatomy; these were known to only a few. In the full tide of his professional life he did more than any man in England to advance ophthalmology, a branch of medicine into which he was swept by force of circumstance. Such services are better known to you than to me, and I do not propose to consider them, but they do not account for the esteem in which he was held by his professional colleagues in all departments of medicine. It was not my privilege

to know him; he died in 1892,* the year in which I became a unit in the medical life of London. I have to regard him, as have most of you, with the cold eye of posterity, but I am certain that those who knew him would never ascribe his ascendancy to the iridescence which shines in life and dies with a man. The personality which captured the heart of James Syme must have been moulded out of permanent and sterling stuff.

You must permit me to pursue my inquiry into the personality of Bowman because of a change in my outlook on medical history. If you had done me the honour ten years ago of inviting me to give this lecture in his memory I would have started by directing your attention to his discoveries, recounted them one by one, measured their worth, and sought for the circumstances which guided him from point to point in his career. Having done that I would have dismissed in a sentence or two all those qualities and activities of mind and heart which we call personality or character, in the belief that personality has

no place in the narration of those events which make up the history of medicine. But now I would alter the order of my treatment and place personality first.

BOWMAN'S CHARACTER.

Bowman lived in a period in which medical knowledge was advancing with great rapidity; he was a Victorian; he entered King's College in 1837 at the age of 21, and before he was 25 he had "advanced" medicine by a series of notable discoveries. He was endowed with certain excessively rare gifts of mind without which no advance or discovery is possible. In King's College he found himself in an atmosphere of research. But rare gifts of mind, skilful hands, encouraging surroundings, do not explain the career of William Bowman. What urged him on? He must have cherished some ambition which had to be satisfied, or formulated some ideal which had to be attained. In his personality there must have been, as in all who seek to improve the state of mankind, some missionary quality

which drove him onwards. When we look beneath the surface of medical history—and Sir William Bowman's life is part of it—we see that the mainspring of all our progress lies not in man's intellectual equipment, but in those qualities which we, in our ignorance, attribute to his heart. The urgent desire for betterment lies not in man's head but in his heart.

On a few occasions only did William Bowman give his contemporaries a glimpse of the motives which regulated his life. The first of these is somewhat disappointing; it is a paper read to his fellow medical students at King's College in 1838—his second year. One is more impressed by the rotundity and balance of his sentences than by the rather trite ideas which he expounded. At one point, however, he shows us where his heart lies; it is with the poor. He counsels his fellow students to show respect for the dead by the "nicety and neatness of our dissection." We come across the same leading motive in the first lecture he gave to the students at Moorfields Hospital in his thirtieth year, having been appointed assistant surgeon to that institution in 1846. After referring to the

SIR WILLIAM BOWMAN.

* Bowman died on March 29th, 1892, aged 76, at his country home on the Surrey hills between Guildford and Dorking, and was buried in the neighbouring churchyard of Holmbury St. Mary.

"pleasure experienced in the earnest pursuit of knowledge" he went on to remind them of cases of blindness caused by inflammation of the cornea. "These cases occur amongst the poor, a class to whom the eye is, if possible, even more valuable than to the rich, because without it they can hardly obtain their daily bread or enjoy the common comforts of existence." The same humanitarian spirit distinguishes the lecture he gave at the opening of the medical session at King's College in 1851. For three years he had shared the chair of physiology with his friend and master, R. B. Todd; he had just been appointed full surgeon at Moorfields, and although he had been assistant surgeon for eleven years at King's College Hospital, he had as yet no beds. His lecture was full of good advice to the students who had just joined, about seventy in number, but it is of value to us now because it is charged with personal conviction. "Take a high view of your pursuits," he told his students, urging them to remember the needs of the poor and the "sacred objects of a hospital." He spoke of a "strong yearning for the advancement of knowledge," and of the "whole soul overflowing with a sincere desire to know and to practise whatever is right." He regretted that the fair page of medicine had been "sullied by harsh jarings and acrimonious contentions of personal or party rivalry." Then after speaking of professional success he pulled himself up in this sentence: "I slide into expressions which seem to imply that precedence in the race of life is the test of merit." We have here a hint of what we are in search—the "yearnings" which urged Bowman forward on his path in life. He fully shared in that spirit of humanitarianism which characterized so many of the great Victorians.

