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SIR WILLIAM TURNER

K.C.B., F.R.S.

A CHAPTER IN MEDICAL HISTORY

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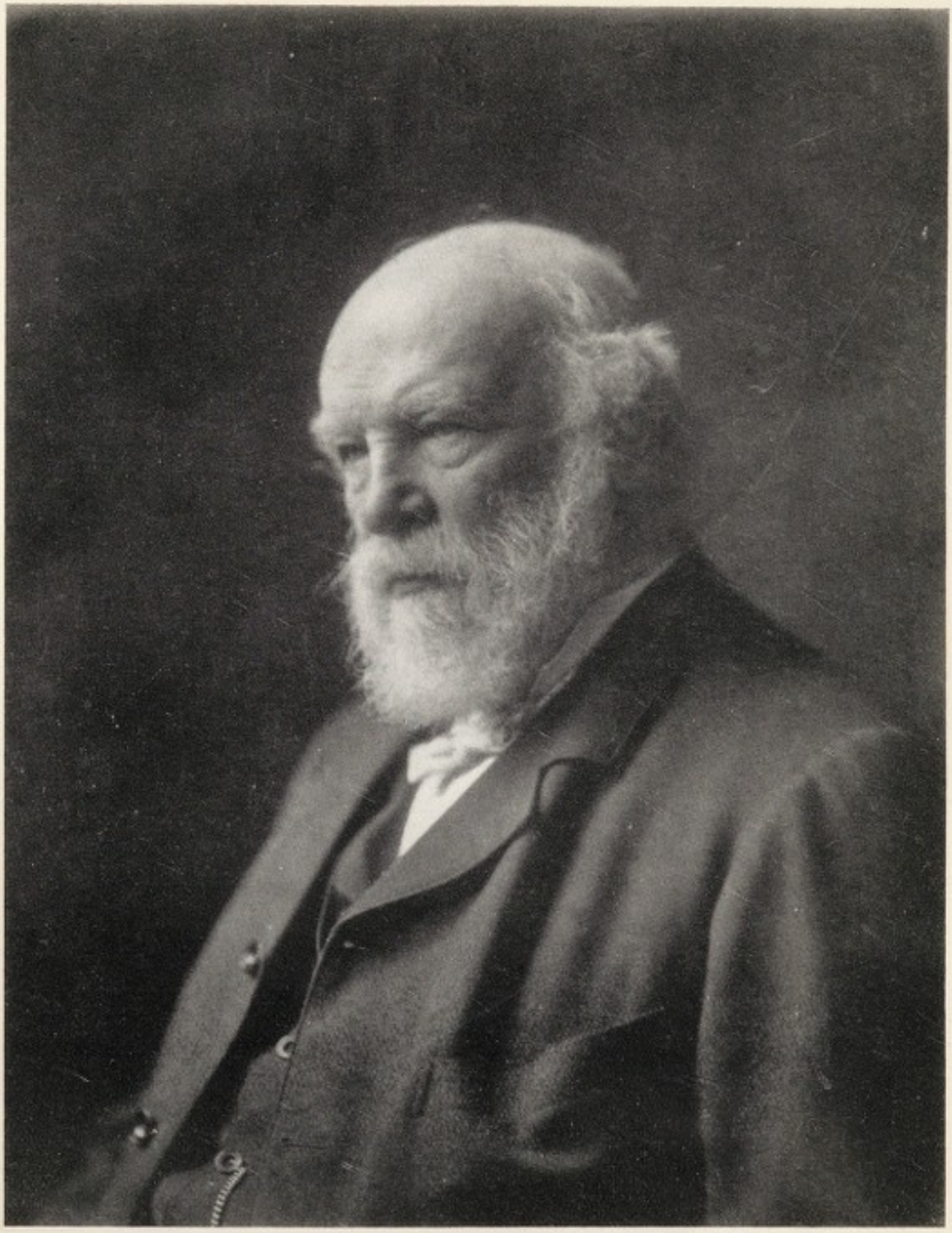
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Sir William Turner

K.C.B., F.R.S.

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Wm Turner

SIR WILLIAM TURNER. 1907. ÆT. 74.

From a photograph by J. MOFFAT.

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Sir William Turner

K.C.B., F.R.S.

PROFESSOR OF ANATOMY AND PRINCIPAL
AND VICE-CHANCELLOR OF THE
UNIVERSITY OF EDINBURGH

A

CHAPTER IN MEDICAL HISTORY

BY

A. LOGAN TURNER, M.D.

William Blackwood and Sons
Edinburgh and London
1919

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TO

THE UNIVERSITY COURT,
THE SENATUS ACADEMICUS,

AND

THE STUDENTS OF THE UNIVERSITY
OF EDINBURGH,

IN MEMORY OF

SIXTY-TWO YEARS OF SERVICE.

PREFACE.

In 1910, my father was approached by an English Publishing House with a view to ascertaining whether he would prepare for publication an account of the progress of medical education during his lifetime. No one was in a better position to do so than he, but, unfortunately, he was unable to see his way to comply with the request. If he had left any instructions relating to the possible preparation of a Biography, I feel certain that he would have suggested that any narrative of his life should take some such form as has been followed in the present volume.

An account of the progress of medical and scientific education, as exemplified in the history of the University of Edinburgh during a period of sixty-two years, would have appealed to his sense of the fitness of things, and I am sure, therefore, that in attempting to write along these lines, I have endeavoured to carry out his unspoken wish. The description lacks that personal touch which can only be given to a narrative by one who has been, not only an active participant in the events which are recorded, but frequently the principal mover in them.

The story has not been arranged altogether in progressive chronological sequence, but rather in the form of a series of sections, each more or less complete in itself, but with the thread of his life easily traceable, chapter by chapter, through the whole. Had my father been engaged in the pursuit of one definite line of research, a story in strictly chronological order would have been more suitable; but his work followed many paths and his interests were numerous. As he combined in his own person the teacher, the scientific investigator, and the administrator, the sectional treatment of the work seems the most appropriate method to have adopted.

It has a further advantage: each aspect of his life may be studied independently, and the reader may select what he thinks will interest him most, and pass over that which he may feel is of less moment to himself.

Unfortunately, my father left no autobiographical notes behind him. A number of family letters written to his mother and brother in his younger days—some of which I have been able to make use of—a few manuscript notes of some early speeches, the hospital note-books of his student days, and a number of letters from friends, mainly of a congratulatory character, are the sole evidence that he might have had some intention of recording the interesting facts of his career, if time and opportunity had permitted. Consequently, there are gaps which I have been unable to fill, and omissions, a record of which would have given an added interest to the story.

In the chapters which recount his scientific work, I have quoted largely from his writings, and most

of the observations therein recorded are described in the language which he himself employed. In Sir Alexander Grant's 'Story of the University of Edinburgh,' I found a rich storehouse of historical facts. 'Goodsir's Anatomical Memoirs'; an 'Historical Sketch of the Edinburgh Anatomical School,' by Professor Sir John Struthers; 'Anatomy in Scotland,' by Professor Arthur Keith; 'Addresses to the Liverpool Biological Society,' by Professor W. A. Herdman; 'The Turner Memorial Number of the Student'; the files of the 'Scotsman' newspaper, and various Medical Journals, have provided me with many interesting particulars, of which I have freely availed myself.

I desire to acknowledge with gratitude my great indebtedness to my sisters, whose untiring interest and ever-ready assistance have been of the greatest service to me, and which have made it possible to record incidents in my father's life which might otherwise have been left unnoted. From a few of his old friends and colleagues I have received help and encouragement: from Professor J. H. Millar; Sir Ludovic Grant, Bart.; Sir Richard Lodge; Professor Malcolm Taylor, D.D.; Professor John Rankine, K.C.; and Professors John Chiene, C.B., and Arthur Robinson. Amongst other friends, whose assistance I sought and received, I wish to mention Sir William M'Cormick; Sheriff G. L. Crole, K.C.; Mr J. W. B. Hodsdon, F.R.C.S.E.; Sir Thomas Hunter; Mr George Somerville; Professors Sims Woodhead and Arthur Keith; and to Mr Cann Hughes, the Town Clerk of Lancaster; Mr W. S. Caw of the Royal Infirmary, Edinburgh; and Mr George C. Pringle, M.B.E., of

the Educational Institute of Scotland, I am indebted for documentary information. Miss Johnson of Lancaster, Miss Acland of Oxford, Mrs Niecks, daughter of the late Sir John Struthers, and Mrs J. D. Cunningham, kindly placed at my disposal a number of letters bearing upon my subject.

To all of these, and to others here unnamed, who have recalled to my memory some half-forgotten incidents of the past, I offer my grateful thanks.

A. LOGAN TURNER.

27 WALKER STREET, EDINBURGH.
February 1919.

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SIR WILLIAM TURNER.

CHAPTER I.

BOYHOOD AND PERIOD OF APPRENTICESHIP.

1832-1850.

Parents—Birthplace—Lancaster—School-days—Indenture of apprenticeship—Life of the apprentice—The Family of Johnson—Early scientific interests—Sir Thomas Storey—Freeman of Lancaster—Leaves native town.

William Turner was born in the county town of Lancaster on January 7th, 1832. His father, born in 1797, after whom William was named, carried on the business of an upholsterer and cabinetmaker, in partnership with a Mr John Battersby. Mr Turner died on the 7th March 1837, at the age of forty, when William was only five years old; he thus had no recollection of his father, whose early death deprived the boy of paternal guidance. His mother, whose maiden name was Margaret Aldren, was born on Christmas Day 1793, being four years older than her husband at the time of their marriage on January 6th, 1830.

Cabinetmaking and upholstering for a long time had formed one of the staple industries of Lancaster.

The well-known business house of Waring & Gillow of Oxford Street, London, had its origin in the northern town, where in 1695 a Gillow had commenced life as a cabinetmaker. In the middle of the eighteenth century, before Liverpool had come into prominence, Lancaster on the river Lune was, next to Bristol, the principal west coast seaport of England, and exported a considerable quantity of furniture to the Indies. William Turner, senior, having as a young man become apprenticed to the trade, acquired a small business of his own, which he carried on in Friar Street. For many years the law required that no one could follow certain occupations in Lancaster, of which cabinetmaking was one, unless he became a Freeman of the town. The freedom could be obtained in one of three ways—by right of birth, by apprenticeship, or by purchase. William Turner, senior, in 1817, became a Freeman by right of his apprenticeship when twenty years of age. Gillow, who was not a Lancaster boy, obtained the freedom of the town by purchase, so that he might enter into competition with the other workers in the same line of business.

The Aldren family belonged to Skerton, an adjoining parish, in which they had been yeomen farmers for several generations. It is said that in 1745, when the Young Pretender passed through Lancaster on his ill-fated enterprise, the Aldrens of that time were forced to give house-room in Skerton to some of his soldiers, who showed their gratitude by afterwards robbing their unwilling hosts. An interesting fact connected with the family was the remarkable longevity of some of its members, on the female side in particular. Mrs Turner's parents were 79 and 82 years of age at the time of their death, and her three sisters died aged respectively 78, 85, and 91 years. She herself survived her husband for thirty-two years, and died on the 26th May 1869, at the age of 75.



WILLIAM TURNER, SENIOR.

[From a drawing, probably about 1830.

She thus lived to see her son become Professor of Anatomy in the University of Edinburgh.

Four children were born of the marriage, but William, the second of the family, alone grew to manhood. The eldest child, also named William, was born in October 1830, but he survived only a few days. It was not uncommon at that time to give the same name to two members of the family, in the event of the first-named dying in infancy. A daughter, Mary Ellen, born in 1834, died of diphtheria at the age of four; while the youngest child, Robert, born in October 1836, died at school from an attack of erysipelas, at the early age of fourteen.

As William Turner, senior, was an only child, and William alone of his generation reached adult life, an explanation is provided of the reason why, after his mother's death, the latter had no relations bearing his own name. He had several cousins, however, on the Aldren side of the house, one of whom, attracted to the study of medicine, found his way to Edinburgh in the early sixties of last century, and became a pupil of his cousin in the anatomy department. After a brilliant career as a student, Robert Aldren took his degree and entered the medical service in India. Unfortunately he was sent to an unhealthy station in the Madras Presidency, where he died of fever at the age of twenty-four, a life of promise being thus cut short. Thirty years later another Aldren, a second cousin of Turner's, also chose medicine as his profession and became his pupil in Edinburgh. Graduating in 1897, Bertram C. R. Aldren afterwards settled in practice at Edgbaston, Birmingham.

William was born in No. 7 Friar Street, in a small two-storied brick house of modest pretensions. In March 1914, a tablet to commemorate the birthplace of one of Lancaster's most famous townsmen was placed upon the house. The inscription which it bears reads as follows:—

IN THIS HOUSE WAS BORN ON THE 7TH DAY OF JANUARY 1832

SIR WILLIAM TURNER

K.C.B., F.R.S., D.Sc., LL.D., D.C.L.

KNIGHT OF THE ROYAL PRUSSIAN *ORDRE POUR LE MÉRITE*

PROFESSOR IN AND PRINCIPAL AND VICE-CHANCELLOR

OF EDINBURGH UNIVERSITY

A somewhat unfortunate controversy, which, however, had its humorous as well as its more serious side, arose over the erection of the mural tablet. In the year 1912 a movement was started in Lancaster by Sir William's old friends and the civic authorities, with a view to perpetuating his memory by marking the house in which he was born. Owing to some misunderstanding a tablet was placed upon the Friar Street front of the Wesleyan Schools, which occupied the site of the old house in which it was believed that he first saw the light of day. The tablet, whose inscription commenced with the words, "In a house on the site of this building," was unveiled on the 7th August 1913 by Mr H. L. Storey, in the presence of Sir William. The ceremony was attended by Mr C. F. Seward, the Mayor, and a large gathering of friends. At that time some doubt was cast upon the accuracy of the site chosen, but, when the tablet was unveiled, no reference was made to the subject, and as Sir William was silent on the point, it was supposed that the matter would be allowed to rest.

In March 1914, however, the second and rival tablet appeared upon the house No. 7 Friar Street, bearing the inscription already quoted. A careful inspection of the rate-books had revealed the fact that for a few years, both before and after the birth of his second son, Mr William Turner had occupied the house numbered seven. For some months the rival tablets informed the townsfolk that Sir William had been born in two places, and for a time this incongruity

excited some comment and controversy. The tablet erected in August 1913 was, however, removed subsequently, and the matter ceased to be of any further public interest.

Lancaster had been a place of some importance in very early times, and in the fifteenth century had shared in the calamities wrought by the Wars of the Roses. In the thirties of last century the town was experiencing a period of considerable commercial depression, although the firm of Gillow continued to exercise a beneficial influence. The shipping industry, which had previously been developed with marked success, had left it, and the shipbuilding yards were closed down. The rapid growth of Liverpool had injured her trade in that direction. Two or three cotton mills supplied her chief manufactured commodity. In 1831 the population was somewhat under 13,000, and between that year and 1851 it had only increased by 1749, while in the late forties Lancaster's misfortunes were further accentuated by the cotton famine. Such were the somewhat depressing conditions in the town during William Turner's boyhood.

In the course of his long life great changes have taken place. Lancaster has undergone very considerable extension; property has increased in value, and a number of handsome public buildings have been erected. At the census of 1910 the population of the town was 46,600. Its prosperity had increased enormously through the great development of its new industries, table-baize, sail- and oil-cloth. When on a visit to Lancaster in 1902 with the object of presenting the prizes at the Grammar School, Turner thus referred to his native town: "When I looked north this morning, as I stood outside the Grammar School, I saw the old church and the old castle perched upon their eminence; I saw where the old Roman town was situated, where the old Saxon town was situated, and where the old medieval town was situated; and I saw the picture through a frame of a

very remarkable character. It consisted of two great factories, one on the right and one on the left, and I could not but think that what I saw before me symbolised very much the education of the present day. It symbolised the meeting-ground of the old with the new."

The increased prosperity of the town has been due largely to the energy and success of two of Lancaster's townsmen, Mr James Williamson, now Lord Ashton, and the late Sir Thomas Storey. Upon the pedestal of the Victoria statue, the gift of Lord Ashton, erected in 1907, there is a series of panels containing the figures of prominent men of the Victorian era. One of these panels is reserved for men distinguished in science and literature, and included amongst them are the figures of Sir William Turner, Sir Edward Frankland, and Sir Richard Owen, three old Lancastrians. In the Storey Institute, gifted by Sir Thomas in 1891, are placed the busts of Turner, Owen, and Whewell, the Master of Trinity College, Cambridge, Whewell also having been a Lancaster boy.

Turner always retained a great affection for his native town, which delighted to honour him. He never failed to respond when invited to attend some ceremony or function, unless important duties made his visit impossible, and he cordially welcomed in Edinburgh any old Lancastrian friend who found his or her way to his adopted city.

Having been left a widow comparatively early in her married life, Mrs Turner transferred her home to Fenton Street, and devoted herself to the upbringing of her two sons, William and Robert. Owing to her limited means, great care and economy had to be exercised in the home in order that they might have every possible comfort. Though not endowed with special intellectual gifts, she was a woman of strong character, which was further developed by the stress and anxiety through which she had passed, consequent upon family losses. Her simple faith and strong



MARGARET TURNER.

[From a photograph taken about 1865.

religious feeling left their impress upon her son William throughout his life, and he often referred with gratitude to the deep debt which he owed his mother for her careful guidance and firm discipline. Up to the time of her death he maintained the regular and frequent correspondence with her which he had begun in his student days. His letters show a sympathetic understanding with her, and reveal the fact that he was desirous of keeping her in close touch not only with what he had achieved, but also with his views regarding his future.

To the natural ability of both her sons Mrs Turner gave of her best, and she encouraged them in the pursuit of their studies. From the time that William was able to read, which he used to say that he could do at the age of four, he developed a great desire to have books. He attended first a Dame's school, known as Teddy Howard's, in Moor Lane, a preparatory institution for the Royal Grammar School, in which, however, he was never enrolled as a pupil. In his boyhood the Grammar School was not in a very flourishing condition, either as regarded its general administration or in its situation. Placed close to the old parish churchyard, it was somewhat gloomy in its surroundings, and the number of its pupils was small. But the fortunes of the Grammar School, like those of the town, have greatly improved since the old site was vacated.

At the age of ten he left Howard's school and was placed under the care of the Rev. William Shepherd, at Longmarton, a village situated about three miles from Appleby, in the county of Westmoreland. The railway from Lancaster to Carlisle was then only in process of construction, and the boy had to make the journey over Shap Fells by coach : he always retained a lively recollection of his coaching experiences. Mr Shepherd, who was vicar of Bolton, a neighbouring parish to Longmarton, kept a small private school which had a very good repu-

tation in the district. The school accommodated about twenty boys, of whom fifteen were boarders and the remainder day scholars. The education which the pupils received was good, and the elementary training which they acquired, chiefly from Mr Shepherd himself, formed a useful preparation for their more extended studies in the future. The following letter, written to his mother by Robert Turner, who later also became a pupil at Longmarton, illustrates the character of the studies that were pursued there :—

I have deferred answering your kind letter, so that I might be able to inform you precisely of the time of our breaking-up. We leave on Tuesday 17th, and you may expect me on the 18th by the train reaching Lancaster about 11 o'clock.

Our class has reached the third books of Homer and Virgil, and about the three hundredth line of Hecuba. We have also begun the Jugurthine war of Sallust. In mathematics we have finished the second book of Euclid. In Mensuration I have begun Solids. We have also begun to read the history of Greece instead of Rome.

There is very little of general interest to record in William's school-days. He remained at Longmarton until the Christmas vacation of 1846, thus completing his school education at the age of fifteen, when many boys to-day are only entering the public schools. The general knowledge which he subsequently acquired was mainly derived through his own application to study. He certainly illustrated the saying of one of his favourite authors, that "the best part of every man's education is that which he gives to himself." His knowledge of history and literature, his command of language in speaking and writing, his ability to grapple with financial problems, were not taught him at any institution, but were the outcome of self-education.

When a man dies over eighty years of age without leaving behind him any autobiographical reminiscences, it is difficult for his biographer to draw any accurate

sketch of the earlier life of his subject. Having outlived all his contemporaries, he has left no one who might be able to provide the writer with interesting facts, or even supply some indistinct memory of a bygone period. During his boyhood William had few of those pleasures and pastimes which brighten the life of many children. He played no cricket or football as these sports are known to-day. Walking formed his chief recreation during his holidays, and again when he returned from London on his vacation. Living within easy reach of the Lake District, he early acquired an intimate knowledge of that corner of England. He was a keen lover of nature, and, even as a boy, he possessed in an unusual degree the faculty of appreciating the beauty of scenery and the ever-changing phenomena of light and shadow. His later studies in botany added to his enjoyment of country life. Botany meant more to him than the dissection and structure of plants and their application to the uses of the Pharmacopeia. Flowers, shrubs, and trees were living things which added to his pleasure in Nature.

It is often difficult to determine the reasons which may have influenced a young man in the choice of a career. In the early life of some men, on the other hand, even before the completion of the school period, the future course has already been discussed and settled. The adoption of a certain profession, or the entry into a particular business or trade, may follow naturally upon the vocation of the youth's father, or it may be arranged for him on the grounds of already established family interests. For William Turner no such family advantages existed. His father had died ten years before the boy left school, depriving him therefore of advice or assistance at this important period of his life.

There is no evidence that his schoolmaster had either formed or expressed any definite opinion as to

the kind of career for which his pupil seemed best fitted, nor have we any knowledge as regards the direction towards which his own thoughts were turned at that time. In a letter which the Rev. Mr Shepherd wrote to Mrs Turner at the close of her boy's last school term, no suggestion was made as to the future. "I cannot allow your son to leave," he wrote, "without expressing to you my entire satisfaction with every part of his conduct during the time that he has been at Longmarton. I assure you that I part from him with very great regret. He has been very industrious and attentive, and his progress is all that I could wish. It will always give Mrs Shepherd and myself the highest pleasure to see him at Longmarton."

In the year 1847 the town of Lancaster was fortunate in possessing amongst the members of its medical fraternity three highly-gifted and cultured practitioners: Dr Christopher Johnson, senior, and his two sons, James and Christopher, junior, the latter being associated as a partner with his father. It was through the influence of these men, and more directly through that of James, who by his marriage had become connected with the Aldren family, that Turner's steps were first directed to the study of medicine. On leaving school he was articled at the age of fifteen to his uncle, John Aldren, a chemist in the town. His pupilage, however, was of very short duration. Within a few weeks Dr James Johnson, recognising the boy's ability, and believing that his talents were being wasted in the position in which he was placed, persuaded his mother and his aunts to arrange for the necessary funds to provide him with a medical education. Accordingly he became apprenticed to Dr Christopher Johnson, junior.

The apprenticeship system was at that time the recognised portal in England through which a youth entered upon his medical studies. He became indentured to a "regular member of the profession,

holding the appointment of Surgeon to a Hospital, a General Dispensary, or a Union Workhouse." It had long been the custom of the qualifying bodies, such as the Royal College of Surgeons of England and the Society of Apothecaries of London, to regard the training received in this way as constituting the commencement of professional study. The Society of Apothecaries, indeed, made such a pupilage compulsory, though they recognised the instruction that was given only if the master had himself been admitted into the Society. The term of apprenticeship was not less than five years, and there was a government stamp of one pound upon the indenture. The actual amount paid for the apprenticeship varied considerably, and might indeed be *nil*, because in many cases a father would receive his son as an apprentice.

The Licentiate of the Society of Apothecaries supplied his patient with physic; medical practice was identified with drug-giving, and indeed this was often its more prominent feature. The practitioner was paid for the medicine he supplied, or what passed for it, and not for his attendance upon the patient; in fact, he could recover fees in a court of law for the medicines supplied, but not for the attendance. In the first half of the nineteenth century the pestle and mortar ruled the practitioner, and he was not liberated from it until 1858. Many years afterwards Turner recalled this condition of things when, in 1907, as the guest of the Yorkshire Association of Graduates of the University of Edinburgh, he said: "I have great hopes that the establishment of Universities in so many of the great provincial cities will bring about what I conceive to be another very important reform which is required in the profession of medicine—that the dispensing of medicine by the practitioner and the charging of a fee will depend on the advice that he gives to a patient, and not on the quantity of the medicine that the patient receives."

Some interesting facts have been collected[1] with regard to the fees paid by medical students in London who were anxious to indenture themselves as "hospital apprentices" to surgeons of renown for the purpose of obtaining special surgical instruction. Thus, it was not uncommon for a distinguished surgeon on the staff of a metropolitan hospital to receive £500 from a student for the privilege of following his work in the wards. This sum was frequently paid to Joseph Henry Green, John Abernethy, and Edward A. Stanley, Presidents of the Royal College of Surgeons of England, while a certain John Alexander Harper paid a premium of £1000 to Aston Key. To surgeons of lesser note smaller but not inconsiderable sums of money were given for the same purpose.

With the passing of the Medical Act of 1858, and the constitution of the General Council of Medical Education and Registration which the Act established, the whole question of the apprenticeship system was reconsidered and modified, and it finally ceased to be a recognised part of medical training.

Turner's Indenture of Apprenticeship was duly drawn up and signed by Christopher Johnson, junior, by his mother, Margaret Turner, and himself, upon the 26th day of February 1847. The old-fashioned formula of the Indenture is interesting, and the terms of the agreement between the contracting parties are sufficiently quaint to justify quotation, in part, at any rate:—

> The said William Turner doth bind himself a covenant Servant or Apprentice to the said Christopher Johnson, the younger, his executors, administrators and assigns from the Day of the Date hereof, during the Term of Five Years, thence next ensuing and fully to be completed and ended. . . . He, the said Apprentice, shall and will faithfully serve his Master, his secrets keep, his lawful Commands gladly obey and do; hurt to his said Master he shall not do nor

[1] 'The Lancet,' 1917.

suffer to be done by others, when it is in his power to prevent the same. His Master's goods he shall not waste nor embezzle, the same give or lend without leave. Day or night absent himself from his said Master's service, nor do any other act, matter or thing whatsoever to the prejudice of his said Master, but in all things shall demean and behave himself towards his said Master and all his, as a faithful Apprentice ought to do. And also that the said Margaret Turner, her executors and administrators shall provide for the said son, the Apprentice, during the said term, meat, drink, washing and lodgings and all manner of necessary and becoming apparel, and also medicine and attendance in case of sickness or lameness. In consideration hereof and of the sum of five shillings to the said Christopher Johnson, the younger, paid as an apprentice fee—(the receipt whereof is hereby acknowledged)—and it is further mutually agreed that, in case the said Margaret Turner shall be desirous that the said William Turner shall spend the last year of the said term in London or elsewhere, in pursuing his studies as a Surgeon or Apothecary, the said Christopher Johnson hereby promises that he will give his full permission to the said Apprentice to do so; also the said Christopher Johnson, the younger, shall and will teach, inform and instruct or cause and procure to be taught, informed and instructed, the said Apprentice by the best ways and means he can, in the Profession, Art, and Trade of a Surgeon and Apothecary.

The duties of the apprentice were varied, and in some respects might be regarded as somewhat of a menial character. He had to receive the messages and make appointments in his master's absence from the surgery, and, in some cases, it was his business to keep the accounts. He made up the pills and the bottles, dispensing the drugs and compiling the prescriptions. Turner rolled many thousands of pills during the days of his apprenticeship. The position, however, offered greater advantages than some might now be disposed to think, because the young student learned in a practical manner many things which to-day are often neglected in his training. He obtained a working knowledge of drugs, and he became versed in minor therapeutic details such as the making of poultices and the application of leeches;

he assisted his chief in his minor surgery and learned how to apply bandages and splints, practical details frequently ignored by the modern student, whose hospital attendance is often taken up with the major operations of surgery. The system, too, brought the prospective student of medicine at once into touch with patients. His interest in the study of disease was early aroused, and when he passed into the medical schools to learn anatomy and physiology, he was the more readily able to appreciate the practical application of these subjects, and his interest in their study was consequently stimulated. In modern times, when so much attention is being paid to effecting improvements in medical education, it might be well that would-be reformers should glance at the past and seek some inspiration from the good that existed in methods now long discarded.

The work of the apprentice, therefore, meant the training of his power of observation, accuracy in detail, and the use of his hands as well as his head, from the very outset of his career. There was time and opportunity, too, for reading and for the study of some scientific subject, depending upon the attainments or the special predilection of the master under whom he worked.

Turner was fond of telling a story relating to his duties at that time. Dr Johnson had amputated a limb, and had given instructions that it should be conveyed to the surgery. It was accordingly packed in a basket and given to Turner to take home. It was Sunday morning, and the public were leaving church as he carried his unusual parcel through the streets. Conscious of the somewhat gruesome contents of the basket, he imagined that every eye had penetrated the coverings and guessed his secret, and it was with feelings of intense relief that he reached the welcome door of the surgery.

We can recall another anecdote relating to his surgical practice which he himself rarely referred to,

further than to explain, when the story was being told in his presence, that the lad upon whom he operated was the only patient he had ever had. In the summer following his appointment to the Chair of Anatomy, he was spending a part of the vacation with his father-in-law near Morebattle, Kelso. While the two men were watching the harvest operations, a small boy became caught in the reaping-machine, both of his arms being severely torn close to the shoulder joints. Turner's assistance was obtained immediately, and the large vessels were tied by him and the bleeding thus arrested before the boy was removed from the field. The circumstances are briefly related in a letter from the patient, now a man of about fifty-seven, who writes with the pen between his teeth. "In reference to your inquiries as to the particulars of my accident, the facts are as follows. It took place one and a half miles from my home, whither I was carried in a sheet. One arm was nearly severed at the shoulder, the other having the bone so severely damaged that it also had to be amputated. Professor Turner, who fortunately happened to be present in the harvest field when the accident occurred, at once surgically operated upon me, and he was the means of saving my life. I was then between seven and eight years of age."

It was during his apprenticeship that Turner came directly under the personal influence of the three Johnsons, and his association with these men was mainly responsible for developing his mind along scientific lines. Mr Christopher Johnson, senior, who practised without diploma or degree, was a man of strong character, wide interests, and of very considerable literary and scientific attainments. He had a kind and sympathetic nature, and was ever ready to encourage young men who showed any desire to study. He was Honorary Surgeon to the Royal Infirmary of Lancaster; he became a member of the Corporation and subsequently Mayor of the town, and he did a great deal to promote the welfare of his fellow-townsmen.

His contributions to scientific journals were numerous. He was a good Italian scholar, was well versed in history, and possessed an excellent library. There can be no doubt that his library was placed at Turner's disposal, and thus, in his leisure moments, the boy was enabled to indulge in his love of reading. By such means he acquired some of that extensive knowledge of history and the general literature of the period in the writings of Dickens, Miss Brontë, Mrs Gaskell, and Scott. His wonderful memory enabled him to recall historical events and dates, and to repeat many of the incidents and name the characters described in the works of these writers, years after he had read about them.

Christopher Johnson, junior, inherited the marked scientific tastes of his father. He was a man of the strictest integrity and honour, and was greatly respected and beloved by his patients. He graduated at Trinity College, Dublin, and, after joining his father in partnership, he carried on an extensive and busy practice. He was appointed Honorary Surgeon to the Infirmary. Notwithstanding his many professional duties, he too found time to take a keen interest in public affairs, and, like his father, became Mayor of Lancaster. Along with his brother James, who had retired from practice, he paid considerable attention to the study of chemistry. The two men gathered round them a group of young lads, whom they encouraged and assisted, and, in the upper storey of the old Mechanics' Institute in Sun Street, James Johnson fitted up a little laboratory and lecture-room, where the two brothers taught the elements of chemistry and provided the means of carrying on experimental work. In this nursery of learning good seed was sown, and the scientific spirit was developed. Amongst the pupils who attended the evening classes was Edward Frankland, who afterwards attained the highest position as a scientific chemist; and Robert Galloway, who became Professor of Chemistry in the

Government School of Science in Dublin, also learned the rudiments of his profession under the same guidance.

Upon the completion of the daily routine work of the Dispensary, it was doubtless a pleasure for Turner to find his way to the evening class in the laboratory and to turn his mind to something of a more intellectual character. Amongst his old note-books there is one bearing the date June 1847. It contains the notes of many of his chemical experiments, and the various reactions are clearly written in graphic formulæ. We have a letter written to his brother Robert, then at school at Longmarton, in which he seeks his assistance in the translation of a Latin phrase, which possibly bore upon his work in the laboratory. "I wish you would translate the following passage: '*Ut vitrum ex officinâ prodit fragile, sic . . .*'; also look in your Lexicon and tell me the derivation and meaning of *Autokrateia.* I hope you will attend to your books; what little Greek I learned I have completely forgotten."

In due course his brother Robert, then twelve years of age, replied: "You request me to translate a passage, '*Ut vitrum ex officinâ prodit fragile, sic . . .*" and I have endeavoured to do so, but I am not sure that I have succeeded, as it is rather difficult to translate an unconnected passage when we have not the context given. However, I take the meaning to be this: 'As the brittle glass from the workshop deceives (that is, as to its strength), so . . .' Then, with regard to *Autokrateia,* I believe it is derived from *autos,* he, and *kratos,* strength, meaning one who acts according to his own will—*i.e.,* a despot."

No account of Turner's early days would be complete without this detailed reference to the public life and character of the Johnsons They not only developed and moulded the scientific bent of mind in their young pupil, but from their force of character

and high ideals they undoubtedly assisted in developing in him that lofty standard of life which characterised all his actions in later years. He himself fully recognised all that he owed to the family, and on more than one occasion he publicly acknowledged his indebtedness to them. When, in 1891, the new scientific laboratory was opened in the Storey Institute, Turner alluded to the benefit which he had derived from his training in the Mechanics' Institute. "There was in those old days a small lamp of science burning in Lancaster, and those who lit it were the family of Johnson."

The influence of the example which one generation may exert upon the next was still further illustrated in his case. When he was a boy, the names of two Lancastrians were kept prominently before the youth of the town—Richard Owen, the Anatomist, and Dr Whewell, the Master of Trinity. Owen's example was frequently before his mind, and he did not hesitate to say that he entertained the hope that, as a man, he might be able to work in the same branch of science as Owen had done before him. The accomplishment of that early hope was fully realised in his career.

In 1888 Turner dedicated his volume, entitled 'Memoirs upon Whales and Seals,' to Sir Richard Owen, whom he designated as the Nestor of British Anatomists, a graceful tribute to his old fellow-townsman who had unconsciously given him his youthful inspiration. Owen's letter of acknowledgment was as follows:—

> Your interesting and instructive volume contributing to the advancement of our common science by the descriptions of the characters and structures of the Marine Mammals obtained by the naturalists on the voyage of H.M.S. *Challenger* has been a source of great gratification. I have always looked out for any contribution by you to our common science from a cherished belief that we were fellow-townsmen, and I now deduce the conclusion more confidently from your contri-

buting pleasure and honour to my name by the friendly dedication of the volume which enriches the anatomical shelves of my library.

I have not visited my birthplace since the death of my immediate relatives, but some of my grandchildren and their widowed mother paid a visit to an old schoolfellow of mine, Mr Pearson Langshaw, whose father and grandfather succeeded my grandfather as organist of the Parish Church.

Excuse this gossip if I be mistaken in your birthplace.

RICHARD OWEN.

During his period of apprenticeship Turner formed a close friendship with Thomas Storey, then a youth three or four years his senior and a fellow-pupil at the chemical laboratory in Sun Street. He was not a Lancastrian by birth, but he had come as a boy with his family to live in the town. Like the other young men who worked in the laboratory, Storey fully appreciated the benefits of the practical education which he had received. When success had duly crowned his efforts in life, he showed his gratitude for the training which had meant so much to him by building and equipping, upon the site of the old Mechanics' Institute, the handsome Storey Institute, containing a new laboratory, facilities for technical education, a school of art, and a public library. In the following letter Sir Thomas Storey appealed to Turner to sit for the bust which, as we have already seen, was placed in the Institute.

REFORM CLUB, PALL MALL, S.W.,
7th November 1889.

You will know that I am building a small Institution for educational purposes, and the thought has possessed me that I should like to have your bust in marble to put into it. I am having a group cast of the Queen and Prince Consort, and I have already got Professor Owen, who was good enough to sit to a sculptor, Mr Percy Wood of Chelsea, last year.

I should employ the same artist for you, and I think he would be able to "fix you up" mainly from photographs, and would only require to see you once or twice, sometime when

you went to town. What do you say? I want you, because it would give me pleasure, but more especially because I wish to place before the future youth of Lancaster what Lancaster boys *may* become. I think I shall ask Atkinson the same question. You two, of the scientific men whom Lancaster has turned out, are my friends and of my own period, and, with Sir Richard Owen, will answer my purpose. Frankland I played with as a little boy, but was never intimate with him.

What do you say, old friend? As I hope you comply with my request, I shall put the sculptor in communication with you.