Only once in his life did Bowman give a really long public lecture. It was an Address in Surgery, given at the Chester meeting of the British Medical Association in 1866.² In its wealth of ideas and suggestions the address contained materials for six ordinary lectures. I recall this address because in it he comments on the character of certain outstanding medical men. Now his comments, or rather his commendations, must express the sentiments that appealed to his own heart. When he commends Harvey's "supreme love of truth," his "intense longings to penetrate the secrets of Nature," his habit of consulting Nature rather than books, his acceptance of "no master save facts," we may be sure Harvey's ways were also his. When he speaks of Harvey as being "modest, gentle, unselfish, courteous, not covetous of honours, fearless, slow to controversy," we feel that these qualities commended themselves to the speaker; indeed, we may say with truth they were native to him. When he says of Joseph Henry Green, surgeon to St. Thomas's Hospital and professor of surgery in King's College when Bowman was a medical student, that he "had too much capacity to be a surgeon only" we feel that he was also thinking of himself.

It is in this lecture of 1866 that he expressed his profound respect for the memory of Professor Robert Bentley Todd, who had died six years before at the age of 51. Todd was projector and editor of that "Great Eastern" of medical encyclopaedias, *The Cyclopaedia of Anatomy and Physiology*, published in four packed volumes between 1836 and 1852, a work which modern anatomists and physiologists can still consult with much profit. When Bowman entered King's College as a student Todd was professor of physiology and of general and morbid anatomy, a post which he held until 1855, Bowman sharing the chair with him during the last seven years. When King's College Hospital was opened in 1840 Todd became its senior physician. He exerted a profound influence on Bowman. In the address just mentioned Bowman speaks of him "as my loved and honoured friend and work-fellow," "a zealous promoter of literary and scientific work in other men"; he extols "the excellence of his heart and life," predicting that the future would recognize his greatness. Beyond a doubt Todd was a great man, exercising a powerful influence on the young men of promise who came into intimate contact with him. He was certainly the inspirer of Bowman, and we see his spirit manifested in the lives of his pupils John Simon, the first and greatest of sanitarians, in George Johnson, and, later,

in Lionel Beale. The driving force of Todd's life was his burning desire to ameliorate human suffering by advancing knowledge of every kind which was likely to help in the understanding and treatment of disease. He had the gift of communicating his enthusiasm to others.

BOWMAN AS DISCOVERER.

Up to this point I have been seeking to lay before you the fundamental traits of William Bowman's personality. I have now to consider him as an investigator and as the author of a series of remarkable discoveries. When Bowman was at Birmingham General Hospital in the fifth and last year of his apprenticeship, certain revolutionary changes were taking place in the medical schools of London. University College had just brought William Sharpey (aged 34) from Edinburgh to fill the chair of anatomy and physiology; that morbidly shy genius Thomas Wharton Jones (aged 28), also of Edinburgh, had just been installed in the school of Charing Cross Hospital. In later years he inspired Huxley and Lister; and became ophthalmic surgeon to University College Hospital. In this year (1836) Richard Owen (aged 32) was made Hunterian Professor at the Royal College of Surgeons, and James Paget, then a student at St. Bartholomew's, obtained the membership of the College. The event, however, which most concerns us now was the resignation of Dr. Herbert Mayo from the chair of anatomy and physiology in King's College. In 1836, upon Mayo's resignation, the chair at King's was divided; Richard Partridge (aged 31) was made professor of descriptive and surgical anatomy, while Robert Bentley Todd (aged 27) was called from a private venture, Aldersgate Medical School, and appointed to the chair of physiology, general and morbid anatomy. Todd had been trained at Trinity College, Dublin, and was a pupil of Dr. Robert Graves. For five years he had been seeking to establish himself in the medical life of London as a scientific physician. He was a man of unbounded energy, enthusiasm, and enterprise. No sooner had he arrived in London than he set about his great project, a *Cyclopaedia of Anatomy and Physiology*. He solicited and obtained the collaboration of the leading scientific men of the period, both at home and abroad. Not satisfied with the *Cyclopaedia* as an outlet for his vast knowledge, he projected, after Bowman had joined him, a great and original work, *The Physiological Anatomy and Physiology of Man*, the first part of which appeared in 1843. From the introductory chapter of this work we learn something about the aims which he ever kept before himself and which he inculcated upon his students. He counsels them to follow "the safe and beaten track of inductive reasoning," and advises them to "quote from Nature," and to accept as an axiom that "a correct physiology must ever be the foundation of rational medicine." A man imbued with such an outlook could not fail to influence young men of exceptional ability, particularly when we take into account his warmth of heart.

Now in the year 1836, Wharton Jones, Sharpey, Todd, Paget—and to these may be added Gulliver of St. Thomas's and young John Goodsir of Edinburgh—had all adopted the improved compound microscope as an instrument of research. They perceived that it was to reveal vast new fields of inquiry. In 1834 Wharton Jones, by the aid of his microscope, had resolved what we now term the pigimentary layer of the retina into its constituent units or "particles." In the school of Johannes Müller in Berlin the possibilities of the microscope were being exploited to a much fuller extent by the keen young men who surrounded him—Schleiden, Henle, and Schwann. It only needed the enunciation of the "cell doctrine" of Schwann in 1839 to start a revolution which completely altered man's conception of living matter and of his own body. In this revolution William Bowman played the part of a pioneer.

At the opening of the winter session in October, 1837, Bowman passed through the modest portal which still leads from the Strand to King's College. He was then 21 years of age and was about to commence his three years' study for a membership of the Royal College of Surgeons. We must not give King's College, however, all the credit for making him what he became. He himself declared that the five years spent in Birmingham General

Hospital, where he was apprenticed to a master surgeon, Joseph H. Hodgson,* at the age of 16, were of the greatest service to him. There, too, he came in close contact with another remarkable man, Dr. Peyton Blakiston, physician to the hospital. Blakiston had presented him with a compound microscope in recognition of his assistance in certain researches on the heart. Thus William Bowman, as he made his way to the dissecting room and physiological department, was already equipped with the new instrument of research. Two other gifts he also brought with him—great manipulative skill and accuracy of draughtsmanship.

He needed no introduction to the professor of anatomy, for Richard Partridge was also an old pupil of Hodgson in the Birmingham General Hospital. He found Professor Todd, his senior by only seven years, assisted by a student of his own age, John Simon, who also became a master of the microscope. In the following year Simon was appointed demonstrator of anatomy under Partridge, and Bowman succeeded him as demonstrator to Todd. Thus were brought together two men eminently fitted to form an effective partnership; Todd had enthusiasm and daring, Bowman cool judgement and technical skill. Todd had then his two projects on hand. Volume i of the great *Cyclopaedia* had appeared in 1836, vol. ii was in the printer's hands and appeared in 1839, while vols. iii and iv were still in preparation, and were not published until 1847 and 1852 respectively. The other project was equally ambitious and even more novel—a *Physiological Anatomy and Physiology of Man*. Professor Todd perceived that Bowman's help would be useful for the future volumes of the *Cyclopaedia*; for the new work on physiological anatomy his partnership was absolutely essential. It was in 1838 that Bowman, then in his second year of study, visited schools in Paris, Belgium, and Germany; and in the following year he became a Member of the Royal College of Surgeons. But it is certain that before then he had started work on the programme set before him by Professor Todd. For the projected work on physiology Bowman was to be responsible for the microscopic structure of the skin, of all organs of sense, of nerves, of the lining membrane of the alimentary canal, of all glands, lungs, liver, kidneys, testes, of muscles, voluntary and involuntary, and of bone and cartilage. Certain of these items were to appear in the *Cyclopaedia*—namely, the articles on mucous membrane, muscle, muscular motion, and Paccinian bodies. This task Bowman undertook in 1838, and completed it by the end of 1845—seven years of herculean labour. Indeed, he had finished the greater part by the end of 1842. When he began, the younger German anatomists, Henle, Purkinje, Valentin, Remeak (Koelliker was still a student under Müller), were opening up the fields he was to explore, but he determined to investigate all of them for himself, and to base his conclusions on facts seen through his own microscope. Thus we see that Bowman made his discoveries in the course of compiling data for a new textbook! I know of no parallel to this feat; no one ever discovered so many new anatomical facts in such a short period, and almost every one of his conclusions has been verified.