T. STOREY.

Turner maintained his friendship with Sir Thomas until the death of the latter in 1898. "He was one of my oldest friends, who combined in his character two attributes — amiability and strength, and one who, when he made a friend, kept him. He was a man who had fulfilled the obligations attached to his position in life, and who devoted his talents, his money and time, to the good of the public service."[1] Although in after life their careers were widely different and their opportunities for intercourse limited, Storey's visits to Edinburgh during the time when his sons were schoolboys at Fettes College brought them frequently together. He usually called upon his old friend, and they talked over early days and other matters of mutual interest.

At the age of sixteen Turner became a Freeman of Lancaster, and took the oath of Free Burgess on the 8th of April 1848. The freedom of the borough, as we have seen, was acquired by birth, apprenticeship, or purchase, on the payment of a small fee. In his case it was obtained as a birthright, his father having become a Freeman by apprenticeship in 1817. Turner has related how he was taken by his uncle to the old Town Hall, and in the presence of the mayor, Dr Howitt, signed his name upon the roll of Freemen.

The old Salt Marsh adjoining the banks of the

[1] Turner in a speech delivered in Lancaster.

river Lune belonged to eighty of the oldest Freemen or their widows, and was held in trust by the Corporation. Each had his share in the "Marsh Grass," which bestowed upon him the right of "turning one horse or two cows of any size to rummage upon this common." In 1795 the old Marsh was enlarged, drained, and embanked, and in this way was placed in a state of good cultivation, thus considerably increasing the receipts derived from the improved conditions of the soil. The Freemen, formerly entitled to a Marsh Grass, then received the sum of four pounds annually. Under the Lancaster Corporation Act, 1901, each Freeman, or the widows of the eighty oldest Freemen, were granted an annuity of thirteen pounds. As an "old Freeman," Turner might have claimed his share in the Marsh Grass had he retired in his later years to live in the town of his birth. In 1903 the Town Council of Lancaster, apparently ignorant of the fact that he was already a Freeman, decided to express the pride which they felt in him by presenting him with the Honorary Freedom of the Borough. When it was pointed out that he was already upon the roll of burgesses, the Council placed it on record that, but for this fact, they would have been pleased so to honour him.

In the summer of 1850, when Turner had served his apprenticeship for three and a half years, the question arose as to the advisability of his continuing his studies at one of the large medical schools. Doubtless much consideration was given to the matter before the final choice of school was made. In writing to his brother at the end of August of that year, he said: "I think I may now safely say that I shall be going to London at the end of September. It is very probable that St Bartholomew's Hospital will be the place selected for my Alma Mater. We have not got another apprentice, nor do I see any likelihood of one, at least at present."

We do not know on what grounds the final selec-

tion of St Bartholomew's was made. It is possible that the school was chosen because Richard Owen had been a student there, and had afterwards acted for some time as the lecturer on Comparative Anatomy. On the other hand, St Bartholomew's held a high place amongst the London schools at that time, and its position was fully recognised by the profession.

Upon the back of Turner's Indenture of Apprenticeship two certificates are written, both dated September 14, 1850. The first reads as follows: "I hereby certify that William Turner, having nearly completed his fourth year of apprenticeship, has my permission to devote the remainder of the Term to the study of his profession in London. (Signed) CHRISTOPHER JOHNSON, jun." The second states: "I certify that William Turner has conducted himself to my entire satisfaction whilst my pupil, and that I have the highest opinion of his intelligence and of the excellence of his moral character. CHRISTOPHER JOHNSON, jun."

At the age of eighteen Turner left his native town.

CHAPTER II.

MEDICAL STUDENT DAYS IN LONDON.

1850-1854.

St Bartholomew's Hospital — James Paget — Instruction at the Hospital Medical School — Death of his brother Robert — London University Matriculation — Holiday excursion — Duke of Wellington's funeral — Membership of the College of Surgeons — Intermediate Examination at London University — Early successes and scientific work — Invitation to Edinburgh.

TURNER left home in order to take up his studies in London on September 30th, 1850. His journey from Lancaster and his first impressions of the metropolis are recorded in a letter written to his mother shortly after his arrival. To the traveller accustomed to the modern comforts of the corridor express, which enables him to cover the distance of 230 miles between Lancaster and London in five hours, the journey at that period must seem somewhat arduous. Turner spent at least twelve hours on the way, and was obliged to make three changes. His luggage on more than one occasion caused him anxiety. All through his life the luggage problem worried him; the experience of years of much travelling without sustaining any loss did very little to allay his fears in regard to the safety of his effects, and it was difficult for those who travelled with him to persuade him to take a less anxious view of the matter. The letter to his mother is dated from his lodgings at 31 Great

Queen Street, Lincoln's Inn, which he had arranged to share with his cousin, James M'Naught:—

I arrived here safely, but before relating to you what I have seen and done, I must tell you some of my adventures by the way. Before reaching Preston we changed carriages: the porter there grumbled about my luggage, said it was overweight, and I ought to be charged: however, I got it put upon another carriage,[1] and we left Preston about 9 o'clock. I was told there that I should have to go to a station called Newton Junction, and there have to change into another train which would take me to London. When I arrived at Newton Junction I found that a train was there waiting for ours coming up: upon attempting to get into it, I was asked what class I travelled, and having told them second, they said I could not travel by that train, as it was the express and only carried first-class passengers. I was obliged to wait an hour and a half there until the arrival of another train. We left at ten minutes to twelve. We arrived at Crewe at 2 o'clock, and had to stay there upwards of half an hour. We went over the Trent Valley line and reached London about 8 o'clock.

About two miles from London I could perceive the twinkling of the lamps stretching a long way on each side of the line. At the Euston station the porters grumbled about my luggage and said I should have it weighed, but, after a little difficulty, I got it free.

After reaching my lodgings we had tea, and, feeling myself much refreshed, James took me out for a little walk. We went first to Oxford Street and walked half-way along it, and, as far as the eye could reach, there stretched on each side of us a long row of lamps, glimmering and twinkling far away into the darkness. We then turned into Regent Street, and certainly I was both astonished and amazed at it. It was a beautiful evening, the stars shone brightly in the dark sky, and the effect that was produced by seeing them between the tops of the lofty and magnificent shops of the Quadrant was extremely grand.

The next morning we went to St James's Park, Buckingham Palace, Trafalgar Square, and numerous places at the West End of London. After dinner we went into the City to the Hospital. I saw Mr Paget, the Warden. I paid him fees to

[1] Passengers' luggage was at that time carried upon the roof of the coaches.

the amount of £45. I only entered for the Winter Session, and shall pay my fees for the Summer Session in May.

We then went to see St Paul's, the Bank, Post Office, Royal Exchange, Guildhall, &c., and took a halfpenny boat back again. In the evening I went to the Hospital to hear the introductory lecture. After the lecture was over, all the students went into the large Hall, where we had coffee. I was introduced to Dr Kirkes: he spoke very kindly to me, and said he would be always ready to give me any information I required. I left about half-past nine.

This morning I have been down to the Hospital: I have attended two lectures and been round the wards with the surgeon, and been looking about me and learning where places are and what I shall have to do. There are upwards of two hundred students.

We have here related in his own words his first meeting with James Paget, the man who was later to have so important an influence in shaping his future career, and whose loyal friendship he retained throughout life. Paget, at that time, was the attractive personality at St Bartholomew's. He was then thirty-six years of age, and an assistant surgeon to the hospital. The tide of success which finally brought him the premier place in the profession in London had not yet turned in his favour, but he was slowly laying the foundation of his future career. It was an uphill fight, with little remuneration. He was engaged in cataloguing the museum of the hospital and the pathological collection belonging to the Royal College of Surgeons, where he was also lecturing. He was thirty-three before he was asked to perform his first operation in private practice—"a trivial affair, but it may do for a beginning."[1] Paget was also warden of the hospital college, and in this capacity he enrolled all the students entering the school and advised them as to their course of study. There is no evidence that Turner carried any letter of introduction to him. In writing to Stephen Paget

[1] 'Memoirs and Letters of Sir James Paget,' edited by his son, Stephen Paget.

in January 1900, offering him his sympathy on the death of his father, Sir James, he said: "I recall my first interview with him in October 1850, when, as Warden of St Bartholomew's, he entered my name as a student and gave me kind words of encouragement, and from that time onwards I invariably received from him help and sympathy when such were needed." The acquaintance formed in this official way gradually ripened into a close intimacy and friendship based upon the mutual esteem which developed between teacher and pupil.

The introduction in 1843 of the "collegiate system" into St Bartholomew's Hospital marked a distinct advance, and remedied a grave defect in the management of the school. There had previously been an entire lack of supervision and guidance of the student, and the absence of discipline, which was a natural result of want of control, had become a matter of some anxiety to the hospital authorities.[1] A similar state of affairs characterised all the hospital schools of London at that period. In 1841, Henry Acland, then a student at St George's, was solicitous as to the uncared-for condition of his fellow-students and of those at the metropolitan hospitals generally. He was anxious to see the provision of houses in or near the hospitals in which students might be lodged economically and simply, the right of admission to such being dependent solely upon their good conduct.[2] A residential college attached to St Bartholomew's was established for a limited number of students, and Paget was made the first Warden, and had his rooms in the building.

His son Stephen, who edited his Memoirs and Letters, thus writes of his father at that time:—

> Science never had a more willing servant: the one thing he was fighting for was the right to live by teaching science to students. He was truly a man of science; he had the

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[1] *Op. cit.*

[2] 'Life of Sir Henry Acland,' by J. B. Atlay.

scientific mind, the true spirit of teaching: he was impatient of all slack thinking and vague talking, and he hated all casual and eccentric ways of working. Here was the man for a medical school. There was nobody quite like him at the hospital: there was no prophet in that Israel: the school was going down for want of a man inspired with the love of hard work in science, who would preach the gospel of hard work and not look back, or hedge, or take things easily: a man with a touch of asceticism in his daily life, and a passionate longing to raise the tone of hospital teaching, and to compel the students to worship with him at the altar of hard work.

His personal influence and the discipline which was required of the residents in college began to develop a better standard of general conduct among all the students. The Warden soon knew every one, and his advice was continually sought. Paget resigned the wardenship in October of 1851. It was not until the spring of 1853 that Turner went into residence in college, so that it was chiefly in the class-room and in the wards of the hospital that he came into contact with Paget.

In the winter session of 1850-51 there were upwards of two hundred students of medicine at St Bartholomew's. Amongst those who entered for the first time along with Turner, and who later in life became leaders in their respective branches of the profession, were Thomas Smith, Jonathan Hutchinson, and Daniel Hack Tuke. The first-named, affectionately known as "Tom" Smith, afterwards received a baronetcy and became senior surgeon to his old hospital.

Turner's association with Sir Thomas Smith was a particularly pleasant one, and they remained close friends until the latter's death in 1909. The two men were mutually attracted, and they spent more than one holiday together on the Continent and in Scotland. Sir Thomas possessed a charm of manner and a rich fund of wit and humour, and was endowed with a genial and sympathetic nature which endeared him to all who knew him.

In the winter of 1851 the hospital roll bears the name of two students of the first year of whom mention must be made—George Rolleston, afterwards Linacre Professor of Anatomy and Physiology in the University of Oxford, whose scientific papers and addresses Turner edited after his death; and William Newman, who for many years was a successful practitioner in the town of Stamford, in Lincolnshire. With both these men he retained a close friendship. After Rolleston's appointment to Oxford, Turner was in the habit of making almost an annual pilgrimage from Edinburgh to that city in order to visit his friend. The common nature of their pursuits and the strong personal regard which they entertained for each other led them to meet as often as it was possible. George Rolleston was one of the most prominent and brilliant figures in the life of Oxford between 1860 and 1880. In the year preceding his entry to St Bartholomew's, he had taken a first in Classics, and shortly afterwards he was elected a Fellow of Pembroke. His appointment as Linacre Professor in 1857 was of historical interest: it was the germ out of which the Science School of Oxford has largely been developed. The Lee's Readership in Anatomy, which was held by Henry W. Acland prior to Rolleston's election to the chair, had laid the foundation of the biological department, but in 1857 the teaching of Natural Science in Oxford became a living thing in Rolleston's hands.

In Turner's student days neither medical education nor the examination system was on a satisfactory basis. In the first place, no preliminary examination in general education was exacted. While the apprenticeship period was undoubtedly valuable in some respects, the time spent by the student at a recognised hospital varied according to the requirements of the different licensing bodies; the Royal College of Surgeons of England required an attendance of three years, the Society of Apothecaries of London was

satisfied with two years. It must further be understood by those who are acquainted only with the modern curriculum, that men were entitled to commence practice upon a single qualification, in one case upon a diploma granted by a licensing body, in another, on a university degree. In one instance the qualification might be medical, as in the case of the L.S.A. given by the Society of Apothecaries; in another, it bore the mark of surgery, as in the case of the Royal College of Surgeons of England, which granted the diploma of M.R.C.S. Although the student was taught at the hospital medical school all the subjects of the curriculum—medicine, surgery, and midwifery included—and his knowledge of each subject was tested by class examinations, the licensing board which finally gave him his diploma made no such complete test. The Apothecaries' Society, the portal through which so many men in England at that time entered upon practice, did not include surgery in its qualifying examination, while the College of Surgeons failed to test the candidate in midwifery. Consequently, men commenced their professional life without having shown evidence, as tested by examination, of being properly qualified in each particular branch. Such a state of affairs was certainly not in the best interests of the public.

It was otherwise, however, with the M.B. degree of the University of London: the student's knowledge upon all the subjects of the curriculum was duly tested, and, in addition, he was required to pass the matriculation examination before proceeding to his professional examinations. The University degree therefore implied a higher standard of knowledge.

In Scotland, during the same period, the portals of entry into the profession were the M.D. degree of a Scottish University and the diploma of the Medical Corporations in Edinburgh and Glasgow,—single qualifications also, but carrying with them both an

education and an examination complete in themselves. The College of Surgeons of Edinburgh, like the Scottish Universities, examined their candidates quite as fully in medicine as in surgery, and gave their licence upon that understanding. Scotland, in medical as in other branches of education, was ahead of her southern neighbour, and the public therefore received a "better article." We shall show later how legislation dealt with the obvious defects to which we have just referred.

The subjects of study during the first winter at St Bartholomew's were lectures on General and Morbid Anatomy and on Physiology, along with lectures on Chemistry and General Surgery; in addition, attendance was required at anatomical demonstrations and work was commenced in the dissecting-room and in the surgical wards of the hospital.

In October of 1850 Turner threw himself into his work with great energy and earnestness. His time was fully occupied; the certificates of his class attendance which he had preserved clearly indicate the nature of his studies. The lectures on General and Morbid Anatomy and those on Physiology were delivered by Paget. To the St Bartholomew's men of that period the hour spent each day with him must have been one of great intellectual enjoyment, and contact with a man of his mental capacity must have had an inspiring influence upon the thoughtful student. Paget possessed the power of speaking fluently, while his subject-matter was always carefully prepared beforehand. His lectures supplied nearly all the material for the first edition of the text-book of Physiology, written by Kirkes, who had been one of his best pupils. Two volumes of carefully written notes of this course, made by Turner, furnish evidence both of the value of the matter which they contained and of the style in which the lectures were delivered. Turner has told us that they were much more than verbal expositions, and

that Paget recognised the importance of appealing to the eye as well as to the ear, and of cultivating and stimulating the power of observation. The lectures were well illustrated by diagrams, and he utilised his skill as a draughtsman by drawing freely upon the blackboard. The phenomenon of the circulation of the blood was illustrated in a practical manner. His lecture on the heart was timed to correspond with some great turtle feast in the City of London, and the huge reptile reposing on the lecture table was made the medium of demonstrating the movements of the heart before being converted into soup to tempt the palate of the citizens. The circulation of the lymph, the presence of non-striped muscle in the coats of the blood-vessels, and the difference in the character of the contraction of striped and non-striped fibre, were all demonstrated in the lecture-room many years before classes of experimental physiology were organised and became special courses in medical education.

Paget's influence, both as a lecturer and as a man, did not lose its hold on Turner with the passage of time. Fifty years later he recorded in vivid terms his impressions of those early days :—

> As an expositor of a difficult branch of medical science, Paget was *facile princeps*. His untiring application made him conversant with the progress of his subject in all its details: his orderly mind marshalled the facts in logical manner: the keen eager face, the bright penetrating eyes, his facility in speaking, his choice of language and the charm of his delivery, presented the subject so as at once to attract and fix the attention of the large class of students. But, in addition, his pupils felt that he was earnest in his work, that he was interested in them as individuals, an interest which showed itself both in the words of encouragement which they received during their pupilage, and in the support which he gave them at critical stages of their career in after life. Many will recollect and treasure the kindly look, the warm greeting, the affectionate shake of the hand which they received on meeting him, even years after they had left the school.

From the passage just quoted, it will occur to many who, in after years, were privileged to be pupils of Turner, that some of the power of exposition, some of the greatness of the master, had been transmitted to his pupil.

The lectures on Chemistry were given by John Stenhouse, whose teaching Turner frequently referred to with pleasure. There is no doubt that the manner in which he applied himself to this subject—a fact to which reference will be made later—must have stimulated the teacher's interest in his pupil. At the close of the winter session he was awarded the first prize in Chemistry, and he writes to his mother to tell her of his success :—

> Yesterday was a great day at the hospital, it being set apart for the distribution of the prizes. The company assembled about 2 o'clock. The Lord Mayor, a great number of ladies, the lecturers and medical officers, and all the students being present. I have got beautifully bound copies of two very excellent works, Whewell's 'History of the Inductive Sciences' in three volumes, and Bacon's '*Novum Organum*' in one volume. Two scholarships, a microscope, and many valuable books were at the same time given to other successful students.

The anatomical demonstrations, which dealt mainly with Anatomy from the medical and surgical aspects, were conducted by Skey, one of the assistant surgeons to the hospital; Holden and Savory were the demonstrators.[1]

At the very outset of his period of study, the student was introduced both to the principles and to the practice of Surgery. Turner attended the lectures delivered by William Lawrence (afterwards Sir William Lawrence, President of the Royal College of Surgeons), who was then senior surgeon to the hospital. His hospital ticket admitting him to the wards was signed

[1] Holden's 'Text-Book on the Bones' became a well-known anatomical work. Sir William Savory rose to be senior surgeon to the hospital.

by Lawrence, Edward Stanley, and E. A. Lloyd. In his reminiscences of his student days he used to recount his surgical experiences in hospital and recall the details of some of the cases which were at that time in the wards. He would often relate with great vividness the impression that had been left upon his mind of the horrible effects of blood-poisoning and the terrors of hospital gangrene in the pre-Listerian days. In the surgical wards he followed for the most part the work of Stanley, the history of many of the clinical cases that were demonstrated being found in his student note-books.

The session was a busy one, and to the industrious student there was ample opportunity for steady work. In a letter to his brother Robert, written in October 1850, he says—

> I have to be at the hospital daily at nine in the morning, a lecture being then delivered; we are occupied from that hour until half-past three in the afternoon, either in hearing lectures, in going round the wards, or in dissection. I am at present engaged in dissecting, having obtained for my share a leg, and I shall have to work hard at it before it gets putrified. In the evening we attend a lecture at seven o'clock. Thus you see that my time is fully occupied.

Towards the end of November he writes again to his brother as follows:—

> I send you an engraving of the great Exhibition. On Sunday last I took a walk to see it; they are proceeding very rapidly with the building, and it is expected to be finished towards the end of the year.
>
> On the 9th of November I went to look at the Lord Mayor's show; in my opinion it was very poor, not at all coming up to my expectations. Last Sunday week I went in the evening to a church where the service is performed after the Puseyite fashion. Over the altar there was the cross, and on each side of it two lighted candles. The prayers were not read but drawled out in a sing-song manner, and interspersed with sundry bows and scrapes and genuflexions. The sermon was read in the middle of the prayers, and it was certainly a very

ingenious one. The text was, "Glorying in the cross of Christ," and every imaginable argument was brought to bear upon it, all tending to extol the cross above Christ.

When you write again, tell me how far you are advanced in your classics and mathematics, also what position you hold in your class, and how you agree with the other boys. What time have you to amuse yourselves; do you get out much to see the country? I suppose you had a demonstration on the 5th. The country is quite in a turmoil, and no one knows when it will become quiet. Public meetings are held daily in London to petition the Queen against the Pope's assumption of authority.

The more I see at the hospital, the more I realise how much I have to learn; the knowledge required of us is very great, and if you have a conscientious desire to profit by the instruction you receive, you must really work very hard. Sometimes in the evening I find time to go to some place of amusement, but that is almost the only relaxation I enjoy; no tales nor novel reading. I have quite given them up: indeed, I never feel the want of them. One evening James and I went to the Haymarket Theatre. We saw Macready play in King Lear; he is the first living tragic actor, and it was certainly the perfection of acting. The bursts of passion he works himself into when convinced of the ingratitude of his daughters, Regan and Goneril, sent a thrill through me. I have not much to tell you of the sights of London, as I have seen very few of them.

A visit to the theatre was his favourite form of recreation, and one which gave him keen enjoyment. He frequently recalled with pleasure his Saturday evening attendance in the gallery of the Haymarket, the old Sadler's Wells, and the Princess' Theatre. In the fifties of last century the London stage was rich in the quality of its actors and actresses. W. C. Macready was a great Shakespearian exponent; Charles Kean was in the heyday of his work and fame; while E. A. Sothern delighted his audiences as Lord Dundreary. Turner had a high opinion of Samuel Phelps, whom he saw at Sadler's Wells, and was most appreciative of the dramatic art of Helen Faucit. A strong impression was made upon him by the acting of J. S. Clarke in "Paul Pry," and when,

in later years, he saw J. L. Toole impersonating the same character, his verdict was strongly in favour of the former comedian. In his Edinburgh days he was not a regular frequenter of the theatre, although at intervals he enjoyed a good play in the hands of a leading actor or actress.

Apart from the daily contact with his fellow-students at the hospital and his intercourse with his cousin, Turner's life at this time was a lonely one. He had little opportunity of becoming acquainted with people. He made use of his leisure moments, however, in acquiring an extensive knowledge of London itself. He wandered all over the great city, and by the end of his student life there were but few parts of it with which he was unacquainted, not only geographically but in their historical associations. It is interesting to recall at this point that Turner possessed a very poor "bump of locality," and, notwithstanding that his form of recreation might have been expected to improve this defective sense, his ignorance of his exact whereabouts, or the correct direction to take on occasions, was sometimes very striking, and was liable to lead him into difficulties had he not been properly guided. During one of his many peregrinations in London, he was a witness of the last of the public executions conducted outside Newgate prison.

In the month of February 1851, he writes again to his brother—

> I am going on as usual at the hospital; as the termination of the session is approaching, all those students who are intending to try for prizes are working hard, while the idle ones are getting still more idle. There are great temptations for men to be idle here: amusements are numerous, and, being thrown so much on their own self-reliance, it is no wonder that so many are overcome. Are you likely to have many new scholars this half-year, any in your own class? There is nothing like a little competition for making a man work. I hope that you have again entered into the spirit of your studies with an earnest desire to acquire everything you possibly can, as, unless your inclination tends to the church,

it will be your last year at school, and the opportunity for acquiring knowledge should not be lost.

It it quite evident from these letters that the enthusiasm for work, which was such a dominating feature of his character throughout his life, had been early implanted in him, and that he fully recognised the necessity of constant application if success were to be achieved. His affectionate interest in his younger brother induced him to inculcate in him a similar desire to acquire knowledge, and the same influence undoubtedly made itself felt in after years upon many of those who passed through his hands.

Towards the end of February 1851, he had the great misfortune to lose his brother, who, at the early age of fourteen, succumbed to a severe attack of erysipelas. He was undoubtedly a boy of very considerable promise, and some of the letters written from school to his mother and brother furnish evidence of unusual ability in a boy of his age. Mr Shepherd, writing from the school at Longmarton shortly before Robert's death, expressed entire satisfaction with his conduct and attention: "He has great amiability, possesses considerable ability, and will make a very good scholar; he is in every way most promising, and it would give me great satisfaction to see him turn his attention to the church."

With the opening of the summer session the following additional subjects were included in the course of study: Lectures on Botany were delivered by Farre, and on Materia Medica and Therapeutics by Roupell, who was one of the physicians to the hospital; a course on Midwifery and the Diseases of Women and Children was conducted by Charles West. Turner was awarded the first prize in Botany at the end of the term.

The chief event in London during the early summer of 1851 was the opening of the great Exhibition in Hyde Park. Reference to the erection of the build-

ings has already been made in one of the letters addressed by William to his brother, but in writing to his mother in the month of June he says—

I have been twice to the Exhibition, and was very much astonished at its magnificence and beauty. It were vain for me to attempt to describe all its wonders; such a collection of splendid objects, such a display of taste, and such an assemblage of articles illustrating the wealth, the power, and the genius of man were never before collected together. The building itself forms not the least important object of attraction, and as you stand at one end and look down the central avenue, and see around you the principal productions of every country on the globe, you are lost in wonder and admiration.

On the Wednesday when I was there last upwards of fifty thousand persons were in the building, and yet there was very little crowding or inconvenience, except around some few objects, such as the Great Diamond and the Queen of Spain's jewels. The greatest order prevails through the building. There are great complaints amongst the London tradesmen against the Exhibition, it not having been half as profitable to them as they supposed. There is no scarcity of lodgings, bills being seen in the windows in every direction.

The time is daily drawing nearer when I hope again to have the pleasure of sitting in my mother's house, and when I hope that I can say that the ten months which I have lived in London have not been unprofitable.

After the summer long-vacation, which was spent at home, Turner resumed his hospital course, with the intention not only of continuing his ordinary studies preparatory to qualifying, but with his mind bent upon passing the Matriculation examination of the University of London which was held in July of each year. This entailed a great amount of extra work, most of which bore no relation to the subjects of the medical curriculum. In after years he sometimes recalled memories of the strenuous days and nights which he spent during the winter of 1851-52.

The London University Matriculation examination included a number of subjects: Mathematics—arithmetic, algebra, and the first book of Euclid; the

Classics—Greek and Latin, a subject being selected from either Homer or Xenophon, and from Virgil, Horace, Sallust, Cæsar, Livy, or Cicero; English included grammatical structure and the outlines of History and Geography; Chemistry; Natural Philosophy, which included Acoustics and Optics. It is obvious, therefore, that while the hospital claimed his time and attention during the greater part of the day, his evenings must have been largely occupied in reading over a somewhat extensive field.

In July 1852 he passed the Matriculation examination, and, along with his two friends Thomas Smith and William Newman, was placed in the first division. As it was open to any candidate to be examined for Honours, he enrolled his name for the Honours' examination, choosing the subjects of Chemistry and Botany, in both of which, as we have already seen, he had taken prizes in his first year of study at St Bartholomew's. He was awarded the first prize in Chemistry and the second in Botany at the written examination, while his friend Newman was awarded the prize in Zoology. It is interesting to record here that at the ceremony for the presentation of degrees, honours, and prizes, held at the University of London in May 1853, the names of Joseph Lister and William Turner appear upon the same roll. The two men were as yet unacquainted with each other, and unknown to the world in which both were destined, each in his own sphere, to play so conspicuous a part. Lister received the degree of Bachelor of Medicine, and was awarded the scholarship and medal in Surgery, while Turner was awarded the prize in Chemistry in the Honours Matriculation examination. At the same convocation John Russell Reynolds and John Syer Bristowe received the M.D. degree, and Frederick William Pavy graduated as M.B.; Henry Enfield Roscoe took the degree of Bachelor of Arts with the prize in Chemistry, and William Stanley Jevons obtained a prize in Botany at his Matriculation

examination. Writing to his mother on July 19th Turner says—

I delayed answering your letter until I could write with some certainty of the result of my examination. I am happy to say that I have passed in the first division, and can thus call myself an undergraduate of the University of London. We students of St Bartholomew's have done very well. Of nine who went up, six have got through in the first division, one in the second, and two are rejected.

You can scarcely imagine the weight that has been taken off my mind now that the result of the examination has proved successful. They kept me waiting all last week, and you may judge the state of anxiety I was in for all that time. If I had been rejected after having devoted my time almost exclusively to the matter for the last three months, the loss I should have sustained both in reputation and in neglect of my other studies would have been almost irreparable.

I was very sorry about the result of the Lancaster election; the Tory party have, however, no one to blame but themselves, for if they had not brought a fresh candidate in the shape of Mr Ellis, they might have returned Messrs Green and Gregson without any trouble. As it is, they suffer for their own obstinacy. Mr Green's life from this time will, I should think, be a perfect blank, as the length of time he has sat in Parliament must have made attendance there almost a necessary part of his existence.

The borough of Lancaster returned two members to Parliament. Thomas Green, who is here referred to, had represented the borough in the Tory interest since 1826, a period of twenty-six years, which explains the reference to the blank which would probably be created in his life by his being unseated in 1852.

In the Easter recess of 1852, prior to completing his work for the Matriculation examination, Turner, along with a friend, took a short holiday in the Isle of Wight. He thus describes his experiences in a letter written to his mother after his return to London :—

Here I am all safe, having returned last night considerably improved by my trip, and having enjoyed myself very much.

You will, of course, know that we left town on Saturday morning. We arrived at Southampton about noon, walked about the town for some little time, and then took the boat for the island. We had rather a rough passage across; a strong north-east wind was blowing, so that our passage was somewhat delayed. We arrived at Cowes in about two hours, but did not land there, proceeding on our way to Ryde, passing Osborne House, of which a fine view is obtained from the sea. We arrived at Ryde at half-past four, and after tea we walked to Quarr Abbey. We spent Sunday there, and in the evening walked to Sandown, a distance of about five miles.

On Monday morning we left this place and took an easy walk through Shanklin, Bonchurch, and Ventnor, to Niton, a village at the extreme south of the island. This was, I think, one of the most beautful walks I ever took; for a great part of the day we were upon the top of the cliffs overhanging the sea, and from there we had an extensive view of an immense tract of ocean, dotted here and there with the sails of numerous vessels coming up the Channel. We spent about two hours at Ventnor.

Most of the places in this part of the island are increasing very rapidly in size, building is going forward at a rapid pace, and everything denotes that the places are becoming more popular year by year. We slept at Niton, and the next morning ascended St Catherine's Mount, a hill from whose summit there is an extensive prospect of the whole island, including the famous Needle Rocks, together with many parts of the south coast of England.

We then visited Black Gang Chine, a kind of excavation in the cliff. At certain seasons after a heavy gale, or rain, or during a violent storm, I have no doubt it is terrible to look upon, but when we visited it after such a long continuance of fine weather, and with a sea on which there was scarcely a ripple, much of the effect was lost; in addition to this, people with very bad taste have built several houses almost encroaching on its sides and have laid out a portion of the grounds around as flower gardens, thus depriving it of that air of desolation which ought to constitute its peculiar grandness.

After seeing this, we turned our steps up the centre of the island towards home. We passed Carisbrooke Castle, and turned aside to walk through the ruins. I saw the room where the unfortunate Charles was confined previous to his trial and execution. We then went to Newport, where we dined, and in the evening walked to Cowes. The following day was occupied in coming home.

I was very much pleased with my trip; the novelty of the place, the beauty of the views, the mildness of the climate, all conspired to render it extremely enjoyable. Our session recommences on Monday.

Another letter to his mother, giving an account of the funeral of the Duke of Wellington in November 1852, may very suitably be introduced at this point, as both it and the one just quoted are good examples not only of his power of observation, but also of his facility of description.

We have had a week of pageants and processions, with the lying in state and the funeral of the Great Duke.

On Thursday evening I went to Chelsea; I arrived there at 8 o'clock, and after waiting about an hour and a half I was admitted. The passage led first into a chamber hung with black cloth and illuminated with wax candles; on its walls the captured flags of foreign countries were grouped, encircling the coats-of-arms of the Duke. Standing around the room were soldiers of the Guards in their splendid uniform, glittering with steel and brass. The way then led up some steps to a doorway which opened into the Great Hall; this was likewise hung with black; on the ceiling silver cords were extended hanging down the walls and terminating in long tassels; these crossed each other and gave an appearance of groining to the roof. Extending down each side of the room were double rows of immense wax candles, supported in gilded stands, and on a raised platform down each side was a line of soldiers, leaning with a sorrowful air upon their muskets.

At the end of the hall was placed the coffin, upon a lofty stand, having the ducal coronet on it; surrounding this were numerous badges and orders belonging to the Duke. Seated below were officers of the Guards in military mourning, while overhanging all was an immense canopy of black cloth lined with cloth of gold. This being lighted up from below, cast an almost indescribable air of richness over the scene.

On the following Thursday I took up my station on the parapet at the top of St James' Street, from where I obtained a very favourable view. The crowd of people was great; the house-tops, windows, balconies, and shops were crowded with people and immense numbers were on the footway, but owing to the excellent police regulations and the long line of streets

through which the procession passed, every one, I think, must have had an opportunity of seeing.

It would be vain for me to attempt to describe the great procession; it occupied an hour and a half in passing the spot on which I stood. Not for years have so great a number of soldiers been gathered together; every regiment was represented—cavalry, infantry, and artillery: the line, the Guards, and the Rifles all sent their quota. Then there were Prince Albert, the Duke of Cambridge, foreign marshals and English officers, representatives of the Houses of Parliament, the Ministry, Bishops, and Judges, all these testifying by their presence to the respect and admiration which they felt for the great departed.

The coffin itself, protected by a silken canopy, was raised upon a lofty car drawn by twelve black horses, the car being covered with an immense black velvet pall embroidered with silver devices. Upon the coffin was placed the ducal hat, and resting at its side on a velvet cushion, the coronet. Following this was the Duke's horse led by a groom, and hanging its head with almost human sorrow.

The proceedings within the Cathedral were, I believe, most solemn and impressive, but I cannot give you any account of them. I have no doubt that many sermons will be preached in the London churches to-day, in which the ceremonial of Thursday will be referred to. I heard Dr Cumming this morning; he spoke very eloquently of the Duke's character, and held it up as a model which we all might follow.

With the commencement of the winter session 1852-53, Turner entered upon his third and last year of medical study. In the following summer he proposed to sit for the examination qualifying him for his diploma; during the winter he completed his dissection of the human body; he attended Paget's instruction in Morbid Anatomy, and, for the second time, took Dr George Burrows' lectures on the Principles and Practice of Medicine and his ward clinics. Burrows was the junior full-physician at St Bartholomew's, and a man of high attainments, who possessed the power of attracting to his hospital service the more industrious of the students. He was an excellent teacher. Of stately appearance, Burrows was held in high esteem by the profession, and in course

of time became both President of the Royal College of Physicians of London and President of the General Medical Council. He received a baronetcy.

The work of the final year entailed the preparation and revision of all the subjects of the curriculum, because the candidates were required to satisfy the examiners, not in a series of examinations, but at one final sitting, on the successful result of which the diploma was conferred. The examination was held in the month of June. Material evidence of the success of Turner's work at this time was forthcoming in the results of the spring examination at the hospital. He obtained the first prize in Practical Anatomy, being bracketed with Mr J. L. Dela Garde, and on 6th May 1853 he was awarded a scholarship in Anatomy, Physiology, and Chemistry of the annual value of £45 and tenable for two years.

With his power of work and with the record of his past successes, he must have approached the final examination in a spirit of confidence. There were no written papers; the students' knowledge was tested in a *viva voce* examination. The examiners sat at one side of a long table and the candidate passed in turn from one to the other. While from the method adopted the examination could not have been of a very searching character, yet the ordeal of having to face so many learned persons was doubtless sufficiently trying, and not conducive to maintaining a calm and well-balanced mental attitude.

Having successfully passed the crucial test, Turner received on 1st July 1853 his Diploma as Member of the Royal College of Surgeons of England. In a letter to his mother he writes:—

> It may not be uninteresting now, at the close of my third summer's attendance at the hospital, to take a review of what I have effected during my three years here, and also to estimate what I have paid in fees, books, instruments, and personal expenses during my residence in London.
>
> At the hospital I have taken the first prizes in Chemistry,

Botany, and Practical Anatomy, and a scholarship in Anatomy, Physiology, and Chemistry. I have matriculated at the University of London, and taken there a first prize in Chemistry and a second in Botany, and I have passed the examination and obtained the Diploma of the Royal College of Surgeons. In addition to all these I have acquired a large stock of professional knowledge, the value of which could not be estimated by prizes or other personal distinction.

The money I have received from home and my half-year's scholarship amount to £312, 5s. Of this I have now in hand £8. This gives an expenditure of £304, 5s. The outlay is as follows:—

	£	s.	d.
Fees—			
St Bartholomew's . . .	108	8	0
London University, including cap and gown . . .	6	4	0
Royal College of Surgeons . .	22	0	0
Books	9	14	0
Apparatus, instruments, and dissection expenses	11	4	6
	£157	10	6
Personal expenses . . .	146	14	6
	£304	5	0

The above table gives a very fair estimate of my expenses and the different ways in which the money has been disposed of. I think, on looking at the personal expenditure, that no one can accuse me of extravagance.