Before examining the programme of research carried out by Bowman from 1838 onwards let us consider how he was otherwise employed. In 1839 he went into the dissecting room as demonstrator of anatomy, being junior to Simon; he also acted as curator of the museum attached to the anatomical department. In 1840 he was appointed assistant surgeon of King's College Hospital; his senior surgeon being Richard Partridge, the professor of anatomy. At the same time Simon became junior to William Fergusson, the newly appointed professor of surgery. In these earlier years private patients were probably few and far between. It was under such conditions that William Bowman began to gather his materials for the *Cyclopaedia* and for the treatise on physiological anatomy, not from books, but from Nature. He evidently intended to com-

plete the article on muscle first, particularly that on striated muscle. He concentrated his attention on the structure of muscle as revealed by the microscope. The method he employed in this part of his inquiry was that which we should now describe as micro-dissection; in this kind of inquiry his manipulative skill gave him many advantages. His genius soon became manifest in two ways: first, in rightly interpreting the appearances presented to his eye by the microscope; secondly, in modifying his methods of manipulation so as to ascertain other possible interpretations. He did not rest until his observations could be expressed in terms of use or function. Professor Todd must have soon realized that what was intended for a textbook was an original contribution to knowledge, one fit for the consideration of the Royal Society. The paper was read on June 18th, 1840,³ and appeared in the *Transactions* of that society. There is no mark of the apprentice hand in William Bowman's first published paper; it is the finished product of the master workman. We still look at striated muscle through his eyes; the picture he drew in word and line of the physical structure of a muscle fibre, when he was demonstrating anatomy in the underground rooms of King's College, is still the picture which guides us to-day.

The most laborious part of the "Todd programme," and in which he achieved his greatest success, was that which concerned the structure of glands and of mucous membranes. Here we can compare the value of his work with that of his contemporaries, for, when he began to turn his microscope on glandular structures, the second volume of the *Cyclopaedia* had just been published. We turn to Bowman's account of glands and of secretion and find in them the sharp outlines of our present knowledge. No doubt Henle, Purkinje, and Schwann had led the way into this new field of knowledge, but Bowman, while acknowledging their priority, owed little to them in his own interpretations. Purkinje, Valentin, and Schwann, and Goodsir too, in a somewhat clumsy way, perceived that each cell was a glandular unit concerned in secretion and excretion; but none of them had so clear a conception as Bowman had of the part played by cellular units, "living particles," in the processes concerned in these functions. In a paper published in 1842 on the appearances revealed by the microscope in a case of fatty degeneration of the liver, Bowman speaks of the cells as "small laboratories of nature," and perceives that a "more complete knowledge of chemical affinities" was needed to explain the processes which took place within them. This short paper must be one of the earliest, if not the first, in which the microscope was employed to elucidate finer pathological changes. Bowman himself was quite aware he was opening up a new field, and claimed that the condition he had drawn attention to "was an admirable example of the kind and degree of insight into pathological changes which the microscope was calculated to afford."