No one indeed could charge him with extravagance. The figures speak for themselves. When we realise that during his three years in London his personal expenses, which included board, residence, and the hundred and one small items which help to swell the debit account of any young man, averaged £48 per annum, the necessity of studying strict economy during his student days must have been a matter which at all times weighed heavily with him. He was mainly indebted to his aunts for the financial help which made it possible for him to pursue his medical studies in London, and it was natural that he should

seek to repay their generosity by steady application to work and by an honest desire to avoid unnecessary expenditure. The self-denial thus imposed upon him doubtless strengthened his resolution and stimulated the wish to persevere and attain success.

His account book, commenced on the day of his arrival in London and always accurately kept, is a striking testimony both of his attention to the smallest detail and of the careful way in which he lived. The subject of his clothes appears at times to have been a cause of anxiety to him, and, on more than one occasion, we find him writing to his mother in some trepidation—

> I am again in want of money, the supply you sent me being only sufficient for another week. The amount required for the summer fees will be eight guineas. I shall also be compelled to get a new coat, and, in addition, I want one or two other little things, such as a pair of gloves and a new tie, all of which I shall get in town. I have given you a pretty long list of my wants. I always endeavour to make my clothes last as long as possible, but they will become shabby in spite of the greatest care.

Later on, when writing to her upon the same subject, he says—

> Oh! would some enterprising individual arise who could manufacture garments that would wear to eternity if required. If such a man did appear, great would be the rejoicing amongst such ever-seedy, ever-threadbare persons as myself!

The respect, one might almost say the affection, which he had for his older garments was characteristic of him all through life, and was often a source of anxiety to his wife, who was obliged from time to time to remove them surreptitiously from his reach. In the family circle it was often a subject of friendly chaff and amusement.

Having taken his Diploma of Membership of the

Royal College of Surgeons in the summer of 1853, Turner was at liberty, under the regulations which then existed, to start medical practice, though some students preferred, if possible, to obtain a double qualification. There can be no doubt that this was also his intention. Having passed, as we have seen, the Matriculation Examination of the University of London in the previous summer, he determined to devote a further period of time to the preparation of the subjects for the Intermediate or First M.B. Examination, his desire to do so being strengthened by the fact that he had gained a scholarship of the annual value of £45. With this end in view he gave up all thoughts of a summer vacation, and, early in July, commenced his work, the subjects for examination being Anatomy, Physiology, Chemistry, Botany, Materia Medica, and Pharmacy. At the same time he obtained a clerkship under Dr George Burrows, which he held until the month of December. A large volume, containing three hundred pages of closely-written notes of clinical cases, remains as evidence of his work in the wards, a model of how cases should be taken and their progress recorded. In the month of October 1853 he was successful in obtaining the gold medal of the Apothecaries' Society of London. The medal was annually open to competition amongst the students attending the various medical schools in England, and was awarded to the student who passed the best examination in Materia Medica and Therapeutics.

Early in January 1854, Turner read his first scientific paper at a meeting of the Abernethian Society, and it is interesting to note that it dealt with a therapeutical subject. The paper was entitled "Some of the Therapeutical Effects of the Iodide of Potassium." The Abernethian Society holds much the same position at St Bartholomew's as does the Royal Medical Society in Edinburgh. It was founded in 1795 as a students' society, and, as its name implies,

was thus designated in honour of John Abernethy, the distinguished surgeon of St Bartholomew's at the end of the eighteenth and beginning of the nineteenth century.

In the spring of the same year he prepared a paper upon the "Examination of the Cerebro-spinal Fluid," which clearly shows his practical knowledge of chemical methods. It was communicated to the Royal Society by Mr Paget, and was published in the Proceedings of the Society in June 1854. M. Deschamps had recently demonstrated in a paper appearing in the Bulletin de l'Académie de Médecine in 1852, that the cerebro-spinal fluid contained a constituent which possessed the peculiar property of reducing the blue protoxide of copper to the state of the yellow suboxide. As the power of reducing the oxide of copper is possessed by grape-sugar, the conclusion arrived at was that the cerebro-spinal fluid contained this constituent; this reducing power, however, was not peculiar to grape-sugar, but was possessed by other organic substances, such as lactine and lactucine, so that this test alone could not be relied upon as affording positive indications of its presence. Further confirmation was therefore necessary, and, in order to determine the point, Turner conducted a series of chemical experiments, the cerebro-spinal fluid being obtained from a case of *spina bifida* under the care of Mr Paget. As a result of his examination, Turner concluded that the power possessed by the cerebro-spinal fluid of reducing the protoxide of copper was not due to the presence either of grape-sugar or of any of the allied substances; whether it depended upon the presence of leucine or other modifications of albumin of a somewhat similar nature, or whether it was due to the existence of a substance belonging to another series, was a point that had yet to be determined. Although later examinations have proved that the cerebro-spinal fluid does contain glucose, the paper

was of some importance, as it was the first investigation upon the subject made in this country.

In April 1854, Turner was asked by Dr Kirkes to take his place as Demonstrator of Morbid Anatomy at the hospital for a period of three months. This temporary appointment, which provided Turner with excellent opportunities of studying pathology, might have led him to adopt a career very different from that which he eventually followed. The successful way in which he discharged his duties led Kirkes to ask him to consider whether he would not apply for the appointment when it fell vacant. The financial difficulties which would have arisen, in the event of his obtaining the demonstratorship, really led to his refusal of the offer. He sought his mother's advice and discussed the points in the following letter :—

In my last letter I told you that Dr Kirkes had been appointed to the post of assistant physician to the hospital, and you may perhaps remember that I told you in a previous letter that during his canvass for the post I had undertaken the duty which he previously had performed. Yesterday he informed me that in consequence of his appointment to the higher post he should resign the one he has so long occupied, and as he was so pleased with the manner in which I had performed his duties, I should have his strongest recommendation to the post when vacant.

But now comes the question: Should I take such an office? If I do, I must give up all thoughts of practising in the country as a general practitioner, and I must sit down contented as a subordinate at the hospital for perhaps six or eight years, work hard and receive as my remuneration £50 per annum, that being the salary attached to the post. During the whole of this period I should be pursuing my studies at the hospital and should have to qualify myself so as to pass the College of Physicians. Then, after the lapse of eight or ten years, if by dint of hard work I had acquired any position, should a vacancy occur, I should take my chance of being appointed assistant physician to the hospital. During the whole of this period I could scarcely hope to make more than another £50 or £60 a year by writing in journals or other publications.

I have to give Dr Kirkes an answer in the course of a

week. My appointment to the post is still a matter of uncertainty, for as soon as his resignation is made known several other candidates will doubtless be in the field, and I should have to take my chance of getting the appointment, and as the claims, as well as the age, of some of them are greater than mine, the preference would probably be given to them. The question which I wish you to consider is whether you would consent to my putting myself in nomination for the post? Provided I got the appointment, the mode of life that I should have to follow is what I should like, because London and its habits present great charms to me, and although the post would require hard work with small remuneration, yet the knowledge that I should acquire, the professional standing that it would give me, would amply repay me for years of privation and toil.

In August 1854, he passed the intermediate examination at the University of London and was placed in the first division, a position which qualified him to enter for the examination for Honours. As the result of this he was placed third in the subject of Chemistry, while in Materia Medica and Pharmaceutical Chemistry he gained the gold medal and an exhibition of £30 per annum, tenable for two years.

In reviewing at this stage in Turner's career the list of prizes and honours which he had obtained during his four years of study at St Bartholomew's Hospital, one cannot fail to be struck, in the first place, by the fact that all his distinctions were gained in the scientific subjects. In Midwifery, Surgery, and Medicine, on the other hand—that is to say, on the clinical side of the curriculum—no honours were awarded to him. It is evident that the science of medicine appealed more directly to him, and that his mental capacity was better adapted to deal with it than with the subjects pertaining more particularly to practice. In the second place, we find that his chief distinctions were obtained in Botany and Chemistry, and in those subjects in which Botany and Chemistry form the chief basis—namely, Materia Medica, Pharmacy, and Therapeutics. It is true that he gained

a first prize in Practical Anatomy and a scholarship in Anatomy, Physiology, and Chemistry at St Bartholomew's, but the outstanding fact remains that, with these exceptions, he did not reveal, at this time, any special predilection for the subject which afterwards became his life's work. The gold medals of the Apothecaries' Hall and of the University of London were both awarded to him in the subjects of Materia Medica, Therapeutics, and Pharmaceutical Chemistry, and in 1861, after he had taken up his residence in Edinburgh, he received the gold medal of the Pharmaceutical Society of London.

Illustrations of the same bent of mind are to be found in the character of some of his earlier papers. Those upon "Some of the Therapeutical Effects of the Iodide of Potassium," and "The Cerebro-spinal Fluid," have already been referred to, but even later, in 1861, he writes upon "The Mode of Elimination of the Metal Manganese when employed medicinally," in which he showed that the drug was eliminated through the kidneys, and another on "The Properties of the Secretion of the Human Pancreas," while in 1866 he describes "A case illustrating the Physiological Action of Iodine Vapour." While working in the chemical laboratory of St Bartholomew's as a pupil of John Stenhouse, his attention was directed to the oxidising property of charcoal and its importance as a deodoriser and disinfectant. Stenhouse himself was specially interested in the construction of the charcoal respirator, and had devised a useful form of oro-nasal mask for protecting the workmen from the noxious effects of the gases to which they were frequently exposed in the manufacture of chemicals. A special interest is attached to this fact. When, after the first deadly German gas attack at the second battle of Ypres in 1915, an urgent demand was made for an efficient means of protecting our troops, Turner recalled the early work of Stenhouse in this connection, and gave his advice and assistance to Professor

Lorrain Smith and his colleagues who were engaged in the pathological department of the University of Edinburgh upon the construction of a suitable respirator.

There is no doubt that Turner's early training in the Mechanics' Institute in Lancaster, under the guidance of his old master, Dr Christopher Johnson, had stimulated his interest in the subjects of Botany and Chemistry, and directed his attention more closely to them and subsequently to Materia Medica and Pharmacy. There is no indication in his letters to his mother that he was turning his thoughts to a scientific career in any of these subjects, but it is related that, had he proved successful in another examination in chemistry for which he had entered, his intention had been to devote himself to the practice of medicine. Life as a physician in London had begun to appeal to him then, as it continued to do at a later period, but the financial question proved a stumbling-block. His successes in Chemistry, Physiology, Materia Medica, and Therapeutics furnished evidence of the way in which he was laying a sound foundation for a career of this kind.

The difficult problem of determining his future course of action was presently to be solved in a manner and from a quarter in which it was probably least expected.

Mr John Goodsir, the distinguished Professor of Anatomy in the University of Edinburgh, had been obliged, upon the ground of ill-health, to give up temporarily his professorial duties in the autumn of 1853. He spent a year on the Continent undergoing special treatment. During his absence the work of the anatomical department was entrusted by the Medical Faculty of the University, with the sanction of the Town Council, to Dr John Struthers, who was at that time engaged in anatomical teaching in Surgeons' Hall. When Professor Goodsir returned to Edinburgh early in the autumn of 1854,

it became necessary for him to obtain a staff of demonstrators in order to conduct the work of his department. Goodsir in his difficulty applied to Mr Paget and others in London for assistance, and as some of the correspondence which passed between the two men was found by Professor John Chiene amongst Goodsir's papers upon the death of the latter's brother, it may very fittingly be reproduced here. Although all the letters bearing upon the matter have not been preserved, the correspondence clearly indicates how Turner came to be appointed a demonstrator of anatomy in the University of Edinburgh.

Professor Goodsir to Mr Paget.

EDINBURGH, *September 1st*, 1854.

I take the liberty of asking you if you know of any men about your hospital or in London who would be inclined to enter into engagements as demonstrators in my anatomical establishment. I require three at present to complete my staff, one to act as principal demonstrator, to superintend the dissecting room under my direction and to deliver a demonstration on Surgical Anatomy daily during the session, the other two to assist the students in their dissections.

To the principal demonstrator I am prepared to give a liberal salary; to the others, salaries in proportion.

The rooms are open from November till May, and from May to July inclusive, with short recesses at Christmas and in the beginning of summer.

The number of students dissecting has averaged 350 in winter—100 in summer. I am in the habit of giving every assistance in the way of advice as well as of co-operation to my demonstrators in the performance of their duties, and of affording all the facilities at my disposal for the promotion of their anatomical and physiological pursuits.

I am inclined to believe that there must be men in London to whom such engagements would offer immediate as well as prospective advantages, and if you can refer me to any such, you will confer on me a very great favour.

JOHN GOODSIR.

From Mr Paget to Professor Goodsir.

LONDON, *September 6th*, 1854.

I should be very glad of the opportunity of recommending good men for your demonstratorships, but at this time I am afraid that there are none at St Bartholomew's who would be at once willing and fitting candidates. The recent additions to our medical staff giving promotion to some and opening the way for others, have left us with few men who are likely to be promoted within some reasonable time. We are thus entirely without any one who would be a candidate for the senior demonstratorship with you, and for the junior there are only two, and I fear these might be deemed too young, for they are respectively only 21 and 22 years of age. They are, however, excellent men, thorough workers, and one of them has just gained a scholarship and exhibition at the University of London. But it might be worth while to ask Mr Gray of St George's, Mr Rainey of St Thomas', and Mr H. Power of the Westminster Hospital School. These, I think, are the best men in London who have not got fixed plans or (so far as I know) certain good prospects.

You might rely, I think, on the future of any one of them; the first two you doubtless know by their works; the third I would guarantee to be one of the best demonstrators you have known. JAMES PAGET.

The two young men referred to by Mr Paget in this letter as suitable for the junior demonstratorships were William Newman and William Turner. Turner had just gained the gold medal and exhibition at the University of London. Henry Gray afterwards became Lecturer on Anatomy at St George's Hospital Medical School, and has since become known to many generations of medical students through the popularity of his text-book on Anatomy, a book which maintains its position in the medical schools under the able editorship of Professor Robert Howden of Newcastle.

Dr George Rainey was a demonstrator of anatomy at St Thomas' Hospital, but he finally gave up his post and settled as a general practitioner in one of the outskirts of London.

Mr Henry Power, a very brilliant Bartholomew's

student, was Demonstrator of Anatomy at the Westminster Hospital Medical School. He afterwards specialised in ophthalmology, and was first, ophthalmic surgeon to St George's Hospital, and then held a similar appointment at his old school. He took a high position in his specialty in London, and died in 1911.

From Mr Paget to Mr William Turner.

LONDON, *September 25th*, 1854.

Professor Goodsir of Edinburgh wants two assistants or junior demonstrators to guide the dissections of his students, and he offers £30 a year. I have no doubt from what I can say of you that you may have one of the appointments if you are so disposed. I cannot certainly say how much it would answer your purpose, but I think it would be right to accept such a post, if it would give sufficient for you to live upon, so that you might pursue science for two or three years more, and gain a reputation which might be of much value in later life, even in practice. Power, I believe, will go down to be senior demonstrator, and I think I can answer for Professor Goodsir that you would find your personal relations agreeable enough. I cannot at all say what advantages the position would offer for success in higher places in Edinburgh. If I were in your place (so far as I know it) I should take the offer. It may lead to substantial good, and it cannot do less than give you an opportunity of studying in Edinburgh and making friends there in a favourable position. But while I say this, I am quite sure that you can judge for yourself much better than I can for you. William Newman, to whom I suggested the other of the two vacancies, declines, looking straight to private practice. JAMES PAGET.

From Mr Paget to Professor Goodsir.

LONDON, *October 6th*, 1854.

I am very sorry to find that Mr Power has declined your Demonstratorship. His friends seemed resolved not to part with him, and it is but fair that you should know that their dissensions were grounded chiefly in the belief that no Englishman would be allowed to succeed as a surgeon in Edinburgh. I do not hesitate to tell you this, because *you* have

never given ground for such an opinion. I fear I cannot find another who might be recommended for the appointment. I would, indeed, in such a position, trust to Mr Turner; for though, as yet, he is young, and without experience in teaching, he is one of those earnest, clear-headed men who seem always to succeed in what they undertake, and who quietly surmount whatever difficulties new positions bring them into.

JAMES PAGET.

Mr Goodsir to Mr William Turner.

ANDERTON'S HOTEL, FLEET STREET,
LONDON, *Oct.* 18, 1854.

Having applied to Mr Paget to assist me in procuring Demonstrators for my Dissecting Rooms in the University of Edinburgh, he some time ago informed me that you were willing to undertake the duties of a Junior Demonstrator. I am anxious to secure the assistance of two Junior Demonstrators, but, as it was necessary to know to whom the office of Senior Demonstrator was to he confided before arranging with the Juniors, I delayed communicating for a time with you on the subject. Finding it necessary to come to London regarding this matter, I failed in falling in with a gentleman of sufficient experience in teaching Anatomy who is not at the same time unwilling to give up for a time the prospective advantages of a metropolitan position. Under these circumstances, from what I have heard from Mr Paget of your character, ability, and acquirements, I now, with his sanction, apply to you with the view of ascertaining whether you would become my *Senior* Demonstrator, Before proceeding, I must inform you that the duties of my Senior Demonstrator are stated generally as follows: (1) The superintendence under my guidance of the Dissecting Room. (2) To direct and assist the students in their dissections. (3) To give a Demonstration at 4 P.M. five times a week in the class-room.

You will admit that the performance of some of these duties requires a certain amount of experience, but I have been so strongly impressed by what Mr Paget has stated to me that I feel confident you will be equal to them. I shall, however, in regard to your demonstrations, give you every assistance and advice. I shall open the session myself, and take my place frequently at the demonstration table, if you should wish at any time to be relieved. I of course deliver the usual University Anatomical Lecture daily (at one o'clock). In regard to your salary, I am not prepared, considering that you have not yet had any experience in teaching, to offer you

more, this session, than £200; but with the understanding that, should you continue with me and acquire the confidence of the class, this salary will be very considerably increased. In Edinburgh you will have every facility in prosecuting Anatomy, Physiology, and Chemistry in all their departments, with a large hospital, library, museum, &c. I myself will be at all times anxious to promote your pursuits by every means at my disposal. As our session opens in the beginning of November, we must decide speedily, and Mr Paget thinks you will probably consider it expedient to return to town to expedite our arrangements. JOHN GOODSIR.

From Mr William Turner to Professor Goodsir.

LANCASTER, 24*th October* 1854.

I willingly agree to all the propositions specified in your letter of 18th inst. I shall endeavour to the best of my ability to render myself properly qualified for the several duties required of me. WILLIAM TURNER.

It was natural that Goodsir should desire a personal interview with the unknown youth of twenty-two, who had accepted so responsible a position, and it is a tribute to Paget's faith in Turner's ability that Goodsir should have made the appointment without first seeing the candidate. On Goodsir's invitation Turner left Lancaster, where he was spending his holiday, and travelled to London to meet him. When presiding at a dinner of the University Club of London, held in May 1903 at the Criterion Restaurant, Turner told the story of his first meeting with his "chief." The interview is recorded in the Report of the Council of the Club as follows :—

It is forty-nine years ago since my eminent predecessor, John Goodsir, came to London in search of demonstrators. My old teacher and life-long friend Paget suggested that I was the sort of man who would make an efficient demonstrator, and he introduced me to Goodsir. He asked me to dine with him at his hotel. I believe that the hotel is still in existence. You know it by the name of Anderton's, in Fleet Street. But in those far-away days it was, I believe, a very different habitation from what it is now. I recollect very well the

dining-room, divided into compartments, seated with hard wooden benches and with a sanded floor, and there I had my first dinner with Goodsir.

After we had satisfied our respective appetites, he said to me: "Mr Turner, you will have to meet a class of 200 students and demonstrate to them. Now, let me hear how you describe the sartorius muscle." And so I described the sartorius muscle, and he said: "Very good, Mr Turner, that will do." That was the beginning of my career as a teacher of anatomy.

Turner cannot have decided to accept the Edinburgh appointment without having given it very careful consideration. It offered him great advantages for extended scientific study, for which his quality of mind was obviously suited, as his previous successes clearly indicated; nevertheless, the fact that he had to take up the important and onerous duties of teaching while yet so inexperienced, must have occasioned him serious reflection. At that time Edinburgh possessed a brilliant constellation of teachers in medicine, and their fame must have strongly influenced his decision, as it doubtless increased the attractiveness of the offer that had been made to him. Some light is thrown upon his attitude of mind in a remark which he made in his speech at the presentation to the University of his portrait, painted by Sir James Guthrie in 1913. He had often wondered since he was appointed, a youth fresh from the students' benches of St Bartholomew's Medical School, which had the greater courage—the professor in choosing the youth, or the youth who dared to accept the appointment.

In after years he did not forget his old Medical School and what he owed to it, and he encouraged his sons, when they had finished their medical studies in Edinburgh, to see the work of the Hospital. During some of his own visits to London he renewed his former acquaintance with "Barts," and expressed his pleasure in the many improvements which had taken place both in the buildings and in the work of the School.

CHAPTER III.

EARLY LIFE IN EDINBURGH.

1854-1867.

Arrival in Edinburgh—The Profession in Edinburgh—The Anatomical Department—John Goodsir—Turner commences Teaching—Colleagues on the Staff—Pupils—Paget's Surgical Pathology—'Journal of Anatomy and Physiology.'

In the early hours of a chill October morning in 1854, Turner crossed the Scottish border and arrived in Edinburgh to take up his duties as Demonstrator of Anatomy with Professor John Goodsir. The young Englishman was indeed a "stranger in a strange land": he had neither friend nor acquaintance to welcome him, and with the exception of his "chief," he knew no one in the city. He could make no claims upon the citizens by right of birth, but as a Lancashire man, born in a part of England "inhabited by a people of somewhat similar type and cognate aims" to the Scotsmen amongst whom he had come to dwell, he was deserving of their sympathy and friendship. Paget had given him a letter of introduction to Edward Forbes, the brilliant naturalist, who had recently been appointed Professor of Natural History in the University in succession to Jameson. The letter was, however, never presented, because Forbes took ill and died on November 18th, at the early age of thirty-nine. By a curious irony of fate Turner was

called upon to perform the *post-mortem* examination upon the body of the man who, had he lived, would doubtless have welcomed and assisted the young anatomist.

Turner occupied lodgings in Lauriston Place, in the house which now stands immediately to the east of Archibald Place. If at times an overpowering sense of nostalgia came over him, it was not to be wondered at in the circumstances in which he was placed, but he would not allow his personal feelings to interfere with the work to which he had set his mind.

"Edinburgh! what memories that name recalls," he said on a public occasion in the closing years of his life; "more than most cities it exercises an influence on those whose lot it is to come and live in it when the mind is fresh and open to new impressions, deeper, I believe, than is felt by those who are born and brought up in its midst. I refer to the *genius loci*, the spirit of the locality. What a revelation to see, for the first time, the old and new towns perched on the sides and summits of eminences, about midway between the adjacent hills and the Forth, commanding a varied and glorious prospect of mountain and sea, of wooded heights and fruitful fields. The city, with its traditions and history, its monuments and public buildings, the Castle surmounting a precipitous rock, the church of the Holy Rood with its royal palace, the ancient streets and modern squares associated with nobles, divines, philosophers, men of letters and of science, took firm possession of my imagination. No one with a feeling for the past but must become inspired by such an environment, and be impelled to labour for his generation and for the future."

Turner sometimes related an anecdote of one of his earliest experiences in Edinburgh, which had evidently struck his imagination. On a particularly windy morning, a not uncommon occurrence, he stood and watched the progress of a baker's boy deftly balancing his tray of loaves upon his head. The

sight was novel to him, and as his eyes followed the boy's steps, suddenly a violent gust of wind swept down the High Street, depositing the tray upon the ground and scattering the loaves over the street. This once familiar figure has now disappeared from the city. Motor tricycles and vans have made the loaf safer for the people, but science has not yet harnessed the gales and the violent gusts of wind and thereby made the streets less unpleasant for the pedestrian.

Literary Edinburgh had passed from the zenith of the reputation which she had made for herself during the first half of the century, and in 1854 death had been busy in the ranks of those who had contributed to the fame of the city. John Gibson Lockhart, though for many years resident in London, had answered the call, and in the spring, death had claimed the commanding figure of "Christopher North," and had thus deprived the pages of 'Maga' of two who had been its most brilliant and loyal contributors. Within a few weeks Lord Cockburn had followed John Wilson. Professor Aytoun in the chair of Rhetoric was in the heyday of his reputation, and was constantly giving his services to 'Blackwood's Magazine.' Robert Chambers, the anonymous author of the 'Vestiges of Creation,' which was denounced by Huxley as a plagiarism of Lamarck, was still engaged in his literary pursuits. Mrs Oliphant had not as yet given to the world the results of her untiring industry, but Miss Catherine Sinclair, the authoress of 'Holiday House,' was a familiar figure in the life of the town.

The University, like the city, had its inspiring influence upon the youthful mind, not only from the fame of the men who had taught within its walls in the past, but from the reputation enjoyed by those occupying the chairs at that time, more especially in the Medical Faculty.

They constituted a remarkable body of men, and, with scarcely an exception, each was a leader in the

subject which he professed. They possessed marked individuality and force of character, and sustained and strengthened the position of the University as a school of medicine. John Goodsir had a world-wide reputation as the most philosophical anatomist of the century. John Hutton Balfour occupied the chair of Botany; Hughes Bennett was Professor of the Institutes of Medicine, and, in addition to his powers as a lecturer, he had an acknowledged distinction in the departments of Physiology and Medicine. His musical gifts, in conjunction with those of Douglas Maclagan, Christison, and Alexander Peddie, provided much enjoyment, not only to the profession but to the general public. The Amateur Vocal Club of which they were members contributed to the social life of the city.[1] William Pulteney Alison, probably without a superior and scarcely a rival in his department, was Professor of Medicine, but failing health compelled him to resign in the following year. A gifted physician, of whom the most distinguished of his pupils, William Stokes, has written, "he was the best man I ever knew. I wonder how it has happened that men should forget what reverence is due to his memory—whether we look upon him personally as a man of science and a teacher, or at his life as that of an exemplar of a soldier of Christ."[2] Sir Robert Christison, previously Professor of Medical Jurisprudence, then adorned the chair of Materia Medica, and, apart from his great scientific reputation as the leading toxicologist in Britain, he was an outstanding personality both in the University and in the city. His tall commanding presence and swinging stride made him a striking figure in the streets. Sir James Young Simpson was Professor of Midwifery, the man of genius who in 1847 had brought into use in surgical practice the anæsthetic properties of chloroform. The house in Queen

[1] 'Life of Sir Robert Christison, Bart.'
[2] 'William Stokes.' Masters of Medicine Series.

Street was the shrine which attracted strangers from both sides of the Atlantic, and which made Edinburgh at that period a veritable Mecca for the sick. James Syme filled the chair of Clinical Surgery, the first surgeon of his day and generation, and James Miller was his colleague in the chair of Systematic Surgery. Syme and Simpson, so often in opposite camps, were still fighting their duels, airing their protestations in the daily press, and opposing each other in the courts of law. William Gregory, the last of the "Academic Gregories," occupied the chair of Chemistry. As the successor to Hope he had realised the dream of his youth. The friend of Liebig, in whose laboratory at Giessen he had studied for several years, he took the premier position in Scotland as a chemist, and contributed much that was of value to the science.[1]

While the occupants of the medical chairs were shedding lustre upon the University, there were also in the "extra-mural" School men who undoubtedly assisted in enhancing the reputation of medical teaching in Edinburgh. They belonged to a younger set, who were laying the foundation of the distinguished careers which awaited them later on. John Struthers, afterwards Professor of Anatomy in Aberdeen, was Assistant Surgeon in the Royal Infirmary; he lectured upon Anatomy, and was rapidly strengthening his position in that department of science. James Matthews Duncan, a graduate of Aberdeen University, had recently commenced his career as an extra-academical teacher of Midwifery, and his success as a practitioner was steadily increasing. Amongst the younger physicians and surgeons, mention must be made of William Tennant Gairdner, afterwards Professor of Medicine in the University of Glasgow; of James Spence, who lectured on the principles of Surgery until his succession to the chair of Surgery

[1] 'The Academic Gregories,' by Agnes Grainger Stewart. Famous Scots Series.

on the death of Miller; and of Douglas Maclagan, who taught Materia Medica, and later succeeded Traill in the chair of Medical Jurisprudence. Henry Duncan Littlejohn had just been appointed Surgeon of Police, and though he did not receive his appointment as Medical Officer of Health until 1862, he had commenced his long and notable service in the interests of the city. James Warburton Begbie, one of the ablest teachers of clinical medicine, who became the leading consultant in Scotland, was President of the Royal College of Physicians; and Dr John Brown, who had not yet given to the public the immortal 'Rab and his Friends,' was Librarian of the College.

Turner entered this professional circle at a time when it could hardly be regarded as a united and pacific body, but the disputes of the period must be studied before being fully appreciated by those who live in the calmer atmosphere of the present. He was a young man with the whole future before him, but nevertheless a youth whom his seniors soon learnt to respect, and to whom they were always ready to extend their assistance. His first introduction to archæological exploration was given to him by Simpson at the Catstane Field of Kirkliston, while he in turn was of considerable assistance to the Professor in conducting his *post-mortem* examinations.

There had recently stepped into the same arena another young Englishman, Joseph Lister, with whom Turner very early formed an acquaintance which ripened into an intimate and life-long friendship. Lister, on the completion of his period as House Surgeon at University College Hospital, London, in 1853, had been sent to Edinburgh by Professor Sharpey with a letter of introduction to Syme, in order that he might see some of the work of that distinguished surgeon. In February 1854, the same year in which Turner came north, Lister was appointed House Surgeon to Syme, and the two young Englishmen, probably little realising at the time that

their stay in Scotland was more than a temporary arrangement, forgathered at "Millbank," Syme's house in the Morningside district.

"I first made his acquaintance in 1855," Turner wrote to Godlee, Lister's biographer, "and my early intercourse with him ripened into friendship, and an increasing admiration and esteem for his intellect and character. He displayed, from the commencement of his studies as a graduate, a scientific habit of thought, and he showed a great capacity to conduct histological research."

Lister's fellow-residents in the old Royal Infirmary were John Beddoe, David Christison (the son of Sir Robert), John Kirk (afterwards Sir John Kirk of Zanzibar), George Hogarth Pringle, Alexander Struthers (brother of John Struthers the anatomist), and Patrick Heron Watson. On the completion of their term of office, all, with the exception of Lister and Pringle, volunteered their services for duty in the Crimea. Alexander Struthers died from malaria while on service. The following extract from a letter[1] written by Beddoe to John Struthers is not without interest at the present time:—

British Hospital, Dardanelles,
August 1855.

We have no patients, and we are reduced to a kind of medical cannibals, preying only on each other. Fortunately, however, we have little need even of that sort.

Dr Christison had an attack of intermittent fever (tertian), but soon shook it off. Now and then a case occurs among the workmen, but I do not think there is any really malarious locality in our neighbourhood; indeed, this is probably one of the healthiest spots in the whole country. Exposure to the sun sometimes causes what is called "sunstroke," but as to the real nature of the affection I cannot make up my mind.

We spent five weeks at Scutari, having had quarters

[1] I am indebted to the family of the late Sir John Struthers for this letter.

assigned to us in the village, but no duty. The hospitals there were in excellent condition, but half empty, and there was a large overplus of medical men. Of your poor brother, everybody who had known him spoke, as was to be expected, in the highest terms. There is no doubt that, great as was the pressure of work thrown upon him in the then crowded and disorderly state of the hospitals, his conscientious anxiety led him to exert himself even beyond that amount.

Patrick Watson, I am sorry to hear, is but slowly recovering from an attack of dysentery. He is now at Scutari, but I suppose you will see him before long in Edinburgh.

Pray remember me kindly to Mr Spence when you see him, and believe me, J. BEDDOE.

John Beddoe, who was somewhat older than his colleagues, had already produced evidence of his scientific ability by the publication of his work upon Scottish Ethnology. His anthropological investigations brought him later into touch with Turner, when both men were engaged upon similar lines of research. David Christison afterwards devoted much attention to archæological work in Scotland, and for a number of years acted as Secretary to the Antiquarian Society of Scotland. He and his brother John, who was for a considerable period Secretary to the University Court, became very intimate with Turner, and they enjoyed each other's society for many years.

The Anatomical Department occupied the north-west corner of the Quadrangle of the University buildings. The structural alterations which have been carried out for the purpose of making the Examination Hall, and in connection with other changes, have completely altered the department of Goodsir's time. The Anatomical Museum was on the ground floor, now occupied by the Examination Room. The Lecture Theatre, which was used jointly with the Professor of Surgery, was situated upon the floor above the Museum, but it and the rooms adjoining

have now been handed over to the Education and History Departments. The dissecting-rooms, a larger and a smaller room, along with the bone-room, were on the top floor, and though the lighting arrangements were good, the cubic space allotted to them was far from satisfactory. The roof has since been raised, and with the necessary alterations it has become the home of the Geographical Department. It is difficult for those who are acquainted only with the spacious buildings in Teviot Place to realise how difficult it must often have been to carry on the work of a Department which was steadily growing.

Goodsir, who had been Curator of the Museum of the University and Demonstrator of Anatomy under Monro *tertius*, had succeeded to the Chair in 1846, at the age of thirty-two. His success as a teacher was rapidly assured. His first aim had been to extend and improve the work in the dissecting-rooms, and to inaugurate a tutorial system of instruction, so that the student might have more favourable opportunities of seeing and examining for himself the structures described in the lecture-room. He continued the daily anatomical demonstration which had been instituted by Monro *secundus*, and this he delegated to his chief assistant. In this way the human body was topographically described by the aid of a series of carefully-prepared dissections, and it proved a popular method of instruction. Goodsir always regarded the teaching of histology, or the microscopic structure of the tissues, as coming within the scope of the department of Anatomy, and as forming, therefore, an essential part of the course. It was at first taught by means of diagrams, but with the improvement in scientific apparatus he introduced the microscopic demonstration.

Turner has testified to the value of Goodsir's methods of instruction, to the truly scientific spirit which pervaded the whole of his teaching, to the influence which his straightforward, manly character

exercised upon those who came into personal contact with him, and to the example which he set of true work done in no self-seeking spirit. He was an ardent student of organic science, and with unflagging industry he devoted himself to the duties of his Chair. He was not a mere descriptive anatomist, with his outlook confined to its surgical and medical aspects, but, availing himself of all the most recent improvements in methods of study, he investigated and taught the science in its relation to physiology, pathology, and development. His lectures were illuminated by the results of his own investigations, and he would point out and suggest the direction towards which inquiry might most profitably be turned, with a view to further discoveries. He thus stimulated enthusiasm for the science, and encouraged his assistants and pupils in the work of research. One of his great projects was to improve and enlarge the Anatomical Museum, founded by Monro *secundus*, and to-day the Museum bears witness to the success of his aims. Turner was indeed fortunate in being brought so early in his life into daily personal contact with a man of so marked a personality, of so vigorous an intellect and so original in his conception, as was John Goodsir.

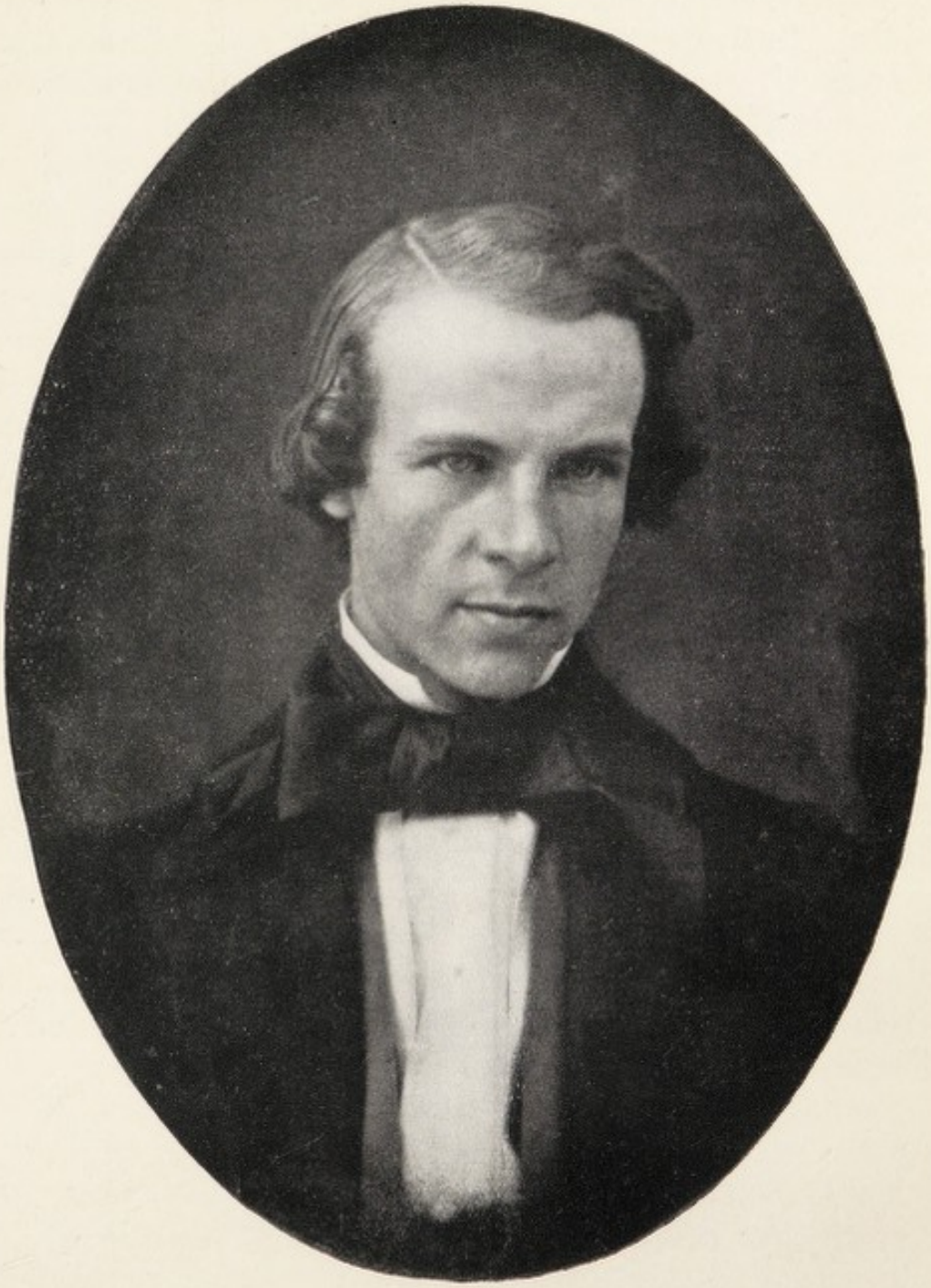
Considerably invigorated by his long rest, Goodsir resumed his professorial work in the autumn of 1854 with much of his former energy, and delivered the daily lecture at one o'clock. He was not an attractive lecturer. Somewhat monotonous in his delivery, he was devoid of rhetorical flourish. There was little in his manner to captivate the student. Tall of stature, grave in demeanour, and almost gaunt of feature, he was the victim of bad health, which betrayed itself in the lines of premature old age which marked his countenance. He lived and worked by the sheer force of his will. The anatomical class, which had numbered 368 during the year preceding his enforced absence, was somewhat reduced in numbers upon his return; but, in the following year,

350 men enrolled their names. The tutorial instruction and the work in the dissecting-room devolved upon Turner and the two junior demonstrators, Edwards and Sayer, both of whom had come from London at the same time as Turner.

Alexander M'Kenzie Edwards had been warmly recommended to Goodsir by Sir William Fergusson of King's College Hospital. Edwards was a young man of great ability, but his sympathies were surgical rather than anatomical. After acting as Demonstrator until the end of the Session 1857-58, he commenced surgical practice in Edinburgh, and, in May 1863, was appointed assistant surgeon to the Royal Infirmary, the vacancy in the staff having been caused by the promotion of Patrick Heron Watson. Dr Joseph Bell was an unsuccessful candidate for the same appointment. Edwards, who had married a daughter of Robert Chambers, had the misfortune to lose his wife early in their married life. This fact, and the condition of his health, caused him to resign his position at the Infirmary in April 1865; he left Edinburgh, and died in London in 1868.

Frederick W. Sayer, who had been recommended by Professor Sharpey of University College, was the Junior Demonstrator, but he unfortunately died after a very brief period of service. He was succeeded by Frederick Paul, who had a great reputation as a dissector; he, however, resigned his appointment in 1857, and death claimed him also as a comparatively young man.

Turner's chief duty, in addition to superintending the work of the dissecting-room, was to deliver the daily anatomical demonstration at four o'clock. "I have never forgotten the kind words which Goodsir spoke, when introducing me to the Demonstration class, nor the hearty welcome with which the students received me—a stranger from another school—nor the patience which they displayed in listening to my prelections, often imperfect and hesitating." The feelings



WILLIAM TURNER, ÆT. 22.

DEMONSTRATOR OF ANATOMY.

[From a daguerreotype taken in 1854.

of the young and inexperienced teacher, preparing and delivering his first demonstration, can be readily understood. A nervousness not unnatural to the occasion, and anxiety lest he should fail, would be combined with the determination at any rate to do his best. Even after the experience of forty-nine years of teaching, Turner always felt nervous at the opening lecture of the winter session, though his manner probably never revealed this to his class.

His figure, of medium height, was spare—he would have described himself at that period as thin—alert and active; his clean-shaven face, grave and thoughtful in expression, was lit up with keen blue eyes, and dominated by a lofty forehead, while his finely-shaped head was covered with fair hair. It was thus that he appeared as he faced his class. His voice, clear and resonant—a powerful asset which he retained with very little impairment to the end of his life—could not fail to impress upon his audience the masterfulness of the mind, whose thoughts it expressed in no uncertain manner.

After a few introductory words, he passed to the subject-matter in hand. "Gentlemen, after what was said to you yesterday by Professor Goodsir, respecting the nature and objects of the series of demonstrations which he has deputed to me to deliver in this classroom during the session, I cannot but feel that any introduction on my part would be not only needless, but at the same time contrary both to your wishes and inclination. Permit me, however, to thank you for the cordial manner in which you have received me on this my first appearance before you as demonstrator, and allow me to hope that those relations which have commenced in so friendly a manner on your part, and, I trust, not the less so on my own, may continue between us throughout the course." The first demonstration consisted in a survey of the surface anatomy of the back, followed by a description of the cutaneous nerves.

His own impressions of his early efforts are recorded in a letter to his mother, written after his first week of teaching :—

I have now got comfortably settled down to my course of work. I have plenty to do, but not more than I can conveniently finish in the course of the day. Professor Goodsir formally introduced me to his class on Monday as the gentleman who had been selected by him to give the daily demonstration at four o'clock. I commenced on the following day, and had every reason to be satisfied with the manner in which I was received by the students. I lectured to them for about three-quarters of an hour on that day. I heard that the students were very well satisfied with me, and, if I may judge from the degree of attention they paid to me, both on that and on the following three days, I think I may safely say that, so far, I have succeeded. I go into lecture each day thoroughly prepared with my subject, having thought well over it and arranged in my mind the way in which I intend to deliver it, but without selecting the language in which it has to be spoken. With the plan thus laid down, I find no difficulty in selecting the words in which to speak it. I have a large marble table before me on which the materials are placed. The top of the table is movable, so that I can turn it round in order that the specimens may be shown to the students sitting in various parts of the room. I am delighted with the Professor; his manner is kind in the extreme, and he is disposed to make my position one of considerable trust and importance. He has entrusted me with a duplicate set of keys, and has given me authority over the servants in his department.

I am very comfortable in my lodgings, and am well and honestly attended to. On Wednesday evening I dined with Professor Simpson, Mr Paget having sent me an introduction to him. I met there several professional gentlemen of importance.

I like Edinburgh very much; the air is sharp and bracing, and I should think that this would allow me to do my work better than in the milder and softer atmosphere of London.

The class-room table here referred to was Goodsir's table. In due course it was transferred to the anatomical theatre in the University New Buildings in

Teviot Place, and it was used by Turner during the whole period of his professorship, his last lecture—like his first demonstration—being delivered from behind it.

His success as a teacher was assured from the first. It is evident from a letter of Mr Paget's, written to Goodsir, that the young demonstrator had made a most favourable impression. "Your report of Turner's success gives me the sincerest pleasure. To have helped in training such a man and in obtaining such a place for him is enough to brighten more than one year of teaching that might otherwise seem dull and nearly useless. I heartily hope that you may yet work together for many years with the mutual esteem which it is my happiness to have heard each expressing for the other."

Not only as a teacher, but as a friend, Turner soon acquired the confidence of the members of his class. His demonstrations were thoroughly appreciated and were attended regularly by the men, notwithstanding the late hour in the afternoon at which they were delivered. "It was the last class of the long day. Though the hard-working students had commenced at nine in the morning, and with the exception of half an hour for lunch had filled in the whole day with lectures, dissections, hospital, and museum, yet he made the demonstrations at 4 P.M. so popular that we went home exhilarated by his masterly handling of a subject so important for all of us."[1] His attitude towards his students was one of unvarying kindness, courtesy, and patience, which won for him their respect and esteem. "Sometimes he would accompany one of us to a difficult or dangerous case in the Cowgate or Grassmarket, and give the benefit of his large experience. Such actions as these endeared him to every thoughtful student of the day, and laid the foundation of a popularity which lasted throughout

[1] Emeritus Professor M'Intosh of St Andrews University, a member of the class in 1857.

his long and busy life. Moreover, he kept up his interest in all earnest graduates subsequent to their college life, and was ever ready to encourage them by communicating their papers to the Royal Society of Edinburgh."[1]

Professor J. G. M'Kendrick, who studied in Edinburgh a few years later, has thus described his recollections of the young demonstrator. "I well remember his active and vigorous figure. He was the most precise speaker I ever listened to. It was not eloquence, and there was no philosophy. His exposition was a work of art; nothing could be more lucid and nothing could be more adept than the movements of the demonstrator when he elevated on the handle of the scalpel the artery or the nerve under consideration. The dissection was always skilfully made by the prosectors under Turner's direction, and it was planned out with great skill." One phrase in this description will recall to many of Turner's old pupils certain words of his which must have become familiar to them when attending his demonstrations: "I take and put upon the handle of this instrument." He had early been impressed with the importance of cultivating the faculty of observation by reading a dialogue between a tutor and his pupil entitled "Eyes and no Eyes, or the Art of Seeing," in which the important lesson was taught him that the art of seeing bore a relation to the degree in which the attention was concentrated upon the object looked at, and the distinction between vacant gazing and intelligent observation was clearly pointed out. In the dissecting-room and in all the departments of his teaching he endeavoured to impress upon his pupils the necessity of their seeing the objects concerning which they were reading.

His colleague, Professor J. S. Blackie, in acknowledging on one occasion in after years the receipt of an address which Turner had sent him, wherein

[1] Letter from Professor M'Intosh.

he had emphasised the value of intelligent observation, wrote him the following reply:—

My dear Anatomist,—Thanks for the lecture, with which I entirely agree. The conquest of fact and the banishment of theory is the law of progress. Truth is the root, beauty the flower, and wisdom the fruit of all spiritual and of all physical growth. And the first step in physical truth, of course, is, as you observe, the use of our eyes.

Here our education is essentially wrong. We do not use our eyes, but we are the slaves of our own tools: dead books and dry rules and cram. I want a living education with as much soul and as few books as possible. J. S. Blackie.

Turner's first session in the Department was not altogether a happy one. The pleasure which he took in his work and the satisfaction which he must undoubtedly have derived from the knowledge that he fully merited the confidence which Paget and Goodsir had placed in him, were somewhat marred by the relations which existed between himself and his junior colleague Edwards. The latter, rightly or wrongly, took up the attitude that their positions ought to have been reversed, and that his previous experience as a Demonstrator of Anatomy in London entitled him to the senior post under Goodsir. The relations between the two men were therefore strained, and Turner did not receive from his junior colleague all the assistance which he was justly entitled to expect.

Reference has already been made to Goodsir's view regarding the inclusion of histology as an essential part of the course of anatomical instruction. Regular microscopical demonstrations were given for the first time in the summer session of 1856, and a short account of the method of conducting these classes is furnished in a manuscript of Turner's. The teaching devolved mainly upon him. Eighty students entered for the first course, which was so arranged that each had half an hour's instruction during the week, and was shown the structure of the primary tissues of the body, bone, muscle, nerve, &c. During subsequent

sessions these demonstrations were still further elaborated. It must be borne in mind that, at that period, the methods of medical education were very different from what they are at the present day, and that, with the exception of botany, chemistry, and anatomy, amongst the scientific subjects, teaching was mainly by means of formal lectures, the subject deriving much of its interest from the descriptive powers of the lecturer and the force with which he threw his own personality into his work. The introduction, therefore, in 1856, of microscopical demonstrations with the object of teaching large classes of men, was attended with difficulties, and implied a much greater effort on the part of the teacher than it does to-day, with the elaborate equipment now provided. Professor M'Kendrick has given a humorous description of one of these demonstrations:—

> In a narrow gallery, with only a roof light, there was a large oval bench or table with stools at the side accommodating from twenty-five to thirty students, each of whom kept his place during the demonstration. On the bench there was a line of metal rails like a little railroad, continuous at each end, so as to form an oval, and on this rail there were twenty small platforms, like trucks or carriages, each bearing a microscope and a lamp. Turner presided at one end of the table, with a blackboard behind him. After a lucid and interesting description of some tissue or organ, the student examined the section under the microscope before him, and on a signal being given by Turner, each student pushed the truck along the rail to his neighbour on the right, and so on until all had seen the section under discussion. It was histology on wheels.

At the close of the second winter session in April 1856, Turner gave up the tutorial instruction which had previously been assigned to him. The members of his class regarded the occasion as a suitable one for expressing their satisfaction with his methods of teaching. In thanking them for their presentation to him, he said:—

I can assure you it is with feelings of no ordinary kind that I meet you here to-day for the purpose of receiving from you this very handsome token of your kindness, which fully justifies me, I hope, in considering that you are satisfied with my labours among you during the past session. But while I look upon this as to some extent a personal expression of good feeling towards myself, yet I must also regard it as an indication of your approbation of the mode of working the system, to the carrying out of which I have been but one of several instruments—a system, the merit of whose introduction in this medical school is due solely to Professor Goodsir.

I have long been convinced of the great advantages to be derived from a judicious plan of tutorial instruction. In my own person, as a student, I experienced considerable assistance from a system similar in its nature to the one pursued here, although not carried out to so great an extent. I always look back with pleasure to that portion of my student career, for I feel that I then acquired information, which has already frequently proved of service, and I doubt not will continue to be useful during my professional life.

To ensure the success of any given method of instruction, it is not only necessary that the mode of pursuing it should be accurately laid down by professorial or other governing bodies, but it is also essential that it should obtain the cordial co-operation of the student; such co-operation you have throughout the winter session afforded, and by your conduct to-day you have put the seal of your approbation upon it.

But much as I shall ever look with pride and satisfaction upon your presents to me, let me also look back with equal satisfaction to those daily expressions of your goodwill which you have displayed morning after morning as we met upstairs for the consideration of our stated subjects. The regularity with which you voluntarily appeared at the appointed hour, the attention that you paid to my remarks, and the ready and accurate manner in which you replied to the questions which I propounded to you, were to me a constant source of satisfaction, and they supplied me continually with fresh motives for renewed exertion; for you may rely upon it that a teacher can receive no stronger stimulus than the assurance that what he says is attended to and understood by his class. Do not suppose that because I now bid you farewell as tutor I consider my obligations to you as discharged and at an end; on the contrary, as long as we bear towards each other the relations of pupil and teacher, I shall endeavour to the utmost of my ability to forward your professional studies.

No account of the Anatomical Department would be complete without reference to another personality, John Arthur, the Professor's janitor, who was a living presence in the dissecting-rooms. He had been engaged by Monro *tertius* about the year 1830 as a class porter, and his usefulness in the rooms, his persuasive methods with the students, along with his ability of knowing how to do things and how to get them done, made him of undoubted importance. He continued in office with Goodsir. With his intelligence and shrewdness and his great skill in anatomical work, he also possessed some of the strong lines of character that marked his chief, for whom he had an intense admiration. Upon his death in 1860, he was succeeded by A. B. Stirling, who had been appointed four years earlier as assistant in the conservatorship of the Anatomical Museum. Stirling, who became well known to many generations of students, was a man of very considerable scientific ability. He became Turner's right-hand man in the work of the Museum, and his death in 1881 deprived the Department of the services of one who had done much good work in it.

During the thirteen years in which Turner held the appointment of Senior Demonstrator, changes occurred as a matter of course in the personnel of the staff. When Edwards turned his attention to surgery and Paul resigned his post in 1857, the vacancies were filled by John Cleland and Henry S. Wilson. Cleland, who remaimed for four years with Goodsir, became Professor of Anatomy and Physiology in Queen's College, Galway, and later, Professor of Anatomy in the University of Glasgow. He and Turner formed and maintained a lifelong friendship with each other, based on mutual respect and a common desire to further the interests of the science which they studied and taught. Cleland alone, of all the men upon the teaching staff in the fifties, is still with us, enjoying

his well-earned rest in the seclusion of the Somerset hills. The late Sir William Mitchell Banks, a student in the dissecting-rooms in 1860, in a humorous letter written to Turner in 1903, congratulating him upon his election as Principal of the University, recalled his impressions of the anatomical staff at that period :—

I can remember as vividly as possible the day I first saw you, in that terrible old dissecting-room at the top of the long stair. I see John Arthur, with white beard, and spectacles on nose, and a note-book and pencil in hand; I see Stirling with his apron on, peering into a microscope; Cleland is at a desk in a small room off the bone-room; Wilson is warming his back at the fire and talking playful nonsense. You are taking names for "parts," in a blue serge blouse and with a black velvet cap on your head. I even see that astounding fiend, the porter, carrying a body on his back down to the lecture-room. And now you are Principal of the University of Edinburgh and covered with distinctions.

Another letter, written on the same occasion to Turner by one of his friends, throws a side-light upon these early days :—

Notting Hill, London,
January 21, 1903.

I was most agreeably surprised when I opened my 'Daily Graphic' this morning to see you and to learn that you were now Principal of Edinburgh University. My heartiest congratulations on the recognition of your work and capabilities.

The event recalls old days, and beside me are my 1856 notes of Goodsir's Lectures on Comparative Anatomy, also the fair copy of yours, of Pearson's, and of my rough class notes compared and re-written in your Drummond Place rooms, with 'Latham's English Dictionary' on your table—days I have never forgotten . . . Pearson has gone. How well I remember your advent in Edinburgh with Edwards, Bart's and King's.

I have no cause to regret your verdict that I was too old for the Superintendency of the Royal Infirmary — I have obtained a more desirable appointment in London, and prefer the Metropolis with the British Museum. Then to you I owe the valuable experience I got from William Newman and his lifelong friendship.

Alex. Turnbull.

In the early sixties three other men joined the staff of Demonstrators as Turner's juniors, having first passed through his hands as members of the Anatomical Class. Ramsay H. Traquair, Joseph Bell, and Thomas Annandale, all of whom, after attaining high eminence in their respective spheres of work, joined the great majority before their senior colleague and friend had passed away. In the winter session of 1866-67, Goodsir's last term of work, John Chiene became Junior Demonstrator.

It is somewhat difficult, it might indeed be regarded as almost invidious, to select from the many hundreds of pupils who passed through Turner's hands during his time as demonstrator, certain names for special mention, when there were doubtless many who, in their own sphere, attained honourable positions in different parts of the world.

> Many also who unknown and unrecorded might say to their *Alma Mater*, "Silver and gold have I none, but such as I have, give I thee," and who have given to her the quiet memorials of a student's life—the example of patient and unobtrusive work, pursued often under difficulties, inspired by duty and lit up with courageous hope—who, bearing their new-lit torches, go forth into the darkness of the future, some of them destined to name and fame and success, but thousands of others who can never win their way to that light, but of whom now and again we catch some unexpected glimpse which reveals them at their task—it may be in some lonely parish of their own land, or it may be at some distant outpost of the Empire.[1]

Some, however, became his colleagues in the Medical Faculty and others his fellow-workers in the Edinburgh School, and, with these and with others who became leaders in their respective branches of the profession, he formed an intimate friendship. He often alluded with a feeling of pride and pleasure to the fact that he had assisted in laying the foundation of their ultimate success.

[1] Professor H. S. Butcher: Farewell Address.

Of his future colleagues in the Medical Faculty no fewer than nine had studied Anatomy under Goodsir during this period: Alexander Russell Simpson (Chair of Midwifery), Thomas Grainger Stewart (Medicine), and his successor John Wyllie, Thomas Annandale (Clinical Surgery), Alexander Dickson (Botany), Alexander Crum Brown (Chemistry), T. R. Fraser (Materia Medica), William Rutherford (Physiology), and John Chiene (Principles of Surgery).

Amongst those who reached professorial positions in other schools, mention may be made of John Cleland and James Pettigrew, appointed to the Chairs of Anatomy in Glasgow and St Andrews; J. Gray M'Kendrick to the Chair of Physiology in Glasgow, and Arthur Gamgee and William Stirling in the Owens College, Manchester; Alleyne Nicholson, Professor of Natural History in Aberdeen, and W. C. M'Intosh to the corresponding Chair in St Andrews; William Mitchell Banks to the Chair of Surgery in Liverpool, and Kenneth Macleod, Professor of Anatomy and Surgery in the Calcutta Medical College.

On the graduation roll are to be found the names of Sir Joseph Fayrer, Bt., of Sir James Crichton Browne, Sir John Batty Tuke, and Sir Thomas Clouston, the distinguished alienists, and Sir Dyce Duckworth, Sir David Ferrier, and Sir T. Lauder Brunton, who have made their mark as physicians in London. Robert Bannatyne Finlay (Lord Finlay of Nairn) although a graduate in Medicine in 1863, adopted Law as his profession, and, in 1916, attained the highest position as Lord Chancellor of England.

Students who commenced the study of medicine prior to the adoption of the Ordinances which followed the passing of the Scottish Universities Act of 1858 graduated as M.D., and, in addition to their examination, were obliged to present a Thesis, which consequently was prepared while they were as yet undergraduates. It is indeed remarkable to observe how, even at that early period in their medical career the theme chosen for the thesis furnished proof of the

leaning which many of them had towards the subject in which they eventually specialised. Thus, Cleland, Pettigrew, and Gamgee wrote upon Anatomical and Physiological problems; Batty Tuke upon Idiocy; Clouston upon the Anatomy and Physiology of the Nervous System, and Crichton Browne on Hallucinations. Crum Brown wrote upon the Theory of Chemical Combination; Alexander Dickson on the Development of the Flower; T. R. Fraser on the properties of the Calabar Bean, and Lauder Brunton upon Digitalis, while Annandale's thesis described the Injuries of the Hip Joint. The title of the thesis presented for the higher degree of M.D. to-day frequently indicates the special branch of science or medicine which the candidate has selected for his life's work, but it has been written after two or more years of post-graduate study, when his thoughts have been directed along special lines.

While Turner's duties as a teacher occupied the greater part of his time and attention, it was not to be expected that they would suffice to satisfy his vigorous intellect. His love of scientific pursuit, developed and encouraged in the early days of his apprenticeship, and still further revealed by his successes at St Bartholomew's, naturally led him to turn his mind to the consideration of various anatomical problems.

Prior to 1857, no publication appeared from his pen, but in that year, his atlas and handbook on Human Anatomy and Physiology, which was later translated into Arabic, was published. His research work was undoubtedly interfered with by his preparation for the final M.B. examination at the University of London, which he passed in the summer of 1857. While thus engaged, he was a frequent visitor at the old Royal Infirmary, where he saw Syme perform more than one of his classic operations. With the same object in view, he became a member of Matthews

Duncan's class in the summer of that year and regularly attended his course of instruction.

Having relieved his mind of the worry of an impending examination, Turner was at liberty to devote more time and energy to research, and, commencing in 1859, he published a series of papers which laid the foundation of his reputation in the scientific world. It will suffice merely to record briefly at this point the lines along which he worked. Notwithstanding the "anatomical atmosphere" in which he lived, his old love of chemistry still maintained its hold upon him, and, as previously indicated, three additional papers on chemical subjects appeared from his pen after he had settled in Edinburgh. During this early period he made a number of contributions upon anatomical subjects; he commenced his investigations upon the anatomy of the brain, and he directed his attention to a study of the cetacea and to craniological research in connection with his inquiries into the wide field of Anthropology, in which later on he was to become an outstanding authority.

Turner's publications upon Pathological Anatomy, although of a more limited character, included the results of both microscopical and naked-eye investigations, and they demonstrate the wide range of the subjects which he studied. The most important contribution to this branch of science was his work in connection with the re-editing of Sir James Paget's Lectures on Surgical Pathology, which were first published in 1853, and which became the standard treatise upon the subject, placing their author in the first rank of pathologists both at home and abroad. Paget was eminently qualified to write on the general pathology of surgical diseases, as he had made a long and close study of the very valuable collection made by John Hunter and bequeathed to the Museum of the Royal College of Surgeons of England. The methodical arrangement of the lectures, the abundant evidence of thought and care in their composition, and the

literary quality of their style placed them amongst the classics in medicine. Notwithstanding the many changes which have taken place in pathological conception, due to advances in research and the consequent addition to our knowledge, Paget's Lectures might still be read with advantage and profit.

Virchow's classical work upon 'Cellular Pathology,' developing and expounding the doctrine "*omnis cellula e cellulâ*" as the basis of pathological structure, which had appeared in 1858, led Paget to consider the necessity of a thorough revision of his book. Owing to a steady increase in his surgical practice, he was compelled to seek assistance in his task. For this purpose he applied to his old pupil, William Turner, to whom he wrote as follows:—

> I shall have great pleasure in communicating your paper to the Medico-Chirurgical Society, and I think it should be published. The arbiters of publication may think it too entirely pathological; for some think (but I disagree with them) that papers of this class should go to a specially pathological Society. I have to thank you for your essay on the cases of Thoracic Aneurism, and for your suggestions respecting my case of cartilaginous growth, which appear very probable ones.
>
> Would it be agreeable to you to take part in both work and pay in the preparation of a new edition of my Lectures on Surgical Pathology? It should be ready by October 1860 at the latest, and we would take, if you like, equal shares of the profits, and, as nearly as might be, of the work too. If you can and will entertain this proposal, I shall write you more fully and say what part of the work I wish to be relieved of; but, if you have no time or mind for it, I need only beg you not to hesitate to say so.

Turner accepted the proposal of his old master, and applied himself to the work of revision with the thoroughness characteristic of him. From the correspondence that passed between the two men, it is evident that most of the minute pathological work was placed in Turner's hands. His desire to assist Paget was probably strengthened by his as-

sociation with Goodsir: doubtless they talked the matter carefully over, and Goodsir's valuable material would be placed at the disposal of his assistant.

The work of revision was a slow process, owing to the new pathological data, the extensive literature in different languages which had to be carefully read and sifted, and the fresh material which had to be prepared and tested. It was not until the summer of 1863, that the second edition was ready. In one of his letters to Paget, Turner states that he had given up coaching in order to devote his evenings to the work.

3 South Frederick Street,
October 23*rd*, 1861.

I received your note this morning.

I have collected a quantity of material for the new edition of the first volume of the Lectures, but it is as yet in the rough state, and will require a good deal of trimming and arranging before it can be incorporated with the old text. The second volume I have done very little to, and I am in much doubt respecting it.

You may remember you told me that it would be advisable to go over all the statistical part bearing on the mortality after operation for cancer, period of life, those most subject to it, &c., with the aid of notes of cases which you have in your possession, and which throw a somewhat different light upon some of your former conclusions.

I hope to finish in the course of next week the anatomical papers at which I am working, and as I do not intend to take any private pupils, I can devote my evenings to the work.

I shall endeavour to send you early in December the first two or three lectures with the additions and emendations I would suggest. William Turner.

In the month of August 1915, the summer preceding his death, Turner spent his holiday in North Wales. During an excursion made by motor-car over the Llanberis Pass, he was reminiscent of a previous holiday spent in the district fifty-five years before. The traveller in North Wales may recall on the descent from Snowdon, as he passes downwards to Capel Curig, the lonely inn of Peny

Gwryd, standing beneath the frowning peaks of Glyder Fawr and Glyder Fach, so well described by Charles Kingsley in 'Two Years Ago.' The inn, the only dwelling-house in Peny Gwryd, is at an elevation of nearly a thousand feet, at the junction of the roads leading to Capel Curig, Beddgelert, and the summit of the Llanberis Pass. Here, in the summer of 1860, Turner spent the greater part of the month of August with his aunts, his main object being to master the contents of Virchow's 'Cellular Pathology,' a volume of over four hundred pages. He was also able to enjoy his favourite recreation of walking and climbing, and, at the same time, to accomplish the task which he had set himself to do. What more restful spot could he have chosen for the unravelling of the intricate phrasing of the German language, and for elucidating the scientific problems of the cell doctrine of disease?

Early in 1863, when Paget's book was in the press, Turner delivered a lecture at the Royal College of Surgeons of Edinburgh, upon "The Present Aspect of the Doctrine of Cellular Pathology." It was a masterly exposition of the whole subject, and it throws much light upon the labour which he had expended in carrying through the revision entrusted to him, and upon the wide grasp of the subject which he had acquired. The knowledge thus gained proved of great value to him later in life in the preparation of his address on "The Cell Theory," which he delivered, in 1889, as President of the Scottish Microscopical Society, and again in his Presidential Address to the British Association at Bradford in 1900.

The second edition, like the first, was a great success, and was entirely disposed of by the summer of 1867, when a third edition was called for. Turner again undertook the work of revision, and the book appeared in 1870. When this also was exhausted, a reprint of a thousand copies was issued, in order to meet the continued demand for it. In October 1896,

Paget wrote to Turner: "I enclose Messrs Longman's account of the last year's sale of our Lectures on Surgical Pathology and a cheque, which may tell that the sale has nearly reached the vanishing point. It might be amusing to know who could have wanted to buy a book on Pathology nearly fifty years old."

In conjunction with Professor George Murray Humphry of Cambridge, Turner took a very active part at this time in founding the 'Journal of Anatomy and Physiology,' the first number of which was published in November 1866. Prior to this date no journal specially devoted to these subjects had appeared in this country, although the 'Natural History Review' had been a channel through which a number of papers upon human and comparative anatomy had been made public. As that journal, however, ceased to exist in 1866, it was felt by some of the younger anatomists that, with the increasing number of workers in this field of science, a means should be provided for the publication of original papers and for reports upon the progress of the two sciences. Anatomy and Physiology were to be regarded in the widest sense as comprehending not only human and comparative anatomy and physiology, but much of Zoology and Palæontology, without excluding even Psychology and Pathology. At the meeting of the British Association in Nottingham in 1866, the arrangements for the production of the Journal were finally completed. A considerable correspondence upon the subject had passed between Turner and Humphry, and the latter's views as to its scope are contained in the following letter:—

CAMBRIDGE, *March* 26, 1866.

MY DEAR MR TURNER,—Thank you for your prompt note, with its congratulations and full information. A feeling of the need of such a journal as we are contemplating seems to be prevalent, and to be felt in Dublin, as well as in Edinburgh and Cambridge, for Dublin is contemplating a similar thing

and seems disposed to join us. I expect to see Professor Wright about it in town on Thursday, and I quite agree with you that the best plan would be to pull together; and if you are disposed to join too, and unite in a Cambridge, Edinburgh, and Dublin journal, I think the thing might answer very well, and a thoroughly good journal ought to be the result, giving the produce of English, Scotch, and Irish Anatomy, with contributions from other sources, reviews, &c., such as you suggest.

Perhaps it might appear three times a year, once a year from each place, the editor in each town being responsible for the number issuing from it. Our idea was to have it printed at our Pitt (*i.e.*, University) Press with Macmillan as publisher. He is a Scotsman, has a London as well as a Cambridge place of business, with Scotch alliances; although the numbers might issue from the three places in turn, yet each number might contain contributions, to some extent, from the three places collectively. This plan would be attended with some disadvantages and difficulties, but would have the advantage of some little rivalry in the three places, and of the co-operation of the three divisions of the country.

We have already several promises of support in England, and our project has been well received.

Perhaps some other better plan may occur to you. I like the notion of a combination, if it can be effected, agreeing with you that two journals, still less three, would not succeed well, and that it would be far better to produce one good periodical.

We had not contemplated Pathology as a subject, but have no objections to it, provided somewhat more range be given to Zoology and Geographical Distribution, for which there would be ample space in three numbers annually. I don't think Newton would assent unless this were so.

With regard to funds, we are quite willing to contribute our share of them, and to bear our share of the loss, supposing there be any, which, if the Universities combined and the thing worked well, might not occur. G. M. HUMPHRY.

The Journal was at first published as a half-yearly volume, Humphry and Turner being assisted in their early efforts to make it a success by Professors Newton of Cambridge and Perceval Wright of Dublin, with Mr J. W. Clark of Cambridge as editor. Throughout the first ten years of its life Turner contributed to each number a *résumé* of all the anatomical work

which appeared in other countries, thus illustrating that he kept himself abreast with Continental literature; in 1874, Dr D. J. Cunningham assisted him in the preparation of the analysis, but this useful feature of the Journal was finally discontinued two years later.

During the fifty years which have passed since its foundation, many changes have taken place in the personnel of the staff conducting its affairs, in the size of the volume, and in the frequency of its publication. In 1872, Humphry was anxious to encourage the physiological side, and wrote to Turner on the matter.

CAMBRIDGE, *May* 28, 1872.

I have just passed for press the last sheet of the Journal, and hope you will soon have the number. There has been no unnecessary delay here.

It has occurred to me that it would be a good thing to strengthen the physiological element by associating a physiologist with ourselves in the conduct of the Journal, and that Dr Michael Foster would be a good man for this purpose. He is a very able person, is Prelector of Physiology in Trinity College, and devotes and intends to devote his time exclusively to the working and teaching of the subject, is almost always in the Physiological laboratory, is well known in this country and on the Continent, and is a good deal interested in the Journal and anxious about its success.

He has often talked to me about it, and I know he thinks the issue should be more frequent, which no doubt would be better, and there might then be a division of the reports. I am pretty sure he would be willing to join us, and he is a good person to associate with in such work. Residing here, he would be a relief to me, which I should be very glad of. Let me know what you think of this. G. M. HUMPHRY.

Professor Michael Foster of Cambridge and Professor William Rutherford of Edinburgh were then added as editors in Physiology. When a journal specially devoted to that subject was published a few years later in this country, Foster and Rutherford resigned and Professor M'Kendrick of Glasgow took their place. At a still later period in the history of the Journal, the chief work of management devolved first

upon Professor D. J. Cunningham and afterwards upon Professor Alexander Macalister of Cambridge.

In October 1916, a few months after Turner's death, its original title was changed, and it became the 'Journal of Anatomy,' its management and ownership passing into the hands of the Anatomical Society of Great Britain and Ireland. An arrangement along such lines had been in Turner's mind for a number of years, and he had indeed made the suggestion to Professor Thane at the time of Humphry's death in 1896.

The Journal undoubtedly established itself as a recognised medium for the publication of original work, and fully justified the expectations of its founders and conductors. Had Turner lived a few months longer he would have had the satisfaction of seeing the completion of the jubilee volume. He himself contributed very frequently to its pages, and although in his later years others were responsible for the editorial work, he retained to the last his interest in it, and every sheet of each issue passed through his hands before going to press. Some of the sheets, indeed, for the forthcoming number were lying at his bedside a few days before his death.

The Anatomical Society was really an offshoot of the Journal, and was intimately associated with it. The Society was founded in May 1887, Turner and Humphry again taking an active part in its inception, along with the co-operation of G. D. Thane, C. B. Lockwood, John Curnow, and John Bland Sutton. Humphry became the first president, Turner succeeding him in the president's chair in 1892. On the death of Humphry, Turner bore testimony to the great ability of his colleague. In all his relations with him, he had experienced invariable kindness and courtesy; he had valued his friendship and appreciated his society, and he had benefited by the clearness of his thought and expression, and by the sound judgment which he brought to bear upon many subjects.

CHAPTER IV.

EARLY LIFE IN EDINBURGH—*continued.*

Universities (Scotland) Act, 1858—Holidays in Germany and Switzerland—Early days of the Volunteer movement—Question of Turner leaving Edinburgh—His marriage—Death of Goodsir.

It is necessary at this point in our narrative to refer to the great changes which were brought about both in the constitution and in the administration of the affairs of the University by the introduction of the Universities (Scotland) Act of 1858. It constituted their "Magna Charta." The University of Edinburgh occupied a unique position amongst them, in that the conduct of her affairs and even the regulation of her discipline and of her system of graduation had been for the most part in the hands of the Town Council, who, under the charter granted in 1582 by King James VI. of Scotland, had been made her patrons. The Senatus Academicus, unlike that of St Andrews, Glasgow, and Aberdeen, possessed little power in the management of the University. History records not only the many quarrels and acrimonious discussions which took place from time to time between the Professoriate and the members of the Municipal Corporation, but it brings to light the fact that the Town Council sometimes made wise and judicious changes in University administration. It had been felt, however, for a long time that the best interests of University education demanded a radical change in constitutional

government. After more than one attempt to bring this about, the Bill of 1858 was brought before the House of Commons on April 22nd, and was carried through by Mr John Inglis, the Lord Advocate in the Conservative Government of the day, and afterwards Lord Justice General and Chancellor of the University. While the Bill was before the House, the interests of the University were keenly supported by Christison and Hughes Bennett, both of whom did yeoman service on her behalf. The Bill became law upon August 2nd.