Bowman started to study the kidney, in the course of his microscopic survey of the glandular system of the body, in or before 1841. Its tubular structure was known and so were the main details of its vascular organization. The Malpighian bodies were then supposed to have no connexion with the tubules, and their use was unknown. It was Bowman who proved that a glomerulus or Malpighian body is always implanted within the head or beginning of a uriniferous tubule; he conjectured, from the glomerular structure and from the arrangement of parts, that their function was to flush the uriniferous tubules. He further inferred that the epithelium which lined the uriniferous tubules took from the "portal plexus" which surrounded them the solid constituents of the urine. Bowman thus gave us at a single step our modern conception of the organization of renal structures. He communicated his observations to the Royal Society in February, 1842. For his paper on the structure of muscle he was elected Fellow of the Royal Society at the age of 25 (1841), and for his paper on the structure of the kidney he was given a Royal Medal. I suspect that the prompt recognition of Bowman's high merits was due to the insight and sagacity of William Sharpey, the professor of physiology at University College.

* Joseph H. Hodgson, F.R.S., was trained in St. Bartholomew's Hospital. He became surgeon to Birmingham General Hospital in 1818, moved to London in 1849, and became president of the Royal College of Surgeons in 1864. He was invited in 1840 to the chair of surgery in King's College, but declined, Sir William Fergusson being the final choice of the electors. He founded the Birmingham Eye Infirmary in 1824, so that Bowman must have been initiated into the practice of ophthalmic surgery at an early period of his studentship.

Clearly it is impossible in the course of a single lecture to recount all the discoveries which distinguished William Bowman's earlier years of toil in King's College; but I must refer, very briefly, to his work on the organs of sense. When you compare the account which Dr. Arthur Jacob, professor of anatomy and physiology in the Royal College of Surgeons in Ireland, wrote on the eye for the *Cyclopaedia* (vol. ii, 1839) with that which Bowman prepared for Todd's *Physiological Anatomy* you feel as if a century, not a year, had elapsed between the times of their preparation. Jacob's account of the eye was that obtainable by dissection with needles aided by a hand lens; Bowman's account is our modern one, the eye as revealed by sections observed through a compound microscope. As we read Bowman's descriptions we marvel, not at the revelations of the microscope, but at the sureness of his interpretation. Our conception of the cornea remains much as he left it; the ciliary muscle had no certain existence until he defined its relations, nature, and function. It is true he supposed that it served accommodation by altering the position not the form of the lens. He detected the circular and radial musculature of the iris; it was left for Koelliker and particularly for young Joseph Lister, working under the inspiration of Wharton Jones a decade later (1851), to amend his conception of the structural elements of that musculature. He saw the optic fibres circle on each side of the "yellow spot," yet dismissed the "spot" as of little importance in vision because it was not present in the eye of the dog, cat, rabbit, and bird, animals with perfect sight. He refused to regard the rods and cones (bulbs) as concerned in perception because they lay on the outer or "wrong" side of the retina. With a flash of insight he speaks of the eye as "a sheet of nervous matter brought towards the surface of the body to meet the appropriate stimulus"; in another passage he states that the relationship between the retina and the "sensorium" is a problem "too inscrutable for our limited powers." Nevertheless I think it may be said with truth that Bowman made a larger contribution to our knowledge of the anatomy of the eye than any other investigator.

The additions he made to our knowledge of the finer structures of the inner ear are at once apparent when we compare his account with that contributed by Wharton Jones to the second volume of the *Cyclopaedia* (1839). I first became aware of the importance of Bowman's observations on the ear about twenty years ago, when preparing an account of the structure of the cochlea for a work published by the late Sir Thomas Wrightson. We owe our present conception of the basilar membrane to William Bowman; it was he who first described its elastic and striate zones, its denticulate lamina and outer spiral ligament.

I must not give the impression that Bowman saw everything that was to be seen within the field of his microscope; he even made mistakes, but there are surprisingly few of them. For example, he had proved that the ciliary "ligament" of the eye was in reality a muscle, and served in the accommodation of vision. He applied the same conception to the ear, and believed that the outer spiral ligament of the basilar membrane was muscular in nature, and served in the accommodation of hearing. He missed the organ of Corti (it was first described in 1851), and thought that the tubular fibres of the auditory nerve ended directly in the basilar membrane. He was unable to follow nerve fibres to their true terminations. The technique needed to fix the delicate epithelial parts of sense organs and to define the final ramification of nerve fibres was unknown in his earlier years; hence we find that he went astray in regard to the sensory structures concerned in sight, hearing, smell, taste, and touch. He was certain that capillaries did not perforate the sarcolemma of muscular fibres, and concluded that it was the same with their nerve fibres.

It is even more interesting to observe, in connexion with the "cell doctrine" enunciated by Schwann in 1839, that there still clung to him something of the old metaphysical Adam. For example, he believed that new epithelial cells of mucous membranes arose not from other cells, but from granular intercellular substance. He also mentioned that bone cells (osteoblasts) could and did arise from the

granular medullary matter. On the other hand, he admits that "in the early development of the embryo all the tissues, however dissimilar from each other, consist at first of nucleated cells." When, however, we make allowance for the primitive methods then at the disposal of microscopists, and the novelty and vastness of the field in which he laboured, it is surprising, not that he was sometimes in error, but that he was so often right.

I now come to what seems to me to be the enigma of William Bowman's life. In those earlier years, from his twenty-second until his twenty-sixth year, investigation followed investigation and discovery succeeded discovery. Then his ardour for research seems to have suddenly cooled. It is quite true that in 1846 he investigated the appearances seen by the microscope in experimental wounds of the cornea—a pioneer piece of research of the highest importance; there was also a study of the vitreous body, but thereafter he was concerned with wards rather than with laboratories. It is also true that at the height of his professional career he seldom allowed a year to pass without making an important addition to the resources of ophthalmic medicine and surgery. Nevertheless, the results of the last fifty years of his professional life (1842–92) did not fulfil the brilliant promise of those earlier years. What had happened? In 1842 he married most happily. Did his home tempt him from his laboratory? Or was it that research did not provide him with that fullness of life which his intellectual and artistic nature craved for? Or was it that, in spite of his great scientific accomplishment, he found that his way into the field of general surgery was blocked, and that, against his inclination, he was compelled to take a side path in his chosen profession?

BOWMAN AND LISTER: A PARALLEL.

One cannot help speculating how surgery would have developed in England if, at the end of his earlier years of arduous research, William Bowman had become surgeon to King's College Hospital in the place of Sir William Fergusson. Would he have prepared the way for Lister and made the path of antiseptic surgery easier? No one, so far as I know, has drawn attention to the many striking resemblances between these two men. Bowman was born in 1816, Lister in 1827. Both had educated well-to-do English parents; both had fathers who had a strong bent for scientific inquiry; Lister, like Bowman, was a natural draughtsman; both chose the more scientific schools for their medical education—the one King's College, the other University College. Both came under leaders in the new movement in anatomy—Bowman under Todd, Lister under Sharpey and Wharton Jones. Both became masters of the microscope while still students. Bowman's first research was into the structure of muscle; Lister's first research was to correct Bowman's description of the musculature of the iris. Both proved in their first publications that they were not apprentices but master workmen. Both became Fellows of the Royal Society. Physically they had also much in common; their tastes were similar. Both were moved by the same deep-rooted desire to relieve suffering, to help the poor and the unfortunate; both sought to improve surgery by inquiry and experiment in the laboratory; both sought to base their art on science. Both suppressed self to an extreme degree; both sought earnestly after truth; they were equally modest, humble, and unassuming. Both possessed in their clarity of thought, in their precision of statement, and in the finality of their proof, the same qualities as Harvey. Both were laboratory men; Lister was so all his life. Would Bowman have still resorted to his laboratory if he had become professor of surgery in King's College while his enthusiasm was still ablaze? One cannot resist these speculations. They are perhaps futile and vain, but of this we may be certain, that if general surgery suffered a great loss in the direction which Fate gave to Bowman's career, ophthalmic surgery reaped an exceedingly great reward.

REFERENCES.

- ¹ *British Medical Journal*, October 24th, 1863, p. 458; November 7th, 1863, p. 509.
- ² *Collected Works*, vol. 2, p. 69.
- ³ *Philosophical Transactions*, 1840, vol. 130, p. 457.

*By a curious coincidence it was Sir William Bowman who was the prime mover in bringing Lister to King's College in 1869 as successor to Sir William Fergusson.