Turner, as a young demonstrator, must have been an interested onlooker, following the discussions and watching with close attention the contest between the University authorities and the Corporation of the City, while the Bill was under consideration in the House of Commons. When, in after years, he himself attained the highest administrative position in the University and in the General Medical Council, he no doubt found that the experience which he had gained by a personal study of what actually took place in 1858, was of great value when medical education and improvements in University administration became matters of the greatest importance to him.

To the University of Edinburgh, in particular, the passing of the Act was of vital importance, as it gave to her Principal and Professors for the first time the authority to discharge all the functions pertaining to the Senatus Academicus. The constitutional changes which the Act enforced were—

1. The formation of the General Council of the University, and, *pari passu* with this, the election of a Chancellor.
2. The election of a Rector.
3. The formation of the University Court.
4. The establishment of the Board of Curators of Patronage.

At the same time, amongst other matters, the Act

prescribed the appointment of a Commission to carry out the views of the Act and to frame Ordinances for the regulation of the revenues, studies, and degree systems, and all other important points in the working of the Scottish Universities. Mr John Inglis, who was now the Lord Justice Clerk, was elected the permanent Chairman of the Commissioners, and he continued in office until 1862; the Ordinances resulting from their deliberations must be regarded as especially the product of the sound judgment and untiring devotion of the chairman.

The General Council of the University met in the Music Hall, George Street, in October 1859, and was presided over by Sir David Brewster, who had just been elected Principal by the Town Council, on the death of Lee. The General Council, at its inception, numbered 1862 members. The function of the Council was to consider all questions affecting the wellbeing and prosperity of the University, and to make representations on such questions to the University Court. Its duty upon this occasion was the election of a Chancellor, Lord Brougham having been proposed by the Whigs. His Grace the Duke of Buccleuch was put forward as the opposition candidate by the Tories. The voting resulted in the election of Lord Brougham as first Chancellor of the University.

In the following month the students exercised the privilege of electing for the first time a Rector. The candidates were William Ewart Gladstone and Lord Neaves, one of the judges of the Court of Session. The number of students who voted were 1170, of whom 643 gave their votes to Mr Gladstone and 527 to Lord Neaves. Mr Gladstone thus became the first Rector of the University of Edinburgh.

The formation of the University Court soon followed, its function being to revise, on appeal, the acts of the Senatus Academicus, to sanction the expenditure suggested by that body, and generally to supervise the Professorial staff. The original Court, seven in

number, consisted of the Rector, Mr Gladstone, who appointed as his assessor Dr John Brown; the Chancellor, Lord Brougham, who made Sir John Melville his assessor; Sir David Brewster, the Principal; the Lord Provost, Mr Francis Brown Douglas; Bailie Grieve, the Town Council's nominee; while the General Council of the University was represented by Mr Edward Maitland, the Solicitor-General (afterwards Lord Barcaple), and the Senatus Academicus by Professor Christison.

Finally, towards the close of the year 1859, the Curators of Patronage were elected, four being appointed by the Town Council and three by the University Court. The Corporation, therefore, continued to take some part in the administration of University affairs, and, although in a minority upon the Court, they obtained four out of the seven representatives upon the Board of Patronage.

Sir Robert Christison has given us in his Life a brief account of the first meeting of the University Court, the object of which was to elect three representatives upon the Court of Curators. Some difficulty arose as to the interpretation of the meaning of the Act in regard to the choice of representatives. Was the Court to select them from their own members, or were they to be chosen from outside the Court? Five of the members expressed the opinion that they should be selected from outside their own body, but Bailie Grieve dissented from this. Mr Gladstone, who, as Rector, occupied the chair, diplomatically suggested that the Court might go outside their body for one or more, but might correctly also appoint one or more from amongst themselves. This became the finding of the Court, two members being selected from themselves —namely, Mr Gladstone and the Solicitor-General, while Mr Mure, the Conservative ex-Lord Advocate, was nominated from outside.

During the early years of his life in Edinburgh, Turner paid more than one visit to Germany. On the first occasion, in August 1856, he crossed from Leith to Hamburg in the steamship *Dunedin*. After spending a few days in that city, he proceeded to Hanover and thence to Göttingen, where he spent some days with an English friend.

His second visit in the summer vacation of 1858 led to a more extended tour, which he made with his friend Mr Eastlake. The primary object of his journey, on this occasion, was to hand over to Professor Du Bois Reymond of Berlin a fine specimen of the African electrical fish as a gift from Mr Goodsir. His experiences are recorded in a series of letters to his mother, which once more illustrate the pains which he took in keeping her acquainted with his movements.

EDINBURGH, *June* 1858.

During the last few days I have been in very great doubt as to where I may go to in Germany and when I may start. Yesterday, however, matters assumed something more of a definite aspect. A few days ago, a specimen of the African electrical fish arrived here. Mr Goodsir had intended to have taken it himself to Berlin to a celebrated scientific man there to experiment with, but it unfortunately happens that he is prevented by private business from leaving Scotland for some time.

Being anxious that the Berlin Professor should not lose the fish, and being afraid of sending it by the steamer without having some one in charge, he has asked me if I would have any objections to take it to Berlin. Although this will upset all my former plans of seeing the south of Germany and the Tyrol, I did not see very well how I could refuse, so yesterday I consented to take it. I shall sail from Leith to Hamburg, and thence by rail to Berlin.

His journey in company with his "strange companion" is thus described:—

BERLIN, *August 5th.*

You will see from my address that I have reached Berlin. I left Leith on Saturday afternoon, and everything looked

promising for a favourable voyage, and we sailed down the Firth in great spirits. On getting up, however, on Sunday morning, we found the ship rolling about in a most unpleasant manner. Not that there was any wind blowing, but there was a great swell on the ocean, and I, for the first time, experienced all the pangs of sea-sickness. On Monday morning the sea was much quieter, and we enjoyed the fresh breezes.

We reached the island of Heligoland about 2 P.M., the Captain taking the ship close to it in order to give us a good opportunity of seeing it. About 5 P.M. we reached the mouth of the Elbe, and after sailing up the river for about three hours, we were obliged to drop anchor, as there was not sufficient water to enable us to get over the bar. The next morning, however, we proceeded with the flowing tide, and reached Hamburg about 10 A.M.

Mr Robert Chambers of Edinburgh, with his two eldest unmarried daughters, crossed in the steamer with us. The electrical fish bore the passage better than all the other passengers, for I had fastened the basket containing the glass jar in which he swims to a beam stretching across the roof of the cabin, and he swung about most pleasantly. On inspecting him when we got on shore he appeared very vigorous.

This morning we started at half-past seven by rail to Berlin. The journey was a long one, as we did not arrive there until 4 P.M. The country through which we passed was very uninteresting, for many miles a sandy desert, nothing grown upon it but stunted grass and scattered tufts. Here and there, however, where water had collected, the herbage was greener and more vigorous.

August 6th.—This morning I went to the University to convey my fish to Professor Du Bois Reymond. He was very glad to see me. He introduced me to some other gentlemen there, and we went round the Museum together. Write without fail, as I should not like to leave Berlin without hearing from you.

Turner used to enjoy telling the story of his experiences with the custom-house officials at Hamburg on this occasion. He assured them that he had really nothing to declare, but the appearance of the basket, containing the glass jar, excited suspicion and roused a natural curiosity. Turner informed the officer that

it contained only a fish, and courteously advised him against any examination of the contents. Being a determined man, however, he decided upon settling the question to his own satisfaction. He accordingly raised the lid of the jar and inserted his hand—and there was no further trouble with the custom-house officers!

The incident with the electrical fish gave Turner his introduction to Du Bois Reymond, and for many years the two men corresponded with each other on matters of mutual scientific interest. At the International Congress of Medicine, held in Berlin in 1890, Turner was chosen as the spokesman of the Anatomical and Physiological sections to propose the toast of the veteran Physiologist at the dinner at which the latter presided. In continuation of his tour Turner writes two further letters which give an account of his journey:—

I have enjoyed very much my stay in Berlin. Eastlake knew some very nice people here, and we have been peculiarly fortunate in many respects. We have visited several times at the house of Dr Horn, Director of the large Hospital, and have been treated with the greatest kindness. We spent a day at Potsdam, about fifteen miles from Berlin, a town almost built of palaces and royal residences. We had obtained an introduction to the King's architect, and by this means we drove about in one of the Royal carriages, seeing the various objects of interest. Our Queen is now at Potsdam visiting her daughter, who is said by the good people here to be about to present the Prussians with an heir to the Crown.[1]

I shall carry away with me very favourable impressions of Berlin. We propose leaving to-morrow for Leipzig, where we shall spend the night, and then start the following morning for Dresden. We then propose walking through the Saxon Switzerland—three days' walk to Prague, where we remain for a time.

HEIDELBERG.

I left Prague and reached Dresden the same evening. The next morning I left for Nürnberg; this was a long journey,

[1] Ex-Kaiser Wilhelm II., born January 27th, 1859.

for we started at ten in the morning of Tuesday, and did not reach Nürnberg until eight o'clock the following morning, being, with the exception of a slight interval, on the move all the time.

Nürnberg is one of the most peculiar cities in Europe. Many hundred years ago it was a very wealthy and important town, and the citizens spent large sums of money on the decoration of their houses, churches, and other public buildings. Most of these are preserved in the original style, so that as one walks through the streets, one might almost fancy that we were transported back some hundreds of years were it not that the modern costume of the people reminded us that we are in the nineteenth century.

The next day we left Nürnberg for Würzburg, a small University town of Bavaria. We remained here two nights, and then went by way of Frankfort to Heidelberg. Here we have taken lodgings, and propose remaining for a few days and then pass quietly down the Rhine, so as to leave Rotterdam *en route* for London.

In September of 1860, he again took a holiday on the Continent in company with his friend Mr Thomas Smith of St Bartholomew's. After sailing from London to Ostend, they travelled through Belgium and Luxembourg, visiting Trèves, thence by steamboat down the Moselle to Coblentz. After spending two or three days at Wiesbaden, they passed through Frankfort and Heidelberg, and finally reached Freiburg in Baden, from which town they set out upon a walking tour. Some idea of the trip may be gleaned from two letters which he sent to his mother :—

SPLÜGEN, *September* 11, 1860.

My last letter was written to you a week ago from Leuzkirch in Baden. In continuation I may state that we left Leuzkirch and walked to Schaffhausen, where there is a magnificent waterfall, the river Rhine falling a considerable distance over rocks. From the hotel we had a very fine view of the Falls. The next morning we left by rail for Zürich, spent several hours there, and then sailed up the lake by steamer as far as Rapperswyl, a small town at the upper end of the lake. The next morning we again took train and went for some miles through a splendid country to Ragatz.

This brings me to Saturday morning. We spent the remaining part of Saturday and the whole of Sunday at Ragatz, a most beautifully-situated place, in a valley with mountains rising on each side to the height of 8000 feet, their summits being covered with snow.

Three miles from Ragatz is a very celebrated bathing-place, Pfeffers, situated in a gorge in the mountains, in the midst of which a hot spring wells up, producing a constant and abundant supply of water. During the summer hundreds of strangers frequent these baths. I thought I would try the effect of one, and on Saturday evening ordered one in the hotel. It was extremely pleasant, the water being at its natural temperature.

On Monday morning we left Ragatz by rail for Chur, and from there started on foot through the valley of the Upper Rhine to Thusis. This valley well repaid us for our walk. We passed on our way Reichenau, a small village in which Louis Philippe, during his early days, played the part of a schoolmaster. The country on each side abounds in ruins of castles, perched on almost inaccessible eminences. As one looks at them, one wonders how their owners got in and out of them. This morning we left Thusis and walked for about eighteen miles to Splügen, through one of the most splendid of the Alpine passes, the Splügen Pass. The ascent is a very gradual one, and the summit, which we have not yet quite reached, is 8000 feet. The road in places passes through enormous ravines, and is then conducted by substantial bridges over the river which flows some hundred feet below. It is one of the most celebrated roads in Switzerland, partly from its height and partly from the difficulties that had to be surmounted in constructing it. The Swiss at the present day are not, however, satisfied with it, and they are actually surveying the district for the purpose of making a railroad. In the morning we propose starting early and going by omnibus across the pass into Italy, where we spend a few days. It is our intention to see Lakes Como and Maggiore, and then to return by the St Gothard Pass into Switzerland.

ZERMATT, *September* 23, 1860.

My last letter was written to you from the inn at Splügen, as I was about to enter Italy. We started the next morning by *diligence* at 3.30 A.M., and after a two hours' ascent reached the top of the pass, about 8000 feet high, just as the morning was breaking. For the next few hours our journey

was down one of the most beautiful roads I have travelled on. In some places the rocks have had to be tunnelled through for many yards, in others great arches have been constructed in order to prevent the avalanches of snow which fall so frequently in the early summer from carrying the road away. In other places it was carried by zigzags down the face of lofty precipices. As we gradually descended, we left behind us the cold Alpine summits and snowy peaks, and came into a land of chestnuts, walnuts, vines, and rich fruits of all kinds.

Italy now lay before us in all its glory, with a hot sun, blue sky, and picturesque costumes. We halted for an hour at the town of Chiavenna, and then took the *diligence* to Colico, a small town on the shore of the upper end of Lake Como. Here we took the steamer, and had a pleasant sail of about two hours down the lake to Bellagio, where we spent the night.

Como is one of the most beautiful lakes in the world, lying in the bosom of a very fertile valley, with numerous pretty towns on its banks, and with scores of handsome residences of royal personages; and it is, I believe, the special ambition of most of the great singers of the Italian Opera House to retire upon their earnings to a villa on the banks of that lake.

The next afternoon we left Bellagio and walked about ten miles to another lake called Lugano. Here we took a boat down the lake to the town of the same name, and next day, along with three young Englishmen whom we met at the hotel, we had a carriage and drove to Lake Maggiore. This is the largest of the Italian lakes, and is specially celebrated for the beauty and magnificence of its scenery.

Baveno, to which we sailed, reminds me somewhat of Windermere, only that the proportions both of the lake and of the surrounding mountains are much greater. At this place it expands into a beautiful bay, with several islands lying in it. The islands are much frequented by visitors, for, owing to the excessive mildness of their climate, trees and plants grow in the open air which cannot be well cultivated on the mainland. Oranges, lemons, citrons, the tea plant, camphor-tree, and many others flourish there in great luxuriance.

In the spring of 1859, the Volunteer movement was initiated with the object of raising a citizen army

for the voluntary defence of the country against the threat of invasion. The response to the call exceeded all expectations, and a force numbering over 200,000 men was raised in a very short time. Foremost amongst those who took up the matter in a practical way were the students of the University of Edinburgh, who selected as their leader their senior professor, Sir Robert Christison. Under his guidance the University Company, No. 4 of the Queen's Edinburgh Brigade, was raised, numbering at first ninety men, originally under the command of Mr Allan Dalziel, M.B., as captain, with Turner as ensign lieutenant. The Company paraded, with the rest of the Scottish Volunteer Force, in the famous Review held by Her Majesty Queen Victoria in the Queen's Park, Edinburgh, in 1860.

In 1861, Christison took over the command of the company himself, and at the same time Turner was gazetted lieutenant. In a letter [1] to his son Alexander, Christison thus describes No. 4 Company :—

> I have a capital lieutenant and most excellent young friend in Mr Turner, our Demonstrator of Anatomy. My ensign has served as drill-sergeant and made a professional almost unnecessary. My main reason for accepting the office was that the Company consisted of a set of remarkably good young fellows, zealous as students and zealous as riflemen, that they both deserved and required a professor at their head to keep them on a good footing in the battalion, all of whose captains are men of position in Edinburgh, and that there was no other professor who could have accepted the charge. The University lads are extremely well behaved and well drilled; many of them are capital shots, half a dozen of them first-rate; and they are a fine-looking set, both individually and as a body. Dr Duncan's eldest son (John Duncan), now my covering-sergeant, I call the "Premier Grenadier de l'Armée": he is a very handsome fellow of six feet and half an inch, probably the first athlete in the battalion, a first-rate shot, and as good a man and student as he is a volunteer. If I am not mistaken, you will hear of him making a figure in the course of time in the Edinburgh School of Medicine.

[1] Life of Sir Robert Christison, by his Sons.

Christison assumed the command of the Company at the age of sixty-four, and he retained it until he was seventy-seven. On the occasion of his professorial jubilee in 1872, he was presented with a sword, the gift of present and past members of No. 4 Company. As lieutenant, Turner made the presentation, the men being drawn up in the University Quadrangle. In his speech, Turner said :—

To your ever-ready sympathy and attention to its interests, the Company is in no small degree indebted for the prosperity which it enjoys and for the position which it holds as one of the largest and most efficient in the Queen's Edinburgh Rifle Volunteer Brigade. But, sir, we would wish to express more than a sense of our indebtedness for the prosperity of the Company; as individual members we would venture to offer an expression of the high regard we entertain towards you personally, and of our esteem for your character as a man of honour and a true gentleman. You have been to us an example of how, by attention to training and exercise, soundness of the body conduces to the preservation of mental vigour, and that, if we wish to keep the brain clear for active thought, our physical health must not be unattended to, and though this day the University celebrates your jubilee as professor, yet, if danger menaced our shores, we are sure that, with honour bright and untarnished as the blade of this steel, the throne and the country would find no more gallant and devoted defender than Captain Sir Robert Christison.

Two of Sir Robert's grenadiers of the sixties are still with us: Lord Guthrie and Sir J. Halliday Croom. The former thus recalls some reminiscences of that period :—

In the University Volunteer Corps, in which I was a private, Mr Turner was lieutenant. The great success of the Company in numbers and efficiency was chiefly due to that thoroughness, down to the minutest details, and that capacity for leadership which characterised his whole life-work in so many varied spheres of activity.

We were all proud of our Captain, Sir Robert, and of his fame and his stately and soldierly figure, and of his enthusiastic interest in the Company. To make sure that we did not

miss our shooting drills in the Hunters' Bog, he would even drive us down in his carriage to the Queen's Park. But he never mastered his drill as his lieutenant did.

On one occasion we were drilling in the open, under the public eye. The two front-rank men were Halliday Croom and myself, put there, not I fear from our knowledge of the drill, but from our height. Yet we knew more than our captain! Sir Robert gave us the order, "Right wheel," but, alas, he proceeded to execute "Left wheel" on his own account. What were we to do? Obey the captain's order, or follow the captain? The situation was only saved and public contempt avoided by the prompt and tactful intervention of his lieutenant.

On another occasion when we were shooting under Lieutenant Turner's command, a member of the corps missed the target by a few hundred yards and shot a sheep on an adjoining eminence. We did not shirk the necessary compensation; but the medical students present, with Mr Turner's permission, ascertained that the animal had been shot clean through the heart. You may imagine the congratulations showered upon the unfortunate marksman for the deadly accuracy of his aim and the prophecies of his future fame at the shooting butts at Aldershot!

But it was not only sheep that were in danger on such occasions: these were the primitive days of ramrods, with the consequent risk to the adjoining lieges of leaving a ramrod in a gun. I was recently told by a fellow-volunteer in the University Corps that Sir William Turner's whole career, so distinguished as Professor and as Principal, was entirely due to him! I must have looked incredulous, for my old college friend added, "Don't you remember that day at the Hunters' Bog when I forgot to take out my ramrod, and it just missed Lieutenant Turner's head by a miracle?"

The memory of his efficiency is a very vivid one. But equally strong is the recollection of his geniality, his infinite patience, and his kindly consideration.

On Christison's retirement in 1876, Turner obtained his captaincy, and for twelve years he commanded the Company, being promoted major in 1881, and receiving the honorary rank of lieutenant-colonel in 1889. He resigned in 1890, after thirty-one years of service, decorated with the long-service V.D. medal.

'The Gazette' of January 7 contained the following announcement:—

WAR OFFICE, *January* 7, 1890.

Queen's Rifle Volunteer Brigade, the Royal Scots (Lothian Regiment), Major and Honorary Lieutenant-Colonel Sir William Turner, Knight, resigns his Commission; also is permitted to retain his rank and to continue to wear the uniform of the corps on his retirement.

Both by his example and by his untiring devotion to duty, Turner did much to maintain the efficiency and discipline of the University Company. He was seldom absent from parade, and, in the summer months, he regularly spent Saturday afternoon marching and drilling with his men in the Queen's Park. His voice, admirably suited for giving the word of command, never failed to bring his men to attention. His natural capacity for command was further developed by his experience as a volunteer officer. Lord Finlay of Nairn, who was a private in No. 4 Company in its early days when Turner was ensign, has aptly applied to him a saying of Gibbon, the historian, "'The Captain of the Hampshire Grenadiers has not been useless to the historian of the Roman Empire." And so perhaps Sir William Turner may have said when he came to preside over the University, "The Captain of No. 4 Company has not been useless to the Principal.'"

Amongst the members of No. 4 Company in the early eighties was George Adam Smith, now Principal of the University of Aberdeen. He recalls the alert, keen-eyed figure of the lieutenant in a somewhat faded tunic, the legend attached to it being that its owner had worn it since the commencement of the volunteer movement; doubtless, in this case, a legend with a strong basis of fact, when we remember his sympathetic attitude towards his garments.

Turner, too, had his "Grenadiers" upon the wings of the Company, and he would refer to them with evident pride. Many will recollect in the eighties,

the tall commanding figures of "Charlie" Reid, the Academical and Scottish Internationalist, and his comrade, W. T. Irvine, of the brothers Hartley, Sergeant Pridie and Corporal H. J. Walker, men who were conspicuous even amongst comrades of no mean stature. Mr W. Bannerman, Writer to the Signet, was for many years his trusted lieutenant, and captain (now lieutenant-colonel) J. A. Hope was another officer of the Company.

An old member of No. 4, Dr A. C. Hartley, thus describes Inspection Day in the Queen's Park: "I well remember how proud our captain was when our line extended a long way beyond that of any other company. He was so pleased with the height and physical bearing of a lot of us that he went and called Sir J. H. A. Macdonald (Lord Kingsburgh) to come and see us. 'Come, sir, and look at my Grenadiers,' and then he stood beaming upon us, while we held our heads up and made the very most of our chests. When the time came for the march-past, Sir William took the time from the band, gave the word of command, and marched off at a swinging pace. We all did likewise, and linked up and passed the saluting-base rigid as a gate, and invariably with a cheer from the crowd." Four medical members of the original No. 4 Company of 1859 still survive—Emeritus Professors Crum Brown and Sir Thomas R. Fraser, Dr R. C. Maclagan, and Mr A. G. Miller, the surgeon, all of them at that time students of medicine.

In the second great Volunteer Review of August 1881, Turner again marched past his Queen, upon a day ever memorable in the annals of the Scottish Volunteers on account of the rain-storm in which it took place. Lord Kingsburgh, who commanded the Brigade, the Queen's Edinburgh, gives a graphic account of the scene in his 'Life's Jottings.' "The storm broke with fury about half an hour before the time appointed. No ordinary words can describe the downpour. It was one of those occasions

when the fall is not in drops, but in streams. There had been nothing seen in the Queen's Park to compare with it within the memory of man, and the parade-ground became a sea of mud before the march-past began."

During the early years of Turner's residence in Edinburgh, the question of his migrating southwards arose on more than one occasion. His financial position was unquestionably a source of some anxiety to him. His salary of £200 as Demonstrator was slightly augmented by fees derived from coaching, a form of teaching which he was compelled to undertake at that time, and which he intensely disliked. For a period of six years, during which he had to discharge very responsible duties, Goodsir's state of health causing an increasing share of the work of the department to devolve upon him, no augmentation of his original salary had been suggested. When he accepted Goodsir's invitation in 1854, it was not with the intention of remaining permanently in Edinburgh, but rather with the view of widening his professional outlook and gaining additional scientific experience, while obtaining at the same time a certain means of livelihood.

In February 1861, his friends at St Bartholomew's Hospital approached him with the view of obtaining his consent to apply for the Wardenship of the hospital, which was about to fall vacant. The emoluments included a furnished house in the college. In addition, it opened up the prospect of a return to his old school and the commencement of a professional career in London, the desire for a physician's life still influencing his mind. Following his usual custom when any question arose involving a change in his prospects, he wrote to his mother—

I have received a letter from my friend Mr Thomas Smith, in which he tells me of certain vacancies which have occurred at St Bartholomew's in consequence of poor Mr Baly's death. It appears, moreover, that Mr Paget and Mr Savory are very

anxious to get me back to the hospital, and they tell me that if I will only agree to come they will secure for me a furnished house in the college and appointments to the value of £150 to £200 a year.

The work I should have to do would be very slight, so that I should have much time for my own improvement. The object to be gained by going there would be to qualify myself for the post of physician to the hospital, which I should endeavour to obtain at the next vacancy. I am very much inclined to accept the proposal, but as I have not yet spoken to Mr Goodsir, or any of my friends, I shall not decide until I see whether they feel disposed to do anything more for me here. I do not wish the matter spoken about until I decide.

Turner consulted Goodsir, Christison, and Syme, and all spoke very strongly as to the advisability of his remaining in Edinburgh; and, in order to improve both his financial position and his *locus standi* in the University, they approached the Commissioners with the view of obtaining an increase in his salary, to be paid from the University funds. The sum promised was £150, in addition to the salary paid by Goodsir. At the same time a definite University position was given to him by making his demonstratorship, which had hitherto been merely a private appointment made by Goodsir, one that was sanctioned and confirmed by the University authorities. The question, therefore, of his remaining in Edinburgh at that time was thus wisely settled so far as the University was concerned.

Unfortunately, this apparently legitimate and well-deserved improvement in Turner's position was not allowed to pass without some opposition on the part of one member of the Senatus Academicus. Hughes Bennett made it the occasion for attacking Goodsir's arrangements for Anatomical teaching in his department. He protested against the decision of the Senatus in confirming in the official schedule of the University Turner's courses of Anatomical Demonstrations. Several reasons were advanced by him in support of his protest. Bennett considered that the

demonstrations held in the anatomical theatre at a fixed hour, and for which an extra fee was exacted, made Turner appear as a recognised teacher of Anatomy, and that this was virtually creating another Professorship of Anatomy, under the sole patronage and control of Professor Goodsir. The relegation of such duties to an assistant enabled the Professor to give another course of lectures in what Bennett called "Anatomy from the physiological point of view, parts being displayed and explained with reference to their actions and functions." This he regarded as the teaching of Physiology, and therefore directly injurious to himself, in detracting from the freshness and novelty of his lectures. If Mr Turner were no longer tolerated as a lecturer, but constrained to confine his teaching to the dissecting-room as a demonstrator, the Professor of Anatomy would then be obliged to occupy his own lectures with the proper subject of his course. This tirade, which the circumstances of the case hardly seem to have justified, did not affect the decision of the Senatus, nor did it alter Goodsir's method of conducting the work of his department along lines similar to what he had been doing for a number of years. Bennett's opposition, however, appears to have left a disagreeable impression upon Turner's mind, because in the autumn of the same year he was considering the question of applying for the vacant Curatorship of the Museum of the Royal College of Surgeons of England, a post which carried with it, at that time, the Professorship of Histology. On the advice of Goodsir and Syme, however, he gave up any further idea of becoming a candidate for the Curatorship.

In the spring of 1862, it was decided to found a Chair of Anatomy and Physiology in Melbourne College, Australia. After making inquiries as to the conditions of work and emoluments, Turner finally decided not to offer himself as an applicant for the post.

In a letter, dated November 16, 1862, he announced to his mother that he was engaged to be married.

I received on Tuesday from the University authorities the sum of £150, being the amount of my salary for the past academical year, payable to me from the University fund. As I am now in receipt of an income of £400 per annum, I have determined to carry into effect a plan of which I have been for some time thinking, and to take unto myself a wife. I am quite tired of leading a bachelor life, and I have arrived at an age at which one is fairly entitled to marry without being charged with imprudence or haste. My means also will be such as will, I trust, with care, enable me to live in my new condition with comfort.

The young lady who has consented to share my lot is the eldest daughter of Mr Logan, a gentleman living in the South of Scotland. I have been acquainted with her and her family for some time. If all goes well, the marriage will, I hope, take place in the spring of next year. I hope that the step which I am about to take will meet with your approval, and be assured that, though I will be assuming a new relation in life, yet that I shall not the less be your son nor you one iota less my own dear mother.

Agnes Logan, to whom he had become engaged, was the eldest daughter of Abraham Logan, of Burnhouses, Berwickshire. Turner had made her acquaintance at the house of his friends, Professor James Muirhead and his wife, where she and her sisters were frequent visitors during the winter months. At that time and for many years afterwards Mr Logan lived at Caverton, near Morebattle, Kelso, which he farmed with great success, and where he was held in high esteem by all who enjoyed his friendship. The marriage took place at Caverton on April 21, 1863, Turner being thirty-one years of age and his wife a year his junior. Mr Annandale, who was then acting as one of Goodsir's demonstrators, officiated as groomsman. The event was made the occasion of the presentation of a very handsome gift of silver plate from many of his present and former pupils, and of the expression on their part of those genuine feelings of

respect and affection which were always a striking feature of the relations between his pupils and himself. In thanking them for their gift he said :—

I am deeply sensible, not only of the honour which you have this day conferred on me, but of the kindness and hearty goodwill which have been displayed in the manner of its bestowal. When my friend, Mr Annandale, called to ask me a week ago when it would be convenient for me to receive a present from some of my former and present pupils, I must confess that I was, for a time, quite taken aback. It was something so altogether unexpected, so unlooked for, that for a few moments I hardly knew how to reply to his question. During the period in which I have been working amongst you, it had never struck me that I had done more than my duty required, more than was demanded of me when we assumed towards each other the relation of teacher and pupil. You have been pleased to express, gentlemen, in the address which has just been read, a high and, I cannot but think, far too flattering an opinion of my efficiency and success as a teacher, for in this you are accrediting me with much that really belongs to yourselves. When a teacher is met half-way, nay, more than half-way, as I have been, by pupils willing and anxious to learn, when he sees around him eager and inquiring faces, when he feels the influence of that mysterious sympathy which binds together a lecturer and an attentive audience, when he fully realises the importance of the subject which he is called upon to teach, then must he be dull and impassive indeed, if he throws not into his prelections that same eagerness of spirit which he sees reflected from those about him.

You have been also pleased to wish me much happiness in certain new relations of life, which everybody seems to have made up his or her mind I am about to enter on. I am not the only person, gentlemen, to whom this expression of your wish this day will afford pleasure and gratification. In what you have done, you have added another to the many feelings of pleasantness with which I regard my connection with this great medical school. I can now look back on a period of nearly nine years' connection with it. During the whole of that not uneventful time, I can truly say that not only from my revered and honoured chief, but from the Professors in the Medical and other Faculties with whom I have been thrown in contact, from the various accomplished men who have been from time to time associated with me in the Demonstratorship,

and from the numerous pupils, amounting now to almost a thousand, who have sat on these benches, I have received a uniform courtesy and kindness which has not and, I can assure you, never will be forgotten.

On his marriage, Turner removed from his lodgings in 3 South Frederick Street, where he had spent the greater part of his bachelor days in Edinburgh, to 25 Royal Crescent, and it was there and in 7 Brunswick Street, Hillside, that the early years of his married life were passed. After his promotion to the Chair, realising that henceforth Edinburgh was to be the scene of his life's work, he purchased No. 6 Eton Terrace, to which, in the course of years, he became deeply attached, and where he continued to reside until his death.

During the thirteen years in which Turner was associated with Goodsir as Demonstrator, the latter had to fight against an insidious but slowly progressive disease of the nervous system, but in spite of the physical weakness which gradually overcame him, his mind remained active and vigorous, and his interest in scientific affairs never abated. As he entered the lecture theatre in these later days, he staggered and guided himself towards his chair by laying his hands upon the table, and, as a rule, he remained seated during the whole of the lecture. Towards the latter part of the Winter Session 1863-64, the state of Goodsir's health prevented him from completing his systematic course of lectures, and he was compelled to hand over both the teaching and the spring examinations to his Senior Demonstrator. It was with great reluctance that, upon the advice of his doctor, he had to submit to an enforced rest. In a letter addressed to the members of his class which he asked Mr Turner to read, he said—

I have to express my extreme regret that, owing to the state of my health, I have been unable to bring the course to a conclusion, as I had hoped to do when last I addressed you. Acting upon the advice of my medical adviser and my col-

leagues, I have very unwillingly found it necessary to have my course finished by deputy. In these painful circumstances I have felt great relief in the conviction that you have shared with me in placing full confidence in Mr Turner's ability and energy.

I cannot, however, cease to regret that I have been precluded from meeting you again before the conclusion of a course, during which I have had the great satisfaction in observing, in your punctuality and attention, that my efforts to illustrate the principles of human anatomy were fully appreciated by my audience. With best wishes for the continued success of your professional studies and for your progress in life, believe me, very sincerely yours, JOHN GOODSIR.

Notwithstanding his increasing infirmity and the gradual loss of power in his lower limbs, Goodsir fought against his fatal disease and continued to discharge his duties as a lecturer. He commenced his winter course in November 1866, but before the end of the monthr he fell in a fit in the presence of his class. He was attended during his last illness by his old friend Professor Spence, and within a few days of completing his fifty-third year, he died on March 6, 1867, in South Cottage, Boswell Road, Wardie, in the same house which had witnessed the last hours of his friend, Edward Forbes. Shortly before his death, Goodsir sent for his friend and Junior Demonstrator, Mr John Chiene. Chiene has told us how he found him lying on a camp-bed in a narrow room, and upon a small table at his bedside lay his Bible and a volume of 'Quain's Anatomy.'

He was buried in the Dean Cemetery; a plain granite obelisk marks his resting-place, and adjacent to it is the grave of Edward Forbes, naturalist, the intimate companion of his earlier days.

CHAPTER V.

PROFESSOR OF ANATOMY.

1867-1903.

Appointment to the Chair—Short sketch of its history—Turner's method of teaching—Relations with his Students—Knighthood and K.C.B.—Presentation of the Reid Portrait.

Upon the death of Goodsir in March 1867, the contest opened for the vacant Chair of Anatomy. As is usual on such occasions, rumour was busy with the names of several candidates, and the competition for the appointment promised to be keen. It was stated that John Cleland, then Professor of Anatomy and Physiology in Queen's College, Galway, was a candidate; but he gave his support to Turner, his old fellow demonstrator. Rumour also asserted that Professor Redfern of Belfast would advance his claims for the post, and Huxley's name was mentioned in some quarters. There were, however, only three candidates — John Struthers, John Bell Pettigrew, and William Turner. Struthers had resigned his extramural lectureship in Edinburgh in 1863, on his appointment to the Chair of Anatomy in Aberdeen University. He was undoubtedly Turner's strongest opponent. He had been teaching Anatomy for a number of years, and his contributions to science were very numerous. He had been placed in charge

of Goodsir's department during the enforced absence of the latter in 1853-54, and he came forward on this occasion with all the prestige attached to the Chair of Anatomy in Aberdeen. Pettigrew, another old Edinburgh student, was the First Assistant to Flower in the Museum of the Royal College of Surgeons of England, but his claims to the post were not sufficiently strong to make him a formidable rival.

Turner's candidature received widespread support. In submitting his testimonials to the Curators of Patronage, in whose hands the appointment lay, he made no elaborate statement regarding his qualifications for the Chair. He contented himself with drawing attention to what the most distinguished Anatomists and Pysiologists, both in this country and abroad, had to say of his special claims as a Human Anatomist, and of the position which he had taken as a scientific investigator, not merely in one, but in all the departments of anatomical inquiry. He pointed out how physicians and surgeons had testified to the value of his writings in the elucidation of various difficult questions in Pathology, and he referred to the expression of opinion which his many pupils, past and present, attached to his method of instruction, and to the assistance which he had always willingly given to them in the prosecution of original scientific inquiries. His testimonials, which numbered more than one hundred, were accompanied by a long list of his publications.

Amongst Anatomists, Zoologists, and Physiologists, we find Owen, Huxley, Flower, Quain, Humphry, Rolleston, Holden, Allen - Thomson, Sharpey, St George Mivart, Hyrtl, Victor Carus, Gegenbaur, Paul Broca, and Van der Hoeven, testifying to his ability and to his fitness for the Chair. A request for a testimonial from Oliver Wendell Holmes, Professor of Anatomy in the Harvard Medical School, elicited the following reply from the author of 'The Autocrat of the Breakfast Table' :—

BOSTON, *April 6th*, 1867.

I feel much flattered by the compliment you have paid me in asking for the expression of my opinion as to your qualifications for the Chair of Anatomy in the University of Edinburgh.

I confess that I dare not presume that my name would be known to the gentlemen with whom resides the power of selection. "Quis custodiet?" Who shall guarantee the guarantors? "The River Rhine, &c., but who shall wash the River Rhine?"

I know that your record is one most creditable to your ability and scientific industry, but I should feel that I was out of place in assuming to enlighten your own countrymen and townsmen concerning a series of varied labours which, they must know at least as well as myself, have done honour to your University.

I am afraid, therefore, that I must confine myself to thanking you for telling me that my name is known to at least one other of my professional brethren in Edinburgh besides Dr John Brown, who has long been one of my unseen friends. My recollections of Auld Reekie are very delightful. I knew nobody there, I believe, but old Dr Knox,[1] to whom one of us had a letter. I was a medical student then, and my love was divided between the museum and the famous haunts in and about the dear old city. I remember a marvellous mercurial injection by Dr John Bell, I think, also a *tour de force* in the way of an arterial preparation. I wonder if you know the ones I mean and whether my recollection is faithful. But I am afraid I should care more for Salisbury Crags and Arthur's Seat than for them and other things if I ever revisited your romantic town.

You have asked for bread and I have given you a stone. I hope to hear, however, that you have found others, who not only had the will but the ability to oblige you with the words of recommendation which I should feel it almost presumption for me to offer. O. W. HOLMES.

His friends in London and elsewhere rallied to his support. James Paget and John Stenhouse, his old teachers at St Bartholomew's, Thomas Smith, Savory, Hilton, Hughlings Jackson, and Joseph Lister, are amongst the names attached to his testimonials.

[1] Robert Knox—see page 120.

The profession in Edinburgh loyally supported him, and eight of the eleven men holding Chairs in the Medical Faculty gave him testimonials. They included Christison, Syme, Simpson, and Lyon Playfair, while many of his old pupils who were beginning to secure positions for themselves, testified to his undoubted claims to be Goodsir's successor. The enthusiasm which was aroused amongst the students of Anatomy was one of the most striking features connected with his candidature. A conjoint testimonial, signed by no fewer than three hundred and fifty undergraduates in medicine, was a spontaneous expression of their feeling towards him, and emphasised their admiration of him as a man of honour, a beloved teacher, and a profound man of science. When his success was announced, he became the recipient of many letters of congratulation from old pupils, scattered all over the country and in different parts of the Empire. Mr P. W. Mackay, the Chairman of the Students' Committee which undertook the preparation of the testimonial, writes thus to him after the election: "You will understand that no words of mine were or are needed to congratulate you upon your success. I never believed in expressed feeling, but I can only say that, as I look forward to the path that may lie before me away from schools and colleges and immediate instruction, into the wide world where each man has to hew his own way, and after seeing and experiencing many kinds of teaching and looking back with much respect to all my teachers, there are none for whom I shall cherish a deeper love or more profound esteem than yourself."

It was undoubtedly a period of great anxiety for Turner and his wife. He naturally felt that his future prospects in Edinburgh depended upon his success. Failure would have meant his departure and a rearrangement of his plans. In spite of his outstanding claims to the succession, his appointment

was by no means a foregone conclusion, and influences were at work which might have turned the scale against him. He recognised that his English origin, his education in another school, and his membership of the Church of England were factors which some regarded at that period of time as prejudicial to his prospects of election.

The Curators of Patronage met on April 11th, 1867, and proceeded to the election of the Professor of Anatomy. The Lord Provost presided. The representatives of the University were—The Right Hon. John Inglis, Lord President of the Court of Session; Sir William Gibson Craig, Bart.; and Sir David Brewster, the Principal; while the Town Council was represented by Mr William Chambers, the Lord Provost; Bailie G. E. Russell; Councillors Fyfe and Adam Black.

In opening the proceedings, the Chairman said that he had never had a more difficult duty to perform than that of making a decision as regarded at least two of the candidates. Mr Pettigrew's qualifications were undoubtedly of a high order: he was a young man of great promise, and might look forward to a distinguished career in his profession as an anatomist, but obviously he could not on the present occasion be placed in competition with the two others. For Dr Struthers he could not but entertain a high esteem, both in respect of his talents and private character, and his testimonials, from those who knew him best, spoke greatly in his favour. On the other hand, there seemed to be preponderating reasons for electing Mr Turner. That gentleman had conducted the anatomical class in Edinburgh for a period of thirteen years. He enjoyed the suffrage and the affection of the students: the medical professors in the University looked hopefully towards him as a coadjutor, and, if the testimonial from Dr Sharpey of London was to be credited, Mr Turner was probably unrivalled as a teacher of Anatomy, as well as for

general scientific requirements. For these various reasons he (the Lord Provost) had, after much consideration and perplexity, made up his mind to propose Mr Turner for the vacant Chair. His Lordship then asked the opinion of each of the other six Curators. Sir William Gibson Craig, Sir David Brewster, and Mr Adam Black concurred in the observations that had been made, and were in favour of Mr Turner. The next Curator whose opinion was invited was Councillor Fyfe. He also said that he had no little difficulty in coming to a decision in consequence of the high qualifications of two of the candidates. He thought, however, that there was one thing which weighed favourably for Dr Struthers. That gentleman was a Scotsman, and well acquainted with Scottish usages and feelings, and, unfortunately, it could not escape attention that the appointment of Englishmen to professorships in Scotland had not, in some instances, been very successful. He therefore gave his vote for Dr Struthers. The Lord President spoke next. He entirely concurred in the observations respecting the eligibility of Mr Turner, who, he was quite sure, would amply sustain the reputation of the University of Edinburgh as a medical school. He could not possibly sympathise with Mr Fyfe in his remarks as to preferring a candidate because he was a Scotsman. "One thing above all others to be proud of is the perfect catholicity of our University. We gladly take the best men from whatever part of the country they come, and this indeed is one of the fine points of all our Scottish Colleges. Besides, Mr Turner, though originally from England, is no new and unknown person. He has been amongst us for thirteen years, and has all along worked cordially with the various departments of the University."

The last to address the meeting was Bailie Russell, who, after some observations, concurred in the appointment of Mr Turner. The Lord Provost then summed up. Six of the Curators voted for Mr Turner

and one for Dr Struthers. Mr Turner was therefore elected Professor of Medicine and Anatomy in the University of Edinburgh at the age of 35.

Dr Pettigrew was subsequently appointed to the Chair of Anatomy in St Andrews in 1875. The result of the election in no way altered the friendly relations which had always existed between Struthers and Turner, and when, on his retirement from Aberdeen in 1889, Sir John Struthers[1] came to live in Edinburgh, the two friends saw a great deal of each other. The following letter illustrates the cordial feelings which Struthers entertained for his friend :—

24 Buckingham Terrace, Edinburgh,
3rd April, 1895.

I wish to say how sorry I am not to have been able to appear at the interesting meeting yesterday for the presentation of your portrait. I had intended to be present, but sad letters came in the morning rendering me unable to attend to any such thing. Otherwise, I am sure it would have given me much pleasure to be there, or even, had there been a suitable opportunity, to have said a word or two of high appreciation, as an old fellow-worker in the same branch. Allow me to take the liberty of saying that the great name of the Chair of Anatomy in Edinburgh, made for it by the first and second Monro and restored to it by Goodsir, has been fully maintained by you, and you have the happiness of knowing that you have sent out into the world even more men than they did. When the time comes for you to think it wise to follow my example, which need not be soon, I hope you may then have years to enjoy the pleasure of voluntary work.

John Struthers.

On the receipt of the news announcing the result of the election, Paget wrote to Turner as follows :—

I congratulate you with all my heart. Personally I could not but feel deeply interested in the election, for I had the good fortune to know and to say, even before you began

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[1] Sir John Struthers, mentioned from time to time in these pages, must not be confused with Sir John Struthers, the head of the Scotch Education Department.

your work in Edinburgh, that your success as an anatomist would be certain, and now I may boast that the Professors of Anatomy in Oxford, Cambridge, and Edinburgh were once my pupils. I wish you many years of great happiness and repute.

Paget used frequently to say that he had sent Rolleston to Oxford, Humphry to Cambridge, and Turner to Edinburgh, all of whom had been his pupils at St Bartholomew's.

A brief sketch of the history of the Chair to which Turner was appointed is not inappropriate at this point. The teaching of Anatomy in Edinburgh owed its origin primarily to the College of Surgeons, which opened, in 1697, an anatomical theatre in Surgeons' Square. At first, the duty of teaching was entrusted to a number of "operators," as they were called, who carried through their course of instruction in a period of ten days. In 1705, this system was changed, and the surgeons appointed Robert Elliot as their teacher or "Public Dissector of Anatomy." The Town Council, however, who had the sole right of creating professorships within the city, made Elliot a professor, with the munificent allowance of £15 sterling per annum. The surgeons never employed this designation in their records, though the Town Council in their minutes always referred to Elliot as Professor of Anatomy. Adam Drummond was later appointed professor along with him, and, on the death of Elliot in 1716, John M'Gill shared the appointment with Drummond, the two men being styled by the Town Council as the "Conjunct Professors of Anatomy in this City and College." In 1720, however, Drummond and M'Gill resigned their conjoint "Chair," and recommended to the Town Council as their successor Alexander Monro, who, at the age of twenty-two, was appointed professor on terms similar to those of his predecessors.

He commenced his lectures in Surgeons' Square with a class of fifty-seven students. By his bril-

liancy and fame as a teacher he soon attracted men from all parts of the country. In 1725, the Town Council admitted him within the walls of the University, where he founded the Anatomical Department. The number of his students increased to 182, which was the maximum attained during his tenure of the Chair. Monro *primus* was largely instrumental in establishing, along with Lord Provost Drummond, the Royal Infirmary, the building of which was begun in 1736. He also inaugurated a Medical Society, from which the Philosophical Society developed, this in turn being the immediate parent of the Royal Society of Edinburgh, which received its charter in 1783. After thirty-five years of teaching, Monro resigned in 1755, in favour of his son.

Monro *secundus*, who was twenty-five years of age at the time of his appointment, surpassed his father both as a teacher and as a man of science, and his class of anatomy increased to 436 members. He raised the reputation of the Chair, so that it came to be regarded as one of the first in Europe. Though the second Monro lived in a period of great men in medicine, such as Cullen, the Gregories, Joseph Black, and the Rutherfords, he held his place intellectually and socially, and was the acknowledged head of the medical school. He continued teaching until 1808, a period of fifty-three years, though, after 1798, his son was associated with him as co-professor.

Monro *tertius* was, like his father, twenty-five years old when he was elected in 1798. Although he lacked neither ability nor accomplishments, he failed as a teacher to maintain the reputation of the Chair at the high level which it enjoyed in the time of his father and grandfather. After teaching for forty-eight years he resigned in 1846, when he was succeeded by John Goodsir, then thirty-two years of age. It was during the time of the third Monro that the fame of the Edinburgh Anatomical School passed

into the hands of the extra-academical teachers, when first Barclay, and then Knox, attracted to their lecture-room many hundreds of students.

Robert Knox, the pupil and successor of Barclay at Surgeons' Square, proved so successful that his class attained an unprecedented size even in Edinburgh, numbering in one session 504 members. His popularity, however, began to wane in 1836, possibly due in part to the association of his name with the Burke and Hare murders, and partly to his intolerance of the opinions of others, which he slighted, regarding his own views on anatomical matters as alone worthy of consideration.

From the appointment of Monro *primus* to the University Chair in 1725, to the death of Goodsir in 1867, a period of one hundred and forty-two years, the Chair of Anatomy, one of the oldest in the country, was in the occupation of four men only, three of whom, prior to their promotion, had filled for a space of time the office of assistant to their predecessor. The history of the Chair, previous to and including the appointment of Turner, furnishes strong evidence of the success attending the selection of young candidates for professorial positions. Our forefathers showed a wisdom which has not always distinguished their successors in whose hands lies the filling up of University and other teaching appointments. The tendency of the present day leans too much towards attaching undue weight to seniority as a mark of distinction in the selection of candidates.

Turner took up his professorial duties fully conscious of the honourable position to which he had been chosen, and duly recognising the responsibilities which had devolved upon him. In addressing his class for the first time, on 4th November 1867, he said—

> The past history of this Chair is one upon which we may look back with pride. Worthily to tread on the path pur-

sued by those who have gone before may well serve as an object of ambition to the anatomist. To conduct the study in that comprehensive spirit which has characterised the teaching of former professors, and to strive to reach their standard of excellence, must ever be a matter of duty. To teach not only those facts in our science respecting which there can be no question, and on which dogmatic speaking is permissible; to show in what direction progress is possible and can be made; nay more, to induce some, perhaps, to act as pioneers in opening up paths as yet untrod, is incumbent on him who fills the Chair of Anatomy in this great University.

If that golden rule, which ought never to be lost sight of by one holding the responsible office of a teacher, be ever kept in mind, that the value of a course of instruction depends not only on the importance of the subject, but on the truthful spirit in which it is taught, then one may hope that, when in future years you recall the hours spent on the benches of the anatomical theatre, or by the tables of the dissecting-room, each of you will be able to say: "There I acquired knowledge, there I treasured up facts, which have stood me in good stead at many a difficult and anxious stage of my professional career."

The Edinburgh method aimed at something more than the teaching of anatomy as applied to medicine and surgery. Criticism has sometimes been passed that the subject was not sufficiently placed before the student from the latter point of view, but such criticism is hardly justified by an examination of the whole scheme carried out in the Department. The study of the structure of the human body was pursued along two lines, the synthetical and the analytical. Turner in his lectures followed the first, and proceeded along the lines adopted by his predecessors, and commenced with the description of the bony skeleton or body framework. The position, shape, and structure of the bones were first noted, and their mode of articulation and movements at the various joints were discussed. The bones were clothed with the muscles whose attachment, structure, and action were next inquired into. The arrange-

ment and distribution of the blood and lymph vessels and the nerve supply were considered, and finally the structure and arrangement of the internal organs and the general body covering were examined. Man's place in nature and the process of his evolution were duly illustrated by appropriate reference to comparative anatomy.

A wider conception of the structure of the human frame was thus acquired. Teaching along such lines was a means of developing the general medical education of the student, and gave him a sounder grasp of the general principles of anatomy and its allied sciences. "As the basis of the biological sciences, the structure of the human and animal frame must be constantly appealed to in all attempts at classification; in all inquiries into the adaptation of parts to special means and ends; in all discussions respecting the manifold functions which they carry out in health, and the alterations and disturbances in these functions which take place in disease."

Turner looked upon anatomy as holding a foremost place in the system of medical education, because, by its study, "the habit of observation is cultivated in order to see truly and completely the objects to be examined. Further, judgment must be rightly employed so as to interpret these appearances. The habit of comparison must be acquired when one structure is contrasted with another; reflection must be exercised in order to draw correct inferences regarding the uses of organs and the part which they play in the economy of the whole, while the spirit of speculation may be indulged in respecting the origin of the forms and their place in nature. When these mental qualities have been developed by a study of the normal, the student is better fitted to approach the study of disease, to recognise when the organs get out of repair, and when the functions which they perform in health have become altered or suppressed."

In the demonstrations instituted a hundred years

before by the second Monro, the analytical method of inquiry was adopted, and the study of anatomy, from its medical and surgical aspects, was thus provided for. The surface landmarks were carefully noted, the integuments were then removed, and the muscles described as they were brought into view, while the position and relations of the blood-vessels, nerves, and various organs were studied, and finally the bones and joints were laid bare. To confine the teaching of anatomy to the method of analysis alone must necessarily cramp the outlook of the student, and deprive him of the means of acquiring the wider intelligence. Turner has thus expressed his views in no uncertain manner :—

> It is an erroneous conception of the science which could never have arisen in a University system of teaching, which must acquire a breadth and comprehensiveness such as is scarcely attainable in the more purely technical schools. A knowledge of the topographical relations of parts and organs does not embrace the whole science of the subject. Such a limited conception of what is meant by the term anatomy, and what ought to be included in its teaching, is most unphilosophical. Here, where the tradition of the character of the teaching of the second Monro still lingers in the school; here, where John Goodsir propounded the science in its manifold relations, it would be an act of treason to the memory of these great men, and to the whole history and development of our school, for one moment to entertain it.

With regard to the value to be derived from the study of anatomical detail, Turner was never in any doubt. His sympathies were not with those who argued that the minutiæ of topographical anatomy acquired by the student with so much labour and toil, and which were so soon forgotten when the examination ordeal had been successfully passed, were of little use to the busy practitioner.

> Of the shoals of wranglers that Cambridge has sent out during the last quarter of a century, how many, except those who may be following mathematics as a business, have pre-

served any accurate recollection of the scores of mathematical details which they had at their fingers' end at the time of the examination? And yet are we to say that they derived no mental profit from their study? How many of the Class men that Oxford has trained during the same period, always excepting those who are scholars by profession, could now write Latin verses, explain the distinctive characters of the Greek language, or even read a Greek play without the aid of a Lexicon?—and yet have not these men improved in taste, in the power of using their own language, and in literary expression, by the cultivation of the ancient classics?

How long do students retain in their memories the dimensions of the epithelium and other cells, the breadth of nerve fibres, and other fine details of histological study? Who amongst busy practitioners remembers the volume of the different gases, or the atomic weights of any but the most common of the elements? What use in practice is a minute knowledge of the chemical constitution of muscle? What is the need to the great bulk of practitioners of being able to discriminate between the characters of the different kinds of cinchona bark or of aloes?

And yet is it to be said that because all these minute details have no direct practical application, and are so soon forgotten, that it is useless ever to learn them, and that the time and labour they have occupied have been wasted? Is not a knowledge of these things, temporary though it may be, evidence of a power of continuous application and of mastering facts? Is it possible, indeed, to obtain a sound general conception of any science, or other subject of study, unless the details are gone into and understood? I could tell you of more than one instance in which men have gone utterly wrong in their enunciation of what they thought were general principles, simply because they had not taken the trouble to master the details. Depend upon it that, whether you learn or do not learn, in the minute details of the more important subjects of study lies the difference between slipshod information and that kind of knowledge, the possession of which makes a man feel that he is treading on firm ground and not on the shifting sand.

Turner's teaching was distinguished by clearness of thought, combined with lucidity of exposition. Many men possess as thorough a knowledge of their subject as he did, and think that they have no difficulty in

explaining it to others, but in the minds of their hearers a very different feeling may have been produced, and they may be conscious of having obtained only a confused idea of what has been laid before them. This could never be said of Turner's exposition, as he combined the faculty of thought and speech in no ordinary degree. His "clear thinking" was not confined to the lecture-room: it was a habit of mind which came quite naturally to him, and was equally noticeable in conversation, however simple the matter under discussion might be. To those of his audience to whom the subject was already familiar, it sometimes appeared as if he were unnecessarily elementary in the way in which he placed his views before them or told his story, but there could never be any doubt as to what he meant. In his teaching he seemed to adopt the principle that even the simplest fact was worth explaining, and that it was preferable, if one wished to be lucid, to assume that the audience knew nothing whatever of the matter. He trained himself to teach, and his subject undoubtedly lent itself to the acquirement of precise and accurate statement. The main features were emphasised, often by repetition in a slightly different form, while the details were not unduly enforced, so that no blurring of the mental picture resulted.

Every lecturer has his own style and method of delivery, which soon become recognised as peculiar to him. It is, indeed, a part of his individuality, and, if not too pronounced, may increase rather than detract from the impressiveness of his teaching. It may be justly said of Turner that he was free from any affectation or mannerisms. He lectured without notes, which allowed him freedom to move about the area of the theatre and handle the various objects required for illustration. A certain hesitancy frequently characterised the commencement of his description, but as he warmed to his subject this disappeared, and his sentences, marked by clearness of utterance, never

failed to reach the ears of his students. He did not address his audience directly, being in the habit of looking closely at the object which he was describing and, from time to time, directing his glance upwards at the men seated on the benches in front of him. One of his favourite expressions of speech was the use of the words "no dubiety," and curiously enough he was not aware, at any rate for many years, that the phrase had come to be regarded by generations of students as his particular property. They were always greeted with a round of applause, and we have a suspicion that latterly he purposely avoided using them. Their association with him has been permanently recorded under his portrait in the clever series of imaginary figures for the M'Ewan Hall niches, drawn by the late Mr John Wallace, known under the pseudonym of "George Pipeshank." Here Turner is represented holding a skull in his left hand, while his figure rests against a whale, the caudal appendage of which is embraced by his right arm.

Turner took endless trouble in the preparation of his lectures, and his specimens, diagrams, and blackboard tables were arranged under his own immediate supervision. The hour preceding the one o'clock lecture was devoted to this object, and he refused to be disturbed by outside matters and callers during this period. He left nothing to chance, and he took every precaution to make his lecture a success. He exercised the same care on other public occasions, as, for instance, when he had to make an important speech. His old assistant, Professor Arthur Thomson, recalls an incident at the time of the University Tercentenary Celebrations. It had been arranged that Turner should make a speech at the luncheon which was given in what is now the Anatomical Museum. Shortly before the appointed hour he took Thomson into the Museum and directed him to take up different positions in the hall while he selected the spot where he was to be seated and proceeded to deliver sundry

sentences and sentiments, afterwards ascertaining from Thomson how his voice carried. That he regarded a good voice and a clear enunciation as important assets in teaching is illustrated by the following incident. When Arthur Thomson's appointment as Senior Demonstrator hung in the balance, Turner requested him to stand at the table in the area of the lecture theatre, while he himself climbed to the back bench and listened to Thomson's exposition, a somewhat trying ordeal for the youthful demonstrator, but evidently quite satisfactory, as proved by his selection to the post.

His class discipline was excellent. "My class has always had the reputation of being an orderly class, and I will see that that reputation is maintained," was the rebuke which he administered on one occasion when an excess of exuberant spirits manifested itself. It became a tradition in the school that it was no use making a disturbance at the anatomy lecture. Consequently there was no rowdyism, and woe to the unfortunate man who attempted to break down the tradition. Discipline was not maintained either by bullying or by expostulation. The method adopted, if the occasion arose, was simple and effective. The lecturer fixed his gaze upon the delinquent, and it was not relaxed until silence was restored or the misdemeanour readjusted. The sympathy of the class was with the Professor. The following anecdote illustrates Turner's happy method of dealing with the situation. On one occasion he had commenced to lecture upon the bones. High up on one of the back benches, a student, to whom the dried bones made no appeal, was comfortably occupied reading the daily newspaper. Turner soon had his eye upon him. "Gentlemen, we commence the study of the bones; this is a long bone which I hold in my hand; it has a shaft and two extremities." A brief pause ensued and the Professor's voice repeated: "This, gentlemen, is a long bone with a shaft and

two extremities," and he continued to fix his gaze upon the all-unconscious offender. "Gentlemen, once more I repeat, this is a long bone with a shaft and two extremities, and if the gentleman who is so deeply interested in the news of the day will kindly attend to the lecture, I shall continue, but not till then." An impressive silence followed, broken only by the sound of the crumpling up of the newspaper, while the young man, now doing his best to look unconcerned, endeavoured to hide himself behind his neighbour. The lecture then proceeded without further interruption.

Certain of his lectures retain a more permanent hold upon the memory than others, notwithstanding the passing of the years. The introductory at the commencement of the winter session was one of these. Possibly the feeling that we were in the presence of a strong personality, that the facts which were being laid before us, concerning which there could be "no dubiety," were sufficient to stamp them upon the memory; but in addition, there was the masterly manner in which the lecturer, commencing with the lower forms of life, sketched the development of the vertebral column or spine, and, demonstrating the changes in its shape and curves, and the attachment of the limbs to it, as he passed up the scale in mammalian development, concluded with the words, "Man alone stands and walks erect."

His lectures upon the brain always proved an attraction. The more difficult the subject, the greater his skill in rendering it simple to the minds of his audience. The lecture-room in the University New Buildings, with accommodation for nearly five hundred students, was, in the eighties, when the Medical School was at its zenith, crowded far beyond its seating capacity during this part of the course.

His power of holding the attention of an audience of experts in the exposition of a difficult subject was well illustrated in his address upon "The Compara-

tive Anatomy of the Convolutions of the Brain," which he delivered before the members of the Anatomical Section at the International Congress held in Berlin in 1890. He carried his audience with him through an intricate argument in such a masterly manner that the success which attended his efforts was the subject of eulogy on the part of those who listened to him. An amusing incident connected with this lecture is related by his old prosector, William Turner, afterwards a well-known surgeon at Gibraltar, who was also present at the Congress. On the morning following, while the latter was still in bed in his hotel in the Unter-den-Linden, he was visited by a German professor, who demanded an interview without delay. So urgent was the message that William Turner felt obliged to see him at once. The professor begged his permission to copy some of the diagrams which had been hung up to illustrate the lecture of the previous day. He was politely assured that so far as he (Turner) was concerned there would be no objection whatsoever, but that unfortunately the diagrams did not belong to him. The discomfited professor was therefore obliged to retire a sadder and, we trust, a wiser man.

Turner's work in the dissecting-rooms brought him into more intimate touch with his students than was possible in the lecture theatre. They met each other more in the relation of fellow-workers in a common cause, than in that of teacher and pupil. The sense of inequality which the rostrum or the platform seemed to inspire, and which produced the impression as of "a great gulf fixed" between teacher and taught, disappeared to a large extent when all met on the floor of the "Rooms." Here, as he passed from group to group, he had the opportunity of observing the men at their work, of appreciating their difficulties, of assisting them with friendly words of encouragement, and of listening to their views. Statements of facts and expressions of opinion were

not confined to one side alone, and criticism was not only possible, but welcomed.

It was in the dissecting-room that the student occasionally obtained a glimpse of that sense of humour of which Turner had a large share, though it was usually concealed from his class behind an attitude of seriousness and gravity. The following anecdote illustrates how ready he was to poke fun at some keen dissector, who was anxious to bring to his notice an anatomical variation which he felt sure would interest the professor, and perhaps, at the same time, interest the professor in him. Two dissectors, busily engaged in unravelling the muscles of the fore-arm, thought, in their inexperience, that they had discovered some unusual arrangement in certain tendons of insertion which might possibly reveal an interesting abnormality. "Well, young men, how are you getting on?" Turner inquired genially as he reached their table. They exhibited their specimen with no little pride and awaited the verdict. He gave it a keen look and paused, then, with a twinkle in his eyes, thus expressed his opinion: "The abnormality is on the part of the dissectors; Nature very seldom makes a mistake. Clear it up, gentlemen, clear it up," and he passed on to the next table, chuckling at their discomfiture.

Turner introduced a series of practical examinations, which had a very stimulating and inspiring influence upon the men in their study of anatomy. They became extremely popular, and the competition was very keen. Five examinations were held during the winter session. They were not conducted *in camerâ*. The class was subdivided into sections of fifteen or twenty men, and each member of the section was shown a specimen and questioned in the presence of his neighbours. Each man, therefore, knew the failure or success of his companions, and towards the close of the session the interest in the final results steadily increased, and excitement ran

high as to the prospects of the successful candidates passing through the ordeal of the final examination. Turner knew equally with his class who were leading. It must, at times, have proved difficult for him to formulate questions of similar value for the successful men, but his sense of justice and fairness carried him through his difficulties without arousing adverse comment. On more than one occasion, the final results were arrived at only by submitting the same question to each of the rival candidates individually and separately, so that there might be no possibility of one man obtaining an advantage over his neighbour. It can readily be understood that examinations of this kind taxed both the mental and physical energy of the examiner, but Turner never spared himself on these occasions, believing, as he did, in the benefit which the student derived from his system.

As an examiner he never failed to give the most conscientious attention to those on the border-line, or to those who, by superior talents, merited distinction. His well-balanced judgment in such cases was proverbial. Turner has thus expressed himself on the question of competitive examinations :—

> Some educationists hold that the system is thoroughly bad, and that students should apply themselves without this incentive. Such, however, is the inherent inertia in human nature and in students, that it often needs great stimulus to bring young men forward. Experience proves that competitive examinations are a marked stimulus in educational training. Those who object to the system have never proposed a better one. Preparation for examination is an important mental discipline. It enables the student to trace his or her progress by comparison with others. The striving to be as one's neighbours is an educational weapon. Sluggish contentment is the enemy of all progress in individuals, institutions, and communities.

He succeeded in impressing upon his class the advantages which would accrue to his study of Anthropology if he could obtain the necessary material.

In consequence of this, he was able to bring together a very large and valuable collection of crania from all parts of the world, a considerable portion of the collection being the gift of his old students, who, when scattered over the globe in their several occupations, did not forget their old teacher's enthusiasm for scientific material. His own keenness as a collector nearly led Turner, on more than one occasion, into difficulties. When spending a summer vacation on the shores of Loch Goil, one morning he was leisurely steering his boat within a short distance of the shore, when his quick eye detected a seal asleep upon a neighbouring rock. He at once seized an oar, and, without waiting to consider what the depth of the water might be, he sprang from the boat, and, with oar uplifted, advanced towards the rock. The noise of his approach, however, awakened the animal to the imminent danger of its position, and in a few moments, with a glide and a flop, it disappeared beneath the surface, and the hunter was deprived of his quarry.

His passion for collecting skulls might, on one occasion, have led him into difficulties with the French authorities, if good luck had not favoured him in his enterprise. While touring through Brittany with two of his sons, he made up his mind that, if the opportunity presented itself, he would enrich his museum by acquiring one or more Breton crania. He was well aware that in the little stone buildings placed in the corner of the graveyards, and used as tool-sheds by the gravediggers, it was the custom to place the bones turned up from the soil during the preparation of fresh graves. One morning the occasion presented itself, and the three travellers, having descended from their carriage, which they left at some little distance, sauntered as unconcernedly as possible into the graveyard and approached the tool-house. In the far corner of the enclosure two men were busily engaged in digging; they took little

or no notice of the visitors, to whose presence, possibly, they were not unaccustomed. A few moments sufficed for the acquisition of the spoil, which was speedily concealed within the folds of two umbrellas, and the party left, outwardly calm in demeanour, but extremely anxious for a rapid and safe return to their hotel.

Turner's influence for good upon his students was established upon a wider foundation than that of a teacher in the lecture-room. There he taught them a knowledge of anatomy, there he inculcated the importance of correctness of observation, of accuracy of thought, and of clearness of order and method—lessons of supreme moment to them in their life's work, far beyond their mere application to anatomical study. But his personality was to them an object-lesson of untiring industry and of indomitable perseverance and patience, and a striking example of how success was to be obtained, not by spasmodic and meteor-like outbursts of work, but by careful and continuous mental application. The example of his life appealed to them. Work and duty were his watchwords, and the men who failed to appreciate this aspect of his character had learned only half of what Turner could teach them.

He stood as the embodiment of dignity and honour. Always courteous and gentlemanly, he dealt kindly with his students, and if, as happened at times, a man felt at the moment that he had been somewhat hardly used, reflection would lead him to realise that he had been treated with justice and fairness. He possessed a wonderful knowledge of the character of his pupils; he knew both their weak and their strong points, and some of them would have been surprised had they realised how his shrewd insight had discovered some of their little failings which they had no reason to suspect that he knew anything about. He took a very real interest in the welfare of his

students, and many can recall little acts of kindness received at his hands. They recognised that behind a somewhat austere manner there was a strong vein of human sympathy. What he did for them was done in a quiet and unostentatious way, for Turner never courted popularity. On one occasion, recognising the absence of one of his pupils, and fearing that illness might be the cause, he ascertained the address of his lodgings, and sent his Senior Demonstrator to call and find out the nature of the trouble. On another occasion, observing that a member of his class looked ill, he sent for him, inquired into his condition, and strongly urged upon him the necessity of a holiday. Turner commanded not only the respect but the affection of his students, the respect founded upon his integrity and sense of justice, the affection based upon his loyalty and human kindliness.

The following incident exemplifying his kindness of heart is related by one who afterwards became a member of his staff of demonstrators and Professor of Anatomy in one of the English schools. At the close of the anatomical lecture, many of the students had crowded round the Professor's table in order to examine more closely some models on which Turner set considerable value. Mr Z., in endeavouring to obtain a better view, managed to tilt the table so that two of the models fell to the ground and were broken. The members of the class at once expressed their feelings of disapprobation in no uncertain manner, thus making the unhappy student extremely uncomfortable. Turner said nothing. Shortly afterwards Mr Z. nervously entered the retiring-room in order to make his apologies. When he had finished, Turner looked at him and said: "It was you I felt sorry for, Mr Z." There was no rebuke, no recrimination. Mr Z. never forgot his first personal interview with his future chief, and he has always cherished the memory of that meeting.

Turner was ever indulgent in his attitude towards

those of his students whom he found turning their minds seriously towards the study of Anatomy; to them his encouragement and help were generously given.

I shall not readily forget the stimulus which I received from him in recognition of my zeal when acting in the capacity of his prosector [writes William Turner (already mentioned)]. Although the incident occurred nearly half a century ago, it is still as fresh in my memory as an occurrence of yesterday. I had to prepare a somewhat elaborate dissection for the lecture upon the following day. I worked at my task from midday all through the afternoon and evening, and when I had completed it I found it was nine o'clock. It was now dark, and to my horror I found that the door of exit had been locked and that I had no means of getting out. Eventually my calls for assistance were heard by a janitor who was making his evening round of the quadrangle. When listening to the demonstration upon the following day, I felt more than fully repaid for all my trouble by hearing the Professor's highly eulogistic pronouncement to his audience of my handiwork. On another occasion I was asked to draw upon the blackboard a large outline of the hand, and fill in, in coloured chalks, a representation of the blood-supply of the hand and fingers. I took as a model my own hand, and I spent considerable pains upon the drawing. Before the lecture, Turner looked at it, first from one side and then from another, and turning to me he said: "I wonder whether it is possible that you may be related to the great artist of our own name?"

Turner used to speak of his pupils as his "family,' drawn from all parts of the world, and he considered himself very fortunate in the family, which numbered many thousands. When he was touring in Canada and the United States in 1897, he was constantly reminded of the widespread character of these family ties. Whether in Quebec or in Montreal, in New York, at Niagara, or in the Adirondacks, members of the family frequently appeared and reintroduced themselves to his notice: had his journeys led him to India or to Africa, to Australia or to New Zealand, the children would have been there to greet him. When the grandchildren began to come to his class, as in

due course they did, his pleasure was further intensified. While he gave much of his best to them, he was fully conscious of what they gave him in return. He realised that perpetual contact with fresh youth, year by year, had contributed to maintain his own mental vitality. Brought into touch as he was with young minds, expanding and opening out into fresh fields of activity, he was put upon his mettle and stimulated to meet their expansion, and, in this way, the young men parted with a portion of their youth and gave it to those who were their seniors. This he regarded as one of the greatest pleasures which a teacher could have.

His wonderful memory enabled him to recognise, often without the least hesitation, men who had been his pupils many years before, and whom he had not met in the interval. Numerous examples might be cited in illustration of this. The power of recognition is a valuable asset and is one that may be cultivated, but it is not given to many as a natural gift. He possessed, too, the faculty of recalling the name of an individual by recognising the tone of the voice. This was the more remarkable in him, as he had no ear for music, and could not retain in his mind any tuneful refrain. On one occasion he was conversing with a member of his staff in his retiring-room, the door of which was ajar. In the corridor a voice was heard inquiring whether Sir William was in the Department. Turner at once looked up and said: "That must be Dr ——, I know his voice. I have not seen him for twenty years."

Evidence of the high esteem in which he was held by his pupils and of the affection which bound them to him, were demonstrated more than once during his long tenure of the Chair. Probably one of the most remarkable demonstrations of the mutual goodwill and sympathy which existed between Turner and his class was witnessed when, in March 1886, it was announced



LADY TURNER.

[From a photograph by J. MOFFAT taken in 1893.

that he had received the honour of Knighthood. He had no idea that such a distinction was under consideration, and the first intimation that Lord Salisbury had placed his name before the Queen was conveyed to him in a letter from the Lord Advocate, Sir John H. A. Macdonald. Those who were present in the Anatomical theatre on the occasion of his return from Windsor cannot fail to remember the scene when Turner entered the class-room, which was densely crowded with an enthusiastic and cheering audience. When silence had been obtained, James Lorrain Smith, a member of the class, now Professor of Pathology in the University, read the following address of congratulation, signed on behalf of the Anatomy class by members of the Students' Representative Council of the first year of Medicine :—

> We, the students of the Anatomy class of the University of Edinburgh, have learned with the greatest pleasure that Her Most Gracious Majesty, Queen Victoria, has conferred on you the distinguished honour of Knighthood.
>
> It is the feeling of the Class that none but your own students can know how eminently worthy you are of this great honour, and we are emboldened to address to you our most hearty congratulations.
>
> We hear men, eminent in Biology, acknowledge you to be unsurpassed in your scientific powers and attainments, and of this we are highly proud. We, however, speak with authority when we tell you of our affection for you and of our confidence in you as a teacher. It is felt by all of us that none of the intellectual privileges which we enjoy in this great University are to be put above the introduction to Medical Science which we receive at your hands, an introduction unique in its combined depth and lucidity.
>
> We would express our indebtedness for the splendid equipment for medical teaching which you have, with unceasing care, provided for us, while we also acknowledge the distinguished services to scientific education which have brought you this latest honour.
>
> We trust that, for a long time to come, you may be enabled to continue the work in which you have been so worthily engaged for thirty-two years, and that our

successors may have many further opportunities of rejoicing with you as we do now.

Presented on behalf of the Anatomy Class,
Edinburgh University, March 1886.

Sir William, considerably affected by the warmth of the demonstration accorded to him, made the following reply:—

Mr Lorrain Smith and Gentlemen,—I have been reminded in this address of the number of years that I have served the students of the University, thirty-two years, a large slice out of one's lifetime. On many occasions I have had the pleasure and gratification of receiving from your predecessors expressions of their good feeling and goodwill towards me, but so absolutely overpowering a demonstration as you have given me to-day I certainly never dreamed of being a party to. I little thought that there would have been so strong a feeling amongst the students of this University as you have just given expression to in connection with the honour, the distinction, which the Queen has been graciously pleased to bestow upon me. I am happy to think that this action of Her Majesty is so thoroughly understood by those of you amongst whom I spend my daily life, and who have, therefore, the best means of knowing the kind of work that one performs daily. When a communication was made to me a few weeks ago by the Member for the University, then Her Majesty's Lord Advocate for Scotland, that it was intended to submit my name to the Queen for the distinction which has just been conferred on me, it was put to me in this form, that it was desired to show some recognition, if I may so say, of the University and of the work that was being done in the University, by conferring a distinction upon one of its Professors. Thus, I look upon this matter not merely as a distinction conferred upon me personally, but also as evidence of the desire that the University should, so far as a matter of this kind can show it, have some public recognition. I felt, therefore, that it was my duty as one of the teaching staff to accept at once and without any hesitation or dubiety the honour which it was proposed to confer upon me. You have now received me, and received me in a way such as certainly, when I came down from London last night, it never for one moment occurred to me would be characterised by the extraordinary enthusiasm which you have displayed, and, as I

have already stated, it is the most complete endorsement of what has been done that could possibly have taken place. Looking back more than thirty-two years, looking back to the days when I was a schoolboy, I recollect that, when any great event occurred, it was always expected that the occasion should be celebrated by what is called a holiday. I do not know whether you are sufficiently advanced beyond the schoolboy age as to feel that I should be—well, not sufficiently recognising your manhood, if I abstained from suggesting that, on this occasion, I would follow out the old schoolroom example, and so, with your permission, we will not have a lecture to-day. You can easily imagine that it would be no very easy task for me to enter into the details of an anatomical description after the state of mental exaltation in which this reception has placed me, and accordingly you will, I hope, allow me to defer what I was intending to say upon the anatomy of the spinal cord. I have only to thank you for this marvellously warm reception, and, with your permission, I shall say good-bye to you until to-morrow.

The news of the distinction conferred upon him gave the greatest pleasure to his friends, and he was the recipient of many congratulatory letters. A letter from his friend Mr William McEwan, M.P., is not without interest as an expression of his opinion regarding the general distribution of honours.

LONDON, *March* 1886.

I see from 'The Scotsman' that you are home, and met yesterday with an enthusiastic reception from your students. Am I not a true prophet?

As they feel, so will all right-minded men who know you, feel in regard to the honour which has been conferred upon you. As to what the small-minded and envious may feel, you need give yourself no concern, for such people are really of no account in the grand movements of the world.

When I see distinctions thrown about with reckless profusion, and nobodies attempting by their aid to become somebody, it is a positive pleasure and relief to see modest merit recognised.

No act of the late Government has given me so much pleasure as the conferring of this honour upon you. I hope to see you soon, and with kindest regards and best wishes, I am,

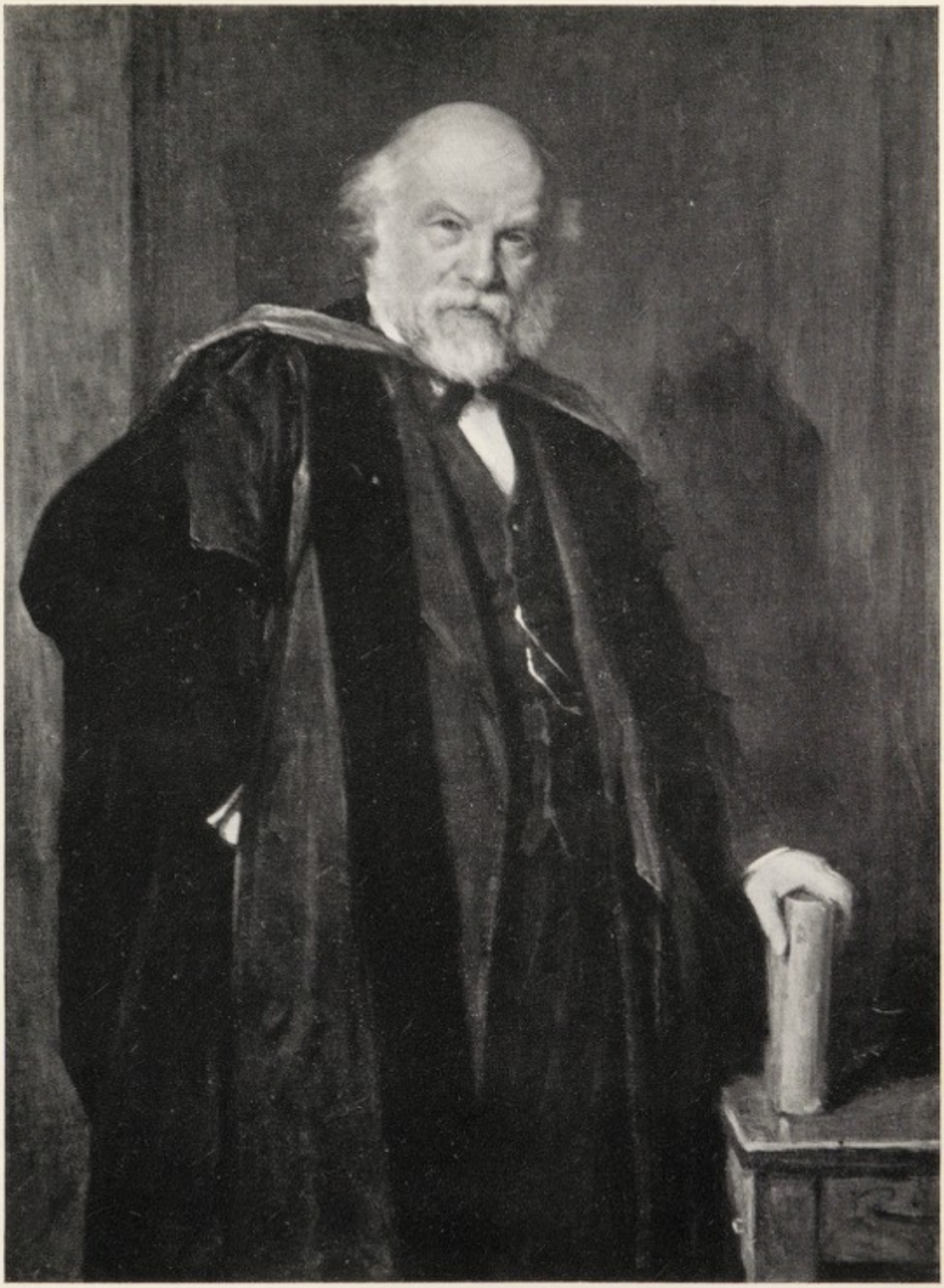
WM. MCEWAN.

The further distinction of Knight Commander of the Order of the Bath was bestowed upon him by Her Majesty Queen Victoria, in December 1900. Owing to the death of the Queen early in the following year, he received the insignia of the Order at the hands of King Edward VII., on February 13, 1901.

Evidence of the esteem and affection in which he was held by his colleagues and former pupils was again demonstrated in April 1895, when they presented him with his portrait, painted by Sir George Reid, President of the Royal Scottish Academy. The portrait, a three-quarter length, depicts Sir William in academic robes, standing in an attitude somewhat characteristic of him when teaching, with which Sir George had familiarised himself by more than one visit to the lecture theatre. The picture shows Reid's work at its best.

The presentation was very appropriately made in the anatomical theatre in the presence of a large gathering of colleagues and friends. Sir James Russell, who, along with Professor Cunningham and Professor Chiene, had formed the portrait committee, occupied the chair. The chairman expressed the feelings of his audience when he said that they were grateful to Turner for his conspicuous services to their *Alma Mater*. They were tied to him by gratitude for what he had done for themselves, for his kindly offices of friendship, assistance, and wise counsel, and they were all bound to him by feelings of regard which had increased with years.

Sir William, in accepting the gift, reminded his friends that the period of the year selected for the presentation of the picture was of special significance to himself. It was the month in which he had been married, and it was the month in which, twenty-eight years before, he had been called to the Chair of Anatomy. The occasion, he felt, was a fitting one for him to acknowledge publicly the honours which he



PROFESSOR SIR WILLIAM TURNER.

[From the painting by the late Sir GEORGE REID, P.R.S.A., presented in 1895 by his colleages and old pupils.

had received from his colleagues, and the confidence which they had always reposed in him. They might think that he was biassed by his professional pursuits, but he had sometimes thought that a sound anatomical education, if there was added to it some experience in the teaching of the subject, was one of the very best preparations for a business career. There was nothing which conduced so much to methodical and orderly habits of classification and arrangement of facts, to clearness of thought and precision of expression, as a course of teaching of anatomy. It had been a source of pleasure to him to see old pupils and assistants taking an active part in public life, and he could cite no better example than that of their chairman, who had been chosen by his fellow-citizens to occupy the highest civic appointment, and they knew how thoroughly, conscientiously, and well he had filled it.

One or two of the numerous letters which he received on this occasion may appropriately be quoted here. The pleasure which the "sittings" afforded to Sir George Reid was shared by Turner, who found the tedium of posing, sometimes for two consecutive hours, very much lightened by the conversational gifts of the painter. As an anatomist, too, he was particularly interested in the way in which Sir George worked upon his picture.

22 Royal Terrace, Edinburgh,
April 3rd, 1895.

Dear Sir William,—Many thanks for your kind note. I am glad to learn that everything went off so well yesterday afternoon, and that your friends were all so well pleased with your portrait.

The sittings were very pleasant, and I felt a touch of regret when they came to an end. I did sometimes feel very sorry for your poor backbone.

I tried to spare it as much as posssible.

We have had influenza victims also, and we are still rather poor creatures. I hope you will have a pleasant holiday.

G. W. Reid.

TRINITY COLLEGE, DUBLIN,
March 31*st*, 1895.

MY DEAR CUNNINGHAM,—Will you kindly express to the meeting of the Turner portrait subscribers my regret that I cannot assist in person at the presentation.

During our Tercentenary celebration in Trinity College in 1892, it occurred to a distinguished Scotsman to proclaim in Dublin that he was an honest man. No one doubted the fact, but we all doubted the good taste of the declaration, and none more so than Sir William Turner, who roundly asserted that he also was an honest man.

It fell to my lot to explain this difficulty, and to state the opinion of Trinity College that they were both honest men.

The highest of all authority is in favour of a blend of the wisdom of the serpent and the harmlessness of the dove, say 90 per cent harmlessness and 10 per cent wisdom. This appears to me about the composition of our dear friend Sir William, whom may God bless and preserve "ad multos annos."

SAML. HAUGHTON.

28 RODNEY STREET, LIVERPOOL,
April 1*st*, 1895.

MY DEAR CUNNINGHAM,—I am sorry that I cannot come to-morrow to the presentation. The truth is I am commanded to London by a certain painter, who is doing my portrait for my old pupils, to be placed in University College here. I therefore sympathise most heartily with Sir William, both in the pleasure which he must feel at this gift from his students, and in the sense of freedom which he must have in being delivered from the painful martyrdom of the "sitter."

My acquaintance with him reaches a long way back, even unto 1859, when I first beheld him helping along our old master, Goodsir—that intellectual and physical giant, whose tottering limbs would scarce bear the burden of his gigantic frame.

Intimate as Turner and I have been and are, I still have, in the background, just the slightest possible shade of awe of him. If one man has ever taught another man the femur, the second man knows that, however close their relations may be, there is a great gulf fixed between them, which will never be bridged over—no, not if they were to live side by side for a hundred years.

Talking of men teaching each other, I remember a curious

little incident at the lunch table of the General Medical Council.

Four men were sitting together. One of them, Matthews Duncan, said, "Turner, I taught you."

"Yes," said Turner, "I did attend your class, and I taught Banks."

And I, turning to the man on my right, said, "Yes, and I taught Hector Cameron."

I have purposely avoided pronouncing a panegyric upon Sir William. Don't we all know him—what he is and what he has done? "A life so arduous and so devoted to duty cannot fail to realise even the dream of Cicero."

W. Mitchell Banks.

Moat House, Dumfries,
March 31*st*, 1895.

Dear Sir William,—I much regret that I cannot be in Edinburgh on Tuesday to be present at the presentation of your portrait.

It is an excellent likeness and does great credit to the artist, who, I think, should be content to go down to posterity on the hem of your garment, as Reynolds said when he painted Mrs Siddons.

I prefer the original to all images, and therefore I wish you to continue with us in health and prosperity for many years to come.

I have just had a very handsome presentation made to Mrs M'Kie and myself from the citizens of my native town.

Thomas M'Kie.

CHAPTER VI.

PROFESSOR OF ANATOMY—*continued.*

Rise and Fall of the Anatomical class—Cosmopolitan character of the University—Turner's Demonstrators—Pupils who became Professsors of Anatomy—Anatomy in the Extra-Mural School—Resignation of the Chair.

A PERUSAL of Turner's class returns reveals the fact that from 1867 to 1903, a period of thirty-six years, covering his tenure of the Chair, 10,500 names were entered upon the roll of attendance at the anatomical lectures. It is necessary to take the returns of the Lecture Class as a basis upon which to estimate the number of individual students who passed through his hands, because they represent more or less accurately the students of the first year. The returns made from the class of Practical Anatomy, on the other hand, include students of the first, second, and third years of medical study, and cannot therefore be used for this purpose. The total of 10,500, however, gives only approximately the size of "the family," because a certain proportion of the men attended a second course. Hence the same name appears more than once on the class lists; some students, on the other hand, worked only in the dissecting-rooms and attended the lectures of one of the extra-mural teachers, consequently their names do not appear in the class returns.

In the winter of 1867-68, Turner lectured in Goodsir's theatre in the University Old Buildings to a class of 210 men. The returns for the practical classes were 217. The numbers increased steadily, until in the year 1880-81, the class reached its maximum figure of 341. It was fortunate that, in 1880, the Anatomical Department in the New Medical School in Teviot Place was opened, because in that year, the number of students working in the dissecting-rooms during the winter session reached the unprecedented total of 633, a figure which was surpassed on only one occasion, when in the winter of 1885-86, 636 names were enrolled. The strain thrown on the teaching staff and on the supply of material for dissection during the days of great prosperity in the Edinburgh School was a severe one, especially in the dissecting-rooms. The lowest attendance registered in the lecture class was in the winter of 1898-99, when the number fell to 179. The minimum number working in the "Rooms" was 207, recorded in the winter of 1900-1.

The study of the comparative figures furnished by the returns from the Anatomical Department during the three decennial periods between 1870 and 1900, is full of interest as throwing some light upon the growth, maintenance, and decline of the Edinburgh Medical School during these years. At the same time, they offer an opportunity for speculating upon the main causes which led, first, to the marked increase, and later on, to a decrease in the number of students entering the School. During the decennial period 1870-1880, 3350 students attended the Anatomical Lectures, thus averaging annually 335, while the average annual winter attendance in the dissecting-rooms during the same period was 420. From 1880 to 1890, 3635 enrolled in the lecture class, while the returns from the practical classes during the winter were never below 500, and in five of the years they exceeded 600. In the decade 1890 to 1900, a very

considerable reduction took place, the returns from the lecture class giving a yearly average of 217, while the average winter attendance in the dissecting-rooms fell to 324. Turner continued to teach during the first three years of a fourth decennial period, when a steady improvement in enrolment again took place.

The number of students who matriculated in the Faculty of Medicine during the same decennial periods may be referred to very briefly, as serving to emphasise the varying fortunes of the University already indicated by the above figures, and, at the same time, it permits of a comparison being made between the enrolment in Edinburgh and that of the Universities of Glasgow and Aberdeen. The students of medicine in Edinburgh more than trebled between 1870 and 1890, when the maximum of 2003 was reached, while during the third decade there was a steady diminution. The Medical Faculties in Glasgow and Aberdeen were passing through a similar experience, and the subjoined table shows the relative position in the three Universities.

TABLE I.

SHOWING NUMBER OF MEDICAL STUDENTS MATRICULATING IN THE THREE UNIVERSITIES.

Year.	Edinburgh.	Glasgow.	Aberdeen.
1870-71	659	320	189
1880-81	1585	563	335
1889-90	2003	800	433
1891-92	(Year of Aberdeen maximum)		472
1893-94	1616	680	405
1899-1900	1364	611	325

(Women students who were required to matriculate in order to obtain the degrees in Medicine and Surgery are not included in these figures.)

Can any explanation be offered to account for the remarkable growth of the Scottish Medical Schools during the seventies and eighties of last century? It

is reasonable to assume that, between 1870 and 1880, the increase was a natural consequence of the demand to meet the growing necessities of the nation. Between 1871 and 1881, the population of England and Wales had increased by more than three million individuals, while in Scotland, in the same period, there was an addition of 375,550. During the eighties, it is possible that still another factor played its part in contributing to the further development of the Schools, which culminated at the end of the decade, namely, the depression in trade. It is interesting to note Turner's own reflections upon the subject, and it is evident from his correspondence that the question was frequently in his thoughts. Writing to his friend, Professor D. J. Cunningham of Trinity College, Dublin, in November 1890, he says: "Our classes are down this year, both in Arts and Medicine. I fancy that the improvement in trade is attracting young men into business rather than into the professions." It is not easy to calculate with any measure of certainty the influence of fluctuations in trade upon men's choice of a career, but the opinion expressed in his letter has been shared by others. Commercial ramifications being so numerous, it is somewhat difficult to determine what basis should be taken for making a suitable estimate regarding trade fluctuations. If the figures dealing with imports and exports into and from the United Kingdom be accepted as an index of trade conditions, then we find that during the years 1880-86, the trade of the country showed a very considerable decline upon the conditions which existed between 1871-80. In 1889, and in the early nineties, a distinct improvement was again manifest. It is possible, therefore, that Turner's surmise as to the effect of varying trade conditions may have some justification.

When we come to consider the continued decline of the Medical School during the third decennial period, it is possible to stand upon firmer ground

and to assign more definite reasons for the same. The Universities (Scotland) Act, 1889, came into operation on January 1, 1890. In the meantime, the Commissioners appointed under the Act, with Lord Kinnear as chairman, prepared and issued certain Ordinances which became operative in 1892. From their nature they were certain to exercise undoubted influence upon the number of men who might be considering the question of studying Medicine. The standard of the preliminary examination in General Education, which was in future to be conducted by the Joint Board of Examiners, was raised. The ordinary course of instruction in Medicine was to be extended from four to five years. Physics was to become a compulsory subject of study and of examination for graduation, and was to be included in the subjects of the First Professional Examination.

The first two changes—one, necessitating a higher standard of preliminary education, the other, demanding an increased educational expenditure and an additional delay of one year before the student was in a position to earn his means of livelihood—would necessarily deter a certain proportion of young men from entering the medical profession. The introduction of Physics into the early part of the curriculum would, in all probability, influence the attendance of first year's students upon the class of Anatomy, as there would be a tendency for them to devote all their time to the subjects of the First Professional Examination.

Writing to Cunningham early in the winter session of 1892-93, Turner again reverts to the question. His class had fallen to 189, the smallest hitherto recorded during his professorship, while the number of first year's students matriculating in medicine was 217.

I have delayed my reply to yours of October 6th until I could say something definite about my winter's class. The entry, although not completed, is now sufficiently advanced to enable me to form an estimate of what it is likely to be,

and it looks as if the fall will be nearly 40 per cent in numbers as compared with last year. This arises: (*a*) from a general diminution in the number of first year's men, owing to the five years' system and the more stringent preliminary examination; (*b*) from the addition of Physics, making the Preliminary Scientific Examination more onerous and keeping men away from Anatomy during the first year.

So far as I can at present judge, it appears as if only the first year's men who are studying Anatomy are those who began Medicine in summer and have disposed of Botany and Natural History, and a few who, having passed the Preliminary Examination before the new statutes came into force, rank under the old regulations.

I am afraid that the effect of the new statutes will be to squeeze Anatomy out of the first year and to throw men into Physiology ignorant of Human Anatomy.

A matter for consideration, therefore, is whether something cannot be done in the way of a short course of Elementary Anatomy to precede attendance on Physiology. I confess that I do not at present see my way to a good arrangement, but the experience of the winter may perhaps help me to a conclusion.

During the three years preceding Turner's retirement in 1903, a gradual improvement took place, suggesting that the School had begun to recover from the first effects produced by the new Ordinances. In 1900, he comments upon the subject in another letter to Cunningham :—

I have now been lecturing for two weeks, and my class is turning out very well; it will be larger than during the last two or three years. It looks as if the schools were now working the boys up to the standard of the University Preliminary Examination. I observe that in London, Cambridge, Manchester, and Liverpool, the numbers are down.

If this inquiry be taken a stage further, we come to the period of development of the modern Provincial Universities of England and to the Irish Education Act of 1908. Although they post-date Turner's professorial life, the subject is not unworthy of attention in its bearing upon the Scottish Universities. The University of Birmingham was founded in 1900, that

of Liverpool in 1903, and in the same year the Victoria University of Manchester was reconstituted. The University of Leeds was founded in 1904, Sheffield in 1905, and Bristol in 1909. The changes brought about by the Irish Education Act had given Ireland in 1909, a University College in Dublin, and had raised the Queen's College, Belfast, to the status of a University. The medical schools of these cities thus came to rank as Universities, and it is reasonable to suppose that they might prove a greater attraction to young men seeking a degree, than they had done in their previous status as Colleges.

In a speech which Turner made to the members of the Manchester Edinburgh University Club after his appointment as Principal in 1903, he dwelt upon the causes of the development of the modern English Universities. Looking back over the long vista of seventy years, he was impressed with the great changes that had taken place in University education in this country. The change was so marked that it amounted almost to a revolution of the educational thought of the British Isles. Instead of there being only the ancient Universities of Oxford and Cambridge, followed by the Universities of Durham and London, there were now the Universities of Manchester, Birmingham, Liverpool, and Leeds, and the College in Sheffield was about to take University rank. What did this mean? It meant that the conception of University education in this country was absolutely different from what it was sixty years ago. It meant that there had been an enormous development of public thought in the matter. It meant that the Universities were to be something more than schools of training for clergymen, barristers, schoolmasters, country gentlemen, and the like. In the old days in England, the Universities, practically speaking, did not touch the great middle class. Where were they to go for a University degree? They went to Scotland, to Edinburgh, to Glasgow, and

some went as far north as Aberdeen. No one had contributed more to the present view of University education and education in England, than the Scottish graduates. It was the Scottish graduate who impressed upon the people of England the necessity of widening their view of University education, and it was the Scottish Universities which furnished the bulk of the teaching staff of the modern English Universities. Here, then, was an example of the influence of the Scottish University on English thought, and for that they had reason to be proud.

Being equipped with complete Faculties of Medicine and granting degrees in Medicine and Surgery, have the new Universities as yet made their influence felt upon the returns of the Edinburgh Medical School? Turner recognised that they would certainly have an effect upon the advent of Englishmen to Scotland. Speaking at Leeds in 1907, he said: "The institution of Universities in so many great English cities will affect the stream of migration from provincial England to London, to Edinburgh, and to the other Scottish Universities. But while we cannot look for the same flow of Yorkshire and Lancashire men to Edinburgh, yet these two counties will find that many young Scotsmen will go southward to settle there, where they will find happy hunting-grounds,—a large population, great industries, activity of life, accumulation of money—thither young Scotsmen will go."

The following table has been compiled from the figures published annually by the University, and shows at a glance the number of students matriculating in Medicine and the countries from which they have come. The year 1898 has been introduced, as it precedes the decade in which the provincial English Schools took University rank, and serves therefore as a basis for comparison. The outbreak of the European War in 1914 has prevented any later observations from being made.

TABLE II.

ILLUSTRATING THE NUMBER OF MEDICAL STUDENTS MATRICULATING IN EDINBURGH UNIVERSITY, AND THE COUNTRIES FROM WHICH THEY HAVE ENTERED.

Year.	Total Matriculated.	Scotland.	England and Wales.	Ireland.	India.	Overseas Dominions.	Foreign Countries.
1898	1387	584 (42% of whole)	374 (27% of whole)	94	60	231 (16% of whole)	44
1900	1338	592	332	106	75	216	38
1903	1451	677	333	118	72	232	19
1905	1500	677 (45%)	336 (22%)	119	70	272 (18%)	27
1907	1478	690	310	118	71	263	26
1909	1386	591	282	123	83	274	33
1911	1353	593	265	91	99	256	49
1913	1315	563 (43% of whole)	231 (17% of whole)	72	102	300 (22% of whole)	47

It is obvious from the table that, when the entries from England and Wales in 1898 are compared with those of 1913, there is not only an actual reduction of 143 in the number of students matriculating, but there is a proportional fall of 10 per cent in their relation to the total entry of students in medicine. The number of students entering from Scotland, on the other hand, shows only a reduction of twenty-one. If the year 1905 be compared with 1913, thus allowing time for the changed conditions in England to produce their effect, we find that the fall in entries is practically the same from both countries—slightly over 100 from each. While the figures are undoubtedly interesting when studied from this point of view, it would be unreasonable to attribute the decline in the English entries to the new Universities, especially when the period under consideration is so short. Notwithstanding the introduction in 1902-3 of the Carnegie Scheme for the financial assistance of Scottish students, the entries from Scotland between that year and 1913, show a decrease of 114.

The table further shows a falling off in the number of students entering from Ireland subsequent to 1909, the year in which Queen's College, Belfast, took University rank. The entries from India and from the Overseas Dominions have increased during the period under discussion, the improvement in the returns from the Dominions being mainly due to the increased number of men coming from South Africa after the termination of the Boer War. It is chiefly as the result of the increase in the number of men entering from India and South Africa, that the proportion of non-Scottish students attending the medical classes in Edinburgh has been maintained. It is quite obvious, from a study of the various figures that have just been recorded, that periods of prosperity in the School alternate with periods which are less prosperous. Certain definite reasons have been brought forward in an attempt to explain the fluctuations, but other causes are doubtless at work. A Medical School may suffer from being too successful. It may attract so many men that its teaching facilities are unable to cope with the demand that is made upon them, and the inevitable result follows. The reputation of a School, too, cannot always be maintained at the same high level without the exercise of very considerable effort and care, and a danger undoubtedly lies in the possibility of maintaining a too complacent satisfaction with the successes of the past.

The cosmopolitan character of the University always appealed strongly to Turner, and he frequently made reference to it. In spite of the increasing provision which was being made in the Overseas Dominions for the training of students, he maintained the belief that their young men would continue to come to Edinburgh, as they had always done in the past.

The University herself is more than 300 years old, and her faculty of Medicine dates from 1725. Early in her career she was a local University, and her students were entirely Scotsmen. Still she prospered, and the students increased in numbers. But when in 1745, the year of the Jacobite rising, she suffered from the effects of the Civil war, they greatly diminished. When the country had once more become settled, they again flocked to her doors. Then commenced the period when the Colonials came to the city for their medical education. In the year 1760, thirteen students were recorded in the books as Americans, and in those days this meant students from the colonies which in course of time grew into the United States of America. With the Declaration of Independence in 1776, there was a change, and in 1779, the American students fell to four. But when the war was over and peace was restored, they came once more from the United States to this country, and in 1784, twenty-four enrolled in the University of Edinburgh, and at the same time, both the West and the East Indies became represented. The University had begun to enlarge her boundaries.

Between that date and the commencement of the nineteenth century, the American students gradually diminished in numbers. By that time they were beginning to found Universities of their own, and this process continued throughout the century, and Edinburgh graduates contributed largely to their foundation. The University of Pennsylvania was founded by Edinburgh students, and in the Carolinas it was recognised that the same element was at work. At the beginning of the nineteenth century, too, our Colonial relations commenced. With the names which now appeared on our roll-books you are all familiar—Canada, Nova Scotia, New Brunswick, and Newfoundland. The students from the parts of the great American continent which continued under the British flag, gave as their native places the particular part of the territory from which they came, and numbers of them were enrolled under these designations.

The University continued to extend her boundaries. In 1821, a student enrolled himself as from New South Wales. That was our first connection with the great Australian territory. In 1825, a student matriculated from the Cape of Good Hope. These were the swallows in the early spring which heralded the approach of summer. They were the swallows which presaged what flocks of young men were to come from Australasia and the Cape to the northern city to receive their education. Will this continue? It is a

matter which we have to consider very carefully, because these young men who go back to their homes at once begin to feel that the Dominions themselves should have Universities, so that they may train their own men there; and Edinburgh graduates have contributed largely to the foundation of Universities in Canada and Australasia. In Montreal and Toronto, in Sydney and Melbourne, and in Dunedin, many pupils of my own hold important teaching positions. We can claim the University of Sydney in the largest sense as one of our children, and we may fairly claim that the University of Edinburgh has done something to cement the stones of the British Empire. Will that association continue? I believe that it will. I believe that there are good, solid, educational reasons why the University should keep its place as a great colonial University. The Scotsman, too, is a wandering being. He does not like to sit quietly in his own land when money and position are to be obtained elsewhere. He finds fertile fields abroad. But he does not always want to remain outside his native land, and if it does so happen that he cannot himself conveniently come back, he likes to send his children, and naturally he sends them to the capital of his native country.[1]

During the long period of his professorship, Turner had many assistants, who ably and loyally helped him to carry on the work of his Department. The good-fellowship which was established between them and him did not cease when their relations were severed by their promotion to other spheres of work, and, in some instances, the acquaintanceships formed developed into lifelong friendships. When they sought his advice as to their future course of action, he gave them of his best, and he used all his influence to promote their applications for teaching or other appointments.

Upon his succession to the Chair, he gave the post of Senior Demonstrator to Mr Chiene, who had previously acted as one of Goodsir's staff. Chiene's inclinations, however, lay in the direction of surgery, and, in

[1] Sir William Turner. Speech at luncheon to the Colonial Premiers, 1902.

the summer of 1870, he left the Anatomical Department and commenced a course of operative surgery at old Minto House. From his chief he learned something more than Anatomy, so he has told us. "I learned many things for which I am thankful, and one of the most useful to me has been deference and kindliness to any one ignorant of his work."

In due course the two men became colleagues, Chiene being elected in 1882 to the Chair of Surgery on the death of Spence. Later on, when, on his promotion to the Principalship, Turner again assumed the *rôle* of chief, their public relations once more reverted to what they had been in earlier days; but there was never any change in the mutual esteem and regard which they entertained towards each other. After Chiene's retirement, Turner was a frequent visitor at "Aithernie," Chiene's country house, a few miles out of Edinburgh. Turner's last call, ten days before his death, was a visit to Davidson's Mains, where he spent an hour with Mr and Mrs Chiene and with their next-door neighbours, his old friends, Mr and Mrs Lawrence Guthrie.

Morrison Watson, who had been associated with Chiene as Junior Demonstrator, succeeded to the Senior post, which he held till 1875, when he was appointed Professor of Anatomy at Owens College, Manchester. Morrison Watson married Lady Turner's youngest sister, and he was the first of Turner's assistants to receive an anatomical Chair. His career was cut short by a fatal illness in 1885.

James A. Russell was Watson's junior colleague on the staff for four years, and, after holding the senior appointment for one year, he resigned in 1876. Like other men who have graduated in medicine, he turned his attention later to public affairs, and became a member of the Town Council of Edinburgh, by whom his work was duly recognised in 1891, by his appointment to the Lord Provostship of the city. Sir James Russell continued to maintain his connection with his

Alma Mater until his death in 1918, as his office of Inspector of Anatomy for Scotland brought him into frequent touch with the Anatomical Department. Like Chiene and Watson, he had been a pupil of Goodsir's, while Turner was Demonstrator. With his departure, the last of Goodsir's students severed his connection with the teaching staff.

In 1875, D. J. Cunningham was invited to join the teaching staff, and he became Senior Demonstrator when Russell retired. He held the appointment until 1883, when he went to teach Anatomy at the Royal College of Surgeons in Ireland. He took an important part in the removal of the Department to the New Buildings in Teviot Place, and in the arrangement of the rooms for the purposes of teaching. "It was during his period of office as Demonstrator," to quote the words of his old master, "that Cunningham gave evidence of the administrative ability, power of organisation, general business qualifications, clearness of expression as a teacher, and the possession of the scientific and practical grasp of his subject, which placed him in the front rank of Professors of Anatomy in the British Islands." When the Edinburgh Chair fell vacant in 1903, there was no doubt upon whom the succession should fall, and Cunningham was unanimously welcomed to the scene of his earlier labours. "He was essentially an active man, firm in purpose, and true to his convictions; but associated with his strong nature was a gentleness of character and a power of persuasiveness which attracted all who were brought into contact with him. It was impossible to quarrel with one whose language was always temperate, whose honour was unquestioned, and whose conduct, both public and private, was not influenced by self-seeking or a desire for applause."[1] His premature death in June 1909, robbed the Edinburgh Medical School of one whom it was ill able to spare.

[1] Obituary notice by Sir William Turner.

Mention must also be made of Arthur Thomson and David Hepburn, both of whom occupied the position of Senior Demonstrator. The former held the appointment from 1883 to 1885, when he left for Oxford to become first, Reader, and then Professor of Anatomy in the University. Through his energy and inspiration he has created a Department of which Oxford is justly proud. Although Thomson's rapid promotion cut short his association with his chief, it was sufficient to lay the foundation of a lifelong intimacy which the passage of time served only to increase.

Hepburn, who succeeded him, retained the senior post for sixteen years, remaining with Turner as his right-hand man until his retirement from the Chair, rendering him much material assistance in the later years of his professorship, during a time when his manifold duties necessitated his having an experienced assistant.

But the staff of the Anatomical Department would remain incomplete if no reference were made to James Simpson, the successor to A. B. Stirling, as assistant Curator of the Museum. He was the "non-commissioned officer" of the Department, and the *fidus Achates* of his master. Obliging, gentle, unassuming, proud of the Museum and jealously guarding its possessions, "Jimmy" Simpson was a many-sided man. He was clever with his hands, had a genius for mounting specimens, and was gifted with the spirit of research. He was the first to identify the remains of the reindeer in Scotland, and was a recognised authority on the salmon fungus and on the causation of disease in the grouse.

In the later years of the nineteenth century, Edinburgh, as an educational centre, was about to repeat what she had previously done while the century was still young, by sending out her sons to reinforce other seats of learning. Sir Charles Bell had migrated to London in 1804 to teach Anatomy: William Sharpey, in 1836, became the first occupant of the Chair of

Anatomy and Physiology at University College: Martin Barry lectured on Physiology at St Thomas' Hospital: Allen Thomson became Professor of Anatomy in Aberdeen for a short period, and John Reid held the same position in St Andrews. In the profession of surgery, London was further enriched by what she received from the northern metropolis. Robert Liston was made Professor of Clinical Surgery at University College in 1835, and, on his death, James Syme accepted the vacant Chair, which he occupied for a few months. Sir William Fergusson was elected Professor of Surgery at King's College in 1840. But University College and St Bartholomew's Hospital more than repaid the debt by sending Joseph Lister and William Turner to Scotland in the early fifties.

It has been the experience of few men, however, and certainly of none in this country, to have taken so large a share in the training and providing of teachers of Anatomy who, in their turn, became elsewhere professors of the subject. Turner's record in this respect is certainly unique, and it was a record which gave him a great deal of pleasure. No fewer than twenty-three Chairs, including the succession to his own, came to be occupied by men who had received their anatomical training in Edinburgh at Turner's hands. All of them had been his pupils, and sixteen had served on his staff of Demonstrators. With the development of the younger schools of medicine both at home and in the Dominions, the necessity arose of obtaining the services of teachers well trained in the scientific subjects. It was not unnatural that Edinburgh, with her outstanding reputation as a School of Anatomy, should be asked to assist in providing the men to fill the teaching appointments. Their names are arranged here as far as possible in chronological sequence. To Owens College, Manchester, she gave Morrison Watson, and his successor Alfred Harry Young. To Otago University, New Zealand, John Halliday Scott. To Trinity College, Dublin, Daniel

John Cunningham, who afterwards succeeded Turner in Edinburgh. To the Queen's University, Belfast, Johnson Symington. To the University of Tokio, Japan, F. Dyce Fraser. To the University of Oxford, Arthur Thomson. To the University of Sydney, J. F. Wilson. To King's College, London, and later to the University of Birmingham, Arthur Robinson, the present occupant of the Anatomical Chair in Edinburgh, in succession to Cunningham. To the University of Liverpool, A. M. Paterson. To the University of Durham, Robert Howden. To the Lahore College, India, and subsequently to University College, Dundee, J. C. Lamont. To the University of Toronto, Alexander Primrose. To the University of St Andrews, James Musgrove, succeeded in turn by David Waterston, who had taken Robinson's place at King's College. To the University of Bristol, Edward Fawcett. To the University of Glasgow, T. H. Bryce. To University College, Cardiff, David Hepburn. To Melbourne University, Richard J. A. Berry. To the University of Leeds, J. K. Jamieson. To M'Gill University, Montreal, A. Campbell Geddes (Sir Auckland Geddes, K.C.B.) To the University of Cape Town, T. B. Johnston.

The Edinburgh School and the teaching of the Monros, of Goodsir, and of Turner have thus spread their influence widely over the globe.

A striking testimony to Turner's position as the "Doyen" of British anatomists, and to the influence which his teaching had exerted upon the different medical schools in the country, was furnished in 1902 by the publication of the 'Text-Book of Anatomy,' edited by Professor D. J. Cunningham. With one exception, all the writers had studied under Turner, and all but two had acted for longer or shorter periods as his assistants. "Bound together by a common tie and animated by affection and reverence for their great master," the authors sought "to produce a book worthy of him whose teaching it so largely reflects."

In acknowledging the receipt of a presentation copy of the volume, Turner writes to Cunningham :—

On returning home yesterday I found your letter and the *magnum opus* awaiting me. As yet I have only had time to turn over the pages and take a general look at the text and illustrations. What I have seen satisfies me that you and your colleagues have produced a book which will rank high as a students' text-book, and, in addition, give to older persons material for thought and consideration in the discharge of their work as teachers. The illustrations are admirable and, in their softness and appreciation of texture, are much in advance of book illustrations generally found in anatomical works. I hope that the sale will be satisfactory and reward you properly for your years of labour.

He would be a very vain man and consequently very hard to please who was not satisfied with the handsome and heartsome expressions in the dedication and preface. I would again express to your colleagues and yourself my gratitude for the terms of affection and regard in which you have referred to our mutual relations. After forty-eight years of teaching it is productive of much pleasure to me to read that so many men, themselves eminent as teachers, can refer to their old master in language so sympathetic.

A short account of anatomical teaching in the Extra-Mural School during Turner's tenure of the Chair is of some interest, not only in connection with the men who taught the subject, but as illustrating a chapter in the history of the School. The following is a brief sketch of the main events as they occurred :—

When, in 1867, Turner succeeded to Goodsir's Chair, Dr D. P. Handyside was teaching Anatomy in the lecture rooms behind Surgeons' Hall. Shortly after his death in 1881, his place was taken by Mr Charles M. Cathcart, who had Mr Francis Caird associated with him as Demonstrator. In 1884, however, Cathcart gave up lecturing on Anatomy, and Dr J. Macdonald Brown then lectured at Surgeons' Hall for eleven years until he migrated to London to engage in practice. In 1895, Mr J.

Ryland Whitaker, the present holder of the lectureship, succeeded him.

When a School of Medicine was opened at Minto House, Chambers Street, in 1877, the anatomical teaching was placed in the hands of Dr J. Cossar Ewart—now the Professor of Natural History in the University—who had been Curator of the Museum at University College, London. After his appointment in 1879, to the Chair of Natural History in Aberdeen, Johnson Symington, who was one of Turner's staff, took over the Anatomy Department at Minto House, where he remained until he was called to the Queen's College, Belfast, in 1893. The work of the School was carried on for another year by Mr Alexander Miles, but in 1895, the dissecting-rooms at Minto House were handed over to the Women's School of Medicine under the supervision of Mr Ryland Whitaker.

Coincident with the termination of anatomical teaching to men at Minto House, the New School, as it was called, was opened in Bristo Place, the Extra-Mural Lecturers of the old Park Place School having been obliged to find new premises on account of the alterations which had been found necessary in connection with the University Buildings Extension Scheme. In the Winter Session 1894-95, Dr James Musgrove, one of Turner's Demonstrators, became the Lecturer on Anatomy in the New School, and continued to teach until 1896, when he was called to St Andrews. He, in turn, was succeeded by Dr R. J. A. Berry, who taught until 1905, when he resigned on his appointment to the Chair in Melbourne University.

Negotiations were then entered into between the owners of the New School and the University authorities with a view to the latter taking over the Anatomical Department. The University acquired the buildings on lease for ten years, with the option of renewal from year to year, and utilised the accommodation for anatomical teaching. With the admission

of women students to the University in 1916, the Anatomical Department of the New School, along with several rooms and theatres in the main building, was set apart for the teaching of women under Professor Arthur Robinson.

At the present time, therefore, the Lecturer at Surgeons' Hall remains as the sole representative of anatomical teaching in the Extra-Mural School. While all must recognise the value of complementary teaching outside the University, it is doubtful whether so many Schools of Anatomy in the city served an altogether useful purpose. The scarcity of material for dissecting-room purposes has always been a great difficulty in Edinburgh, and the need of economy was not simplified by distributing it over so many departments. This brief account of the Extra-Mural Anatomical School indicates, too, the direction in which events were moving towards a greater concentration of the direction of medical teaching in the hands of the University, to a fuller consideration of which further attention will be given later.

In the autumn of 1902, it was becoming increasingly evident that, for reasons of ill-health, it would be necessary for Sir William Muir to resign the office of Principal of the University. Turner's appointment as his successor naturally implied the end of his career as a teacher. His promotion to this official position, coming as it did in the middle of the winter session, necessarily interfered with his daily participation in the work of his Department, the duties devolving largely upon David Hepburn, his Senior Demonstrator. The words which Turner addressed to his class when the news of his election had been made public, reveal the state of his feelings at having to sever his connection with the Department in which he had taught as demonstrator and professor for forty-nine years.

When the applause ceased and quietness was restored, Sir William said—

Gentlemen, this is an overpowering reception. I thought I detected in the midst of it certain words and phrases and attempts at music. I think perhaps that I am right in feeling that, since we separated yesterday, your attention has been directed to a particular form of literature which is not included within the pages of your anatomical text-book. You are evidently acquainted with a fact which is not there, and I recognise that your information on this matter is correct. It is true that I have had the honour of being chosen by the Curators, the Patrons of the University, to be the Principal. I have accepted the office, and, in doing so, I feel that I have to fill a position of great responsibility and of a very important character in the University. I shall have to put myself in line with a whole series of distinguished men who have, during three centuries, previously occupied that position—men who have been distinguished in various departments of life, as scholars, as historians, as divines, as men of science, and as men of high administrative ability.

I have served under four Principals. Dr Lee was Principal when I came to the University in 1854, and he was succeeded by Sir David Brewster, who, in turn, was succeeded by Sir Alexander Grant. Then came a Principal with whom you are all acquainted, and who, although years spent in the discharge of most important duties have led him to feel that the time has come when he should retire from office, is still happily with us, Sir William Muir. I feel, gentlemen, that I cannot assume the duties of the new office which has been conferred upon me without referring to that courteous gentleman, that kind-hearted man, who, throughout his eighteen years of service here, has always acted towards his colleagues in a noble and impartial way, and who has acted towards the students of the University, not only you, gentlemen, who are now standing before me, but generations of students before you, and has shared in their feelings and sentiments, in a way which has most thoroughly endeared him to you and to them, and I am sure that he will live in your memories.

Gentlemen, the acceptance of one office signifies that something is to follow. I shall cease to be Professor of Anatomy. There is such a thing as human nature, and there is such a thing as human strength. Although, as may seem to some of you, I have still a reserve of force, the duties of the new office, if they are to be fully discharged, will render it neces-

sary that certain duties discharged now, and which I have discharged for so many years, must be relinquished. You will, I think, recognise that labouring as I have been doing now for nearly fifty years in this University as a teacher of Anatomy, for thirteen years as the principal Demonstrator and for thirty-six years as Professor, the relinquishing of these duties means a great wrench. It is putting behind me a great part of my life, and, when a man has reached the age which I have reached, he knows perfectly well that in the ordinary course of nature that part of his life which lies before him cannot be very long.

Gentlemen, you will understand that the acceptance of this new office was to me a matter of much thought, concern, and anxiety, and it was only because I was sure that it was my duty to accept it that it was accepted. I am not going to say "good-bye" to you to-day: I have got my lecture prepared for you. I cannot leave the Chair of Anatomy yet; I have still its duties to perform, so I feel that I must go on with my lecture. You must now allow me to thank you, and through you, all those generations of students who have sat before me during the long period of nearly fifty years. I wish to thank you all for the sympathy and kindness and, I am proud to say, the affection, yes, the affection, which has existed between us during all those years. I cannot leave this place in which I have been so long engaged without having my emotions excited. Gentlemen, you will understand me. I should be a very cold-blooded person indeed, if there was not implanted firmly in my heart and in my memory all that I owe to the students of the University of Edinburgh.

It is very difficult, indeed impossible, within the compass of one chapter, to give a proper conception of the increasing amount of work which, year by year, Turner was able to overtake during his Professoriate. Although he regarded the duties of his Chair as having the first call upon his time and attention, his work was by no means confined merely to teaching. To some, the conduct of a large Department, which, as we have seen, was for many years of exceptional size, might have seemed sufficient in itself. It formed a part only of the many engagements which he had to meet. As his capacity for work and his powers as an administrator and a man of affairs became more

generally recognised by his colleagues, the demands made upon his time and energies steadily increased. University administration and extension, the work of the General Medical Council, and other outside interests which claimed his attention, combined with his constant application to scientific research, fully occupied his days.

Notwithstanding these obligations, he never relaxed his departmental work, nor relegated his duties as a teacher or examiner to others, save under special circumstances over which he had no control.

The work which the professional examinations entailed upon him at the end of a heavy session he found particularly trying, and he always looked forward with pleasure to an early holiday upon their completion. In writing on one occasion to Professor Cleland in Galway, evidently he had complained of the arduous nature of his duties, as may be gathered from the following reply from his friend :—

I sympathise with your moans over excessive winter work. For my own part I am as flat as one of Traquair's flounders, and I get nothing done that is in the least amusing. The School is, however, beyond all question improving, and is turning out some really good men, which is a great comfort. But the system of examinations is the bane of medical education. I am glad that Lyon Playfair begins to see that. That cursed Board of highly estimable men, the General Medical Council, which has been quite as much to blame as the infatuated and crazy Gladstone Ministry (strong language!) in foisting the "Chinese" system on the country, seems determined to go on meddling and muddling till it ruins the profession.

I feel the better of writing that last sentence and expect sympathy from you, as I think you admit the evil effects of the severe examinations now the fashion, especially upon the better sort of students, who ought to be left to study in peace in their own way and with leisure to develop reflection, but who are crushed down into inept perambulating memories. For all that, being an examiner under the system, I own that I work it and keep the unfortunate wretches with their noses at the grindstone, while I pray for better days.

Cleland's letter is dated 1872. Are not examiners and examinees still praying for better days?

Turner's methodical habits, his punctuality, and his power of concentration upon the work in hand, enabled him to overtake all his engagements with apparent ease. It was strikingly characteristic of him that he never postponed until to-morrow what he felt ought to be attended to to-day. In illustration of this, he would answer an important letter after returning home at the end of a long day's work, and would even go out to post it himself, rather than postpone his reply until the following morning. Blessed with a strong constitution, which he never abused, he possessed the power of recuperating rapidly, largely through his being able to sleep well, save on certain occasions when specially important business occupied his thoughts. In addition to that beneficent gift, he adopted, after reaching middle life, the excellent habit of going to bed early. At the same period of his career, he gave up working in the evening, and, throwing off the cares of the day, he obtained much mental relaxation in reading biographies, books of travel, and novels of all kinds. An incident may be recalled here of how one of his colleagues, desiring to see him on some matter of business, called at his residence one evening between nine and ten o'clock. After some delay, necessitated by the lighting of the hall gas and the unbolting of the front door, he was at last admitted, only to learn that Turner had retired for the night. Such early hours were not exceptional, but, on the contrary, were the rule in his household. Breakfasting regularly at eight o'clock during the session, and often engaged in the reading of proof-sheets or in letter-writing before that hour, he overtook a considerable amount of correspondence before leaving home. Notwithstanding the almost universal adoption of the typewriter, he set his face steadily against the use of the machine in connection with his personal correspondence. He preferred to the last to

write his letters in his own hand, regarding this in the light of a greater courtesy to his correspondents, in spite of the increased work which it entailed.

He had the supreme satisfaction during his lifetime of seeing his labours as a teacher duly rewarded, recognising that the Anatomical Department had developed under his care, that he had trained a large body of men as successful teachers, that he had imbued them with the scientific spirit, and that he had done his part in preparing many generations of students for their future career in life. He completed his task, conscious of having carried on worthily the best traditions of the Edinburgh School of Anatomy—of having, indeed, added to its fame—and happy in the knowledge that he had won and retained the respect and affection of thousands of his pupils.

CHAPTER VII.

SCIENTIFIC WORK.

Anatomy in Edinburgh in the first half of the nineteenth century—Sir Charles Bell and John Reid—Barclay and Knox—Wharton Jones—Allen Thomson—Martin Barry—John and Harry Goodsir—Hughes Bennett—Edward Forbes—The Darwinian epoch—Turner and Lister—Turner and Darwin—Comparative Anatomy of the Brain—The Marine Mammals.

"WHEN we consider the progress which society in general, or any of the arts or sciences has made, we at once perceive that that progress has not been steady and invariable, but by fits and starts, presenting periods of action and of reaction, epochs of rapid development and of comparative repose. Each successive period of advance differs both from the one which precedes and the one which follows. Each successive epoch, differing in some essential particulars, becomes a period of repose when considered in relation to its predecessor. The interests of the last age, although no longer presenting the same freshness and excitement which they did to our fathers, do yet settle down with us into steady acknowledged principles of action usefully curtailed of their exuberances, only to be the better fitted to support and protect the more recent ideas of our own age. All advance is accompanied by opposition, every society presents two parties, progress is apparently the result

of antagonism; from which at least we may learn this useful lesson—to listen charitably to those who are opposed to us in opinion, and to examine our opponent's statements from his own point of view." [1]

However interesting it might be to dip into the records of anatomical science, and pass in review the progress which it has made since the days of Hippocrates and Galen, its revival in the Middle Ages, and the important advances which illuminated the eighteenth century, it is sufficient for our purpose to follow the history of anatomy in Scotland during the first half of the nineteenth century, prior to Turner's arrival; to endeavour to show how his work was influenced by the traditions of the Edinburgh School, and to describe the part which he himself took in maintaining the scientific reputation of his Department to the end of the century, and even beyond it. It was in Edinburgh for the most part, and in the hands of her sons whom she had educated and sent elsewhere, that anatomy was advancing between 1800 and 1854: in no other centre north of the Tweed was research, with its attendant progress, more sedulously carried out.

Descriptive anatomy dealing with the essential structure of the human frame with its influence upon surgical anatomy, and the consequent improvement in the art of surgery, marked the epoch of the anatomists Cowper, Winslow, Albinus, Boerhaave, and Monro *primus*, from the close of the seventeenth to the middle of the eighteenth centuries. From that date to the commencement of the nineteenth century, attention was further directed to the study of comparative anatomy and human physiology. The functions of the various organs of the human body became systematised in the work of Haller in Germany, in that of the second Monro, and of his colleague Robert Whytt, who occupied the Chair of the Institutes of

[1] John Goodsir, Introductory Lecture delivered at the commencement of his first Winter Session, 1846.

Medicine in Edinburgh. It was the period also of the Hunters, William and John; to the latter, probably more than to Cuvier and other exponents of the French School of a later period, must be given the distinction of establishing and advancing the subject of comparative anatomy on a truly scientific basis.

At the commencement of the nineteenth century, the third Monro filled the Chair of Anatomy in Edinburgh. Though lacking in the genius for anatomical research, and failing to keep himself in line with the scientific advance of his time, he nevertheless formed the nucleus of the craniological collection in the Anatomical Museum of the University, which was afterwards to prove such valuable material for the study of anthropology in Turner's hands. We must, therefore, turn to the able body of men in the Extra-Mural School of this period, and observe how experimental physiology and comparative anatomy were developing in their hands. Charles Bell was still resident in Edinburgh, and lectured at the College of Surgeons until the end of 1804, when he migrated to London to teach anatomy. His work upon 'The Anatomy of Expression,' though not published until 1806, was mainly the outcome of his early labours in Edinburgh. In it he maintained that man alone was endowed with certain muscles solely concerned with the function of expressing the emotions. As this view obviously could not be reconciled with the doctrine of man's descent from some other and lower form of life, Charles Darwin later in the century was led to study the whole subject, not only in the various races of man, but in the lower animals, the result of his investigations being published in the volume entitled 'Expression of the Emotions in Man and Animals.'

Charles Bell's reputation, however, is permanently established upon his conception of the function of the central nervous system. He reasoned by infer-

ence from anatomical structure and relations, and he carried out experiments in order to verify the fundamental principles thus conceived. He was the first to realise that a meaning was attached to the subdivision of the nervous system into big brain, little brain, spinal cord, and nerve roots, and, in the early days of his professional struggle in London, his mind was completely absorbed with his new "Idea." His most important and best-known work was the discovery of the functions of the roots of the spinal nerves, which was published in 1811, in the form of an Essay. He likewise saw in the double roots of the fifth cranial nerve a resemblance to what he had noticed in the spinal nerves, and he proved by experiment, what he also observed in disease, that part of the nerve conducted the motor-power to muscles, and that part contained the nerve-fibres of sensation. Sir Charles Bell returned to Edinburgh in 1836 to occupy the Chair of Surgery, with a reputation which, on the Continent, was regarded by some men as greater than that of William Harvey. He was then sixty-two years of age, too old to make a fresh start in life: he died in 1842. It was his misfortune, in which Edinburgh shared, that no great anatomical position had been secured for him in his native city at a time when his energies and mental vigour were at their best.

The example of his work upon cerebral function served to stimulate the mind of John Reid along similar paths of research. Born in Bathgate in 1809, two years before James Young Simpson saw the light of day in the same town, Reid entered the University at the age of fourteen, and, early in his studies, he developed a preference for anatomy and physiology. A disciple of Haller, a friend of Goodsir and of Edward Forbes, he became assistant to Robert Knox. By his numerous original contributions to science, and especially by his classical work upon the function of the glosso-pharyngeal

and vagus nerves, published in 1838, he gained for himself a position amongst the experimental anatomists of which time will not deprive him. He also proved that the heart had a double innervation through the vagus and sympathetic nerves, and he just failed to discover the cardio-inhibitory function of the vagus nerve. With the technical difficulties under which men like Bell and Reid worked, it is astonishing that so much was elucidated. They possessed no well-equipped laboratories; they had no more satisfactory nerve-stimulus than that supplied by the galvanic current and by chemical and mechanical irritation, no anæsthetic other than morphia, and they worked without the knowledge of what is now known as antiseptic procedure. In 1841, John Reid was elected to the Chair of Physiology in the University of St Andrews, but he died in 1849, at the early age of forty.

During the period covered by the work of Bell and Reid, the study of comparative anatomy was receiving further attention. From 1797 to 1825, Dr Barclay, full of enthusiasm for his subject, was lecturing to crowded benches in Surgeons' Square. Though a profound human anatomist, he had a wide knowledge of the anatomy of the whole animal kingdom, and his museum, now the property of the Royal College of Surgeons, was laboriously collected and arranged by himself. Amongst the many pupils upon whom his influence fell was Sir Richard Owen, who, while a student in Edinburgh in 1824-25, received great encouragement from his teacher. The stimulus which Owen derived from Barclay did much to assist in finally placing him in the first rank of comparative anatomists. Barclay sent Owen to St Bartholomew's with a private letter of recommendation to John Abernethy.

As Barclay's successor, Robert Knox added fresh interest to anatomical teaching by the manner in which he propounded the science from its morpho-

logical aspect. An early visit to Paris, where he had familiarised himself with the work and ideals of the brilliant Frenchmen, Cuvier and Geoffroy St Hilaire, led him to teach the structure of the human frame, not as a mere appendage to surgery, but through the medium of comparative anatomy; he thus sought to shed light upon man's body and upon the type from which his individual parts had been evolved. In 1842, his position in Edinburgh became untenable, for reasons already referred to,[1] and his later years, which must have been full of bitter disappointment to him, were spent to a large extent in giving popular lectures in different parts of the country. He died in London in 1862. Amongst his many pupils upon whom he left an inspiring influence were John Reid, John and Harry Goodsir, Edward Forbes, James Young Simpson, Hughes Bennett, Wharton Jones, Martin Barry, William Sharpey, and W. B. Carpenter.

With the discovery in 1831, by the English botanist, Robert Brown, of the "nucleus" within the cells of the epidermis and tissues of the orchids and other plants, and with the further observations of the German botanist Schleiden, that the nucleus was a universal elementary organ in the vegetable kingdom, a fresh impulse was given to the investigation of the primary structure of animal tissues and their mode of development. During the thirties of the nineteenth century, therefore, we find the dawn of the period of embryology, in which the Edinburgh School played no unimportant part. The attention of anatomists and physiologists was directed to this field of research, their labours being greatly facilitated by the improvements devised in the manufacture of compound lenses. In addition to the magnification of the object under observation, a relatively large and flat field of vision was obtained along with clearness and sharpness of definition. In January 1830, Joseph Jackson Lister, the father of Lord Lister, read before the Royal Society

[1] Chapter V.

his memoir "On some Properties in Achromatic Object-Glasses applicable to the Improvement of Microscopes." Through his inventive genius it thus became possible to investigate with greater precision the minute anatomy of the tissues.

While the German observers, Johannes Müller, Schwann, and Henle, were publishing the results of their researches upon the anatomy of the animal cell and stating their views as to its mode of subdivision, a small but brilliant band of workers in Edinburgh was also turning its attention to the structure of the cell and the early changes in the human embryo, thus contributing its share to the new epoch in anatomical science. They assisted in establishing the "cell-theory" as the basis of organic structure, and, at the same time, they helped to lay the foundation of the doctrine of cellular pathology.

Wharton Jones, born in St Andrews in 1809, studied medicine in Edinburgh, and at the age of eighteen was demonstrating anatomy with Knox. In 1835, he made the discovery of the germinal vesicle in the mammalian ovum, and in 1837, described the origin of the chorion. His description of capillary circulation and of the minute phenomena of inflammation in the web of the frog, and in the bat's wing, afterwards suggested to Lister his more extended researches in a similar field. Having studied the diseases of the eye in Glasgow, Wharton Jones settled in London in 1838, as Lecturer on Physiology at the Charing Cross Hospital Medical School. Here Thomas Henry Huxley became his pupil. Wharton Jones was next appointed Professor of Ophthalmic Medicine and Surgery at University College, where Lister assisted him, and was given his first definite piece of research work. While his activities were now directed to ophthalmological practice, he continued to maintain his interest in Physiology. Of somewhat eccentric disposition and of retiring habits, his later years were spent in comparative poverty. Though a man gifted

with rare powers of observation and a pioneer in his branch of research in early life, he has never occupied in the world of science the position to which his undoubted abilities entitled him. He died in the Isle of Wight in 1891.

Allen Thomson, a son of the professoriate, was born in the same year as Wharton Jones. At the very outset of his career, he turned his attention to embryological investigation, and graduating in 1830, he presented his thesis upon the "Development of the Heart and Great Blood Vessels in the Vertebrates." He at once commenced teaching in the Extra-Mural School along with William Sharpey. Thomson, with a knowledge of French and German, visited the Continental schools and became familiar with the work of Schwann, Henle, and Kölliker. In 1839, the year in which he temporarily left Edinburgh to become Professor of Anatomy in Aberdeen, he published his most important contribution upon the development of the human embryo. Returning to his Alma Mater in 1842, he occupied the Chair of Physiology until 1848, when he went to Glasgow as Professor of Anatomy.

Probably the greatest of the men of this period was Martin Barry. An Englishman by birth, he graduated at Edinburgh University in 1833; he did more than any other man in this country in extending the horizon of the cell-theory in its early days. In his memoirs published between 1838 and 1847, he announced several important discoveries. He was the first to recognise the segmentation of the yolk in the mammalian ovum, and he demonstrated the fact that in animals as in plants, the young cells were reproduced from pre-existing cells, the nucleus acting as the important centre of reproduction. He enunciated the doctrine that all cells were descended from an original mother cell by cleavage of the nucleus, the subsequent nuclei propagating in the same way. He thus made an important advance on the view entertained by Schwann, who regarded endogenous cell

formation as quite exceptional in animals. Barry further observed the fertilisation of the ovum, and he expressed the opinion that the fertilised ovum was the germinal spot or centre. His earlier work was conducted in Edinburgh; in 1843, he delivered a course of lectures on Physiology at St Thomas' Hospital, and in 1848, he unsuccessfully contested the vacant Chair of Physiology, when Hughes Bennett was appointed.

Between 1840 and 1845, John Goodsir and his brother Harry were also studying the processes of cell life, freely acknowledging the assistance which they had derived from the researches of Martin Barry. John Goodsir watched the endogenous cell formation which was taking place in the cartilage cells in the process of inflammation. He studied the secreting process in the cells of glands, and he established the fact that the cells were the active structures engaged in the production of glandular secretion. He further observed the changes which were produced in the diseased conditions of Peyer's patches, thus offering the first satisfactory evidence of, and giving the clue to, the correct conception of the part played by the cell in the production of disease. He thus anticipated by a number of years the work of the German pathologist, Rudolph Virchow. Goodsir's observations were confirmed by his brother Harry in 1845, shortly before the latter joined Sir John Franklin's ill-fated expedition to the Polar Seas, where he perished along with the other members of the exploring party.

The observations of Martin Barry and the Goodsirs constituted a great step in advance of the views entertained by Schleiden and Schwann, and showed that they had a deeper insight into the nature and function of cells than was possessed by most of their contemporaries. Hughes Bennett, the last of the band whose labours with the microscope are deserving of attention, based his observations mainly upon the study of diseased processes. Like Henle, he opposed

the view of the formation of new cells from pre-existing cells through the division of the nucleus, and held that they were developed in an organic fluid by the aggregation of molecules which produced nuclei, round which cell walls were formed. This theory of free cell formation, which many pathologists at that time supported, had finally to be abandoned, alike in healthy as in diseased processes, as the result of the mass of evidence accumulated by Virchow, who maintained that there was no formation *de novo*, enunciating the law of continuous development, formulated in the expression *omnis cellula e cellulâ.*

"It was in the accuracy of his observations and in the justice of his inferences that John Goodsir was pre-eminent, and the lesson that we may learn from his early career is, that the secrets of man's body will not yield to a frontal attack with knife and forceps, as was the method of the third Monro, but to those who approach man's anatomy through the simple animal forms where the processes of life are more easily observed."[1] For this reason we find Goodsir turning his attention in other directions and seeking to unravel the larger animal kingdom of which man forms only a part. Born in 1814, at Anstruther, within sight and sound of the Firth of Forth, its fauna were early a source of delight and interest to him. Marine Zoology was at his door, and he dredged its waters and studied the natural history of the many living forms which he thus obtained. In company with his friend and fellow-student, Edward Forbes, a native of the Isle of Man, to whom he had been instinctively drawn when they met first in Knox's dissecting-rooms, many expeditions were carried out. Between 1837 and 1847, the two men made valuable contributions to comparative anatomy; the natural history of the sea-urchin, the skeleton framework of the sponges and the anatomy of the

[1] Professor Arthur Keith. "Anatomy in Scotland," Edinr. Med. Journal, 1912.

Amphioxus, were carefully detailed by Goodsir's pen. Nor were his researches confined to unravelling the secrets of the deep. The opening of ancient "barrows" in Fife, and the excavation of the old burial-ground of the Abbey of St Leonard's at St Andrews, furnished him with skulls, while the limestones and the slates in the quarries near Anstruther provided him with the remains of fossil fish. In Edward Forbes, the genial and gifted Manxman, the University possessed, during the thirties, a student of medicine and science with a great future before him. A pioneer in the science of deep-sea exploration, his researches, limited in his youth to the waters surrounding his native isle and the shores of Scotland, were extended to the Mediterranean and the Eastern Ægean. Cut off in his thirty-ninth year, within a few months of his appointment to the Chair of Natural History in the University, he would probably, had he lived, have made Edinburgh the greatest centre of Marine Biology in Europe. In the attic rooms at 21 Lothian Street, the Goodsir brothers, in their younger days, lived and worked and entertained their friends, Robert Knox, John Reid, Edward Forbes, and Hughes Bennett. "They issued a journal and formed a club, the brotherhood of which was stamped with the sign of the triangle, symbolical of wine, love, and learning. The wine was not excessive: the love was brotherly love: the learning was of a high order."[1] There, too, they gathered together their zoological material, frogs, fish, molluscs, and sea-urchins, and the odds and ends of the Invertebrate Kingdom, which they dissected, examined, and described. The rooms presented a "chaos of natural history and domesticity only to be surpassed by the oddest curiosity shop in the Cowgate of the ancient city."[2] But like other students of

[1] Professor W. A. Herdman—'Life and Work of Professor Edward Forbes.'

[2] 'Anatomical Memoirs of the late John Goodsir,' edited by William Turner.

science of those earlier days, their brains and their hands, unassisted by the facilities now obtainable in the modern laboratory, yielded them results of permanent value.

Such, in brief, were some of the lines along which Goodsir worked, and his Anatomical Memoirs, collected and edited by his Demonstrator and successor in the Chair, furnish abundant evidence of the many-sided character of his work.

Within a short period of Turner's arrival in Edinburgh, a new epoch in biological science was inaugurated, which profoundly influenced the minds of anatomists. The doctrine of Evolution, previously enunciated by Lamarck, received an enormous impetus by the publication, in 1859, of Darwin's 'Origin of Species,' which sent men's minds moving along a path the end of which could not be seen. Evolution assumed a position and acquired an importance which it had never before possessed. In Scotland, it took hold of the imagination of her anatomists, and it directed the lines along which they worked up to the end of the nineteenth century and beyond. A definition of the Darwinian doctrine may perhaps be rendered more clear by quoting what Turner has written upon the question.

> Heredity may be defined as the perpetuation of the like, or, as Galton more fitly expressed it, "Like tends to produce like." The offspring is moulded into the likeness of the parents; but similarity never reaches identity either in form or structure, because the tendency to a general similarity coexists with the tendency to minor variation. The pigeon- or canary-fancier distinguishes without fail the various birds in his flock, and the shepherd recognises each sheep that is under his care. Variability therefore is the production of the unlike, and has a most important bearing upon the origin of species.

Turner has more tersely defined the Darwinian theory as "Heredity, modified and influenced by variability." In amplification of the above, he wrote :—

> The signification of the variations which arise in plants and animals had not been apprehended until a flood of light was thrown on the entire subject by the genius of Charles Darwin, who formulated the wide-reaching theory that variations would arise, accumulate, and be perpetuated, which would in course of time assume specific importance. New species might thus be evolved out of organisms originally distinct from them, and their specific characters would in turn be transmitted to their descendants. By a continuance of this process new species would multiply in many directions, until at length from one or more originally simple forms the earth would become peopled by the infinite varieties of plant and animal organisms, which have in ages past inhabited, or do at present inhabit, our globe. Through the accumulation of useful characters the specific variation was perpetuated by natural selection, so long as the conditions were favourable for its existence, and it survived as being the best fitted to live.

Thus Paley's doctrine of design, which regarded the organism as perfect and impossible of improvement, made and adapted to carry out the special function ordained for it, was supplanted by the doctrine of Evolution.

Goodsir would not accept the new teaching. He worked to check the growth of Darwinism in Britain, and to counteract the impression that had been made upon the minds of the citizens of Edinburgh by the publication of the 'Vestiges of Creation,' and by Huxley's lectures at the Philosophical Institution on "Man's Place in Nature." He sought to defend orthodoxy against what he considered was an unqualified and hasty expression of thought. Turner, although coming under the spell of Goodsir and stimulated by the great mental qualities of his master, was nevertheless inspired by the evolutionary movement. A study of his work will show just what his position

was, and how persistently his mind dwelt upon the problem, as he carried on his researches in the field of Comparative Anatomy and Anthropology. He very early turned his attention to the study of those structural variations which occur in the human body, recognising their significance as furnishing evidence of Man's origin. Many of his papers, published in the sixties, deal with variability in structure, malformations of organs, hereditary deformities, supernumerary and rudimentary structures, and their relation to corresponding features in the lower animals, all illustrating points in the evolutionary history of Man. It is interesting to observe at this point that, like his friend George Rolleston of Oxford, he was not prepared to accept the evolutionary doctrine in its entirety. Darwin sought his assistance upon a number of points, especially upon those dealing with rudimentary structures and variations in man and the higher mammals, and the correspondence between the two men dealt mainly with matters of this kind. In one of his letters to Darwin, Turner, while pointing out that in the 'Descent of Man' a confusion had arisen in the author's mind between the supra-condyloid foramen sometimes present in the arm-bone of a man and the inter-condyloid foramen of the same bone, had evidently expressed some doubts regarding the evolutionary doctrine. Darwin's reply was as follows:—

March 28, 1871,
Down, Beckenham, Kent.

I am much obliged for your kind note and especially for your offer of sometimes sending me corrections, for which I shall be very grateful. I know that there are many mistakes to which I am very liable. That is a terrible one confusing the supra-condyloid foramen with another one. This, however, I have corrected in all the copies struck off after the first lot of 2500.

I daresay there will be a new edition in the course of nine months or a year, and I will correct as well as I can. As yet,

the publisher has kept up type and grumbles dreadfully if I make many corrections.

I am very far from surprised that you have not committed yourself to full acceptation of the Evolution of Man. Difficulties and objections there undoubtedly are, enough and to spare, to stagger any very cautious man who has much knowledge like yourself. CH. DARWIN.

Turner, like Goodsir, took a wide view of his subject, and he embraced within its horizon much more than the details of human anatomy. In his scientific work as in his teaching, he came under the influence of the traditions and the spirit of the Edinburgh School. We have endeavoured to show how, in the past, her anatomists were not confining their attention to the mere descriptive anatomy of the human body, but were probing its secrets by the study of its development and of its functions, and by comparing it with the structure of the lower forms of animal life. In his own Department all that was best in Anatomy was embodied in the personality of John Goodsir. When Turner entered the school in 1854, her teachers held scientific positions of world-wide reputation, so that he could not fail to absorb some of the atmosphere of his immediate environment and be stimulated to take his share in maintaining the prestige of the School. It is doubtful whether any one of the scientific workers in Edinburgh at that time, or indeed in the past, showed such catholicity of pursuits as he did. Chemistry, Pathology, Human Anatomy (descriptive and microscopical), Physiology, Zoology, Comparative Anatomy, Anthropology (including Archæology), all received his attention. His energies were not dissipated by reason of the various lines along which he worked: on the contrary, his wide and precise knowledge of every branch of anatomical science was a source of strength, as it enabled him to bring to bear upon each piece of work which he had in hand a more exact interpretation of the meaning of the facts which he observed and described.

We have already referred to the interest which he took in Chemistry in his earlier days, and we have given a brief account of his work on Pathology in connection with the editing of Sir James Paget's 'Lectures on Surgical Pathology.'[1] It is unnecessary, therefore, to recapitulate what he did in these two branches of science; they played their part in laying the foundation of the edifice which he was gradually to build up. His experience in the use of the microscope, which he acquired as a teacher, and his conviction that a thorough knowledge of the structure of the tissues and organs of the human body was a necessary basis from which to proceed to more extended research, led him into microscopical work. In 1859, he collaborated with his friend Joseph Lister in an investigation into the Structure of Nerve Fibres.

In 1859, Mr Lockhart Clarke, of London, visited Edinburgh and demonstrated specimens which he had made to illustrate the minute structure of the spinal cord. Those of us who were present were much impressed with the clearness of his sections, so materially enhanced by the use of the carmine stain recently introduced into histological methods. It occurred to Lister and myself that the use of this reagent might throw additional light on the structure and chemical composition of the constituent parts of a nerve-fibre. Lister suggested that we should undertake a joint inquiry, the results of which were published in the same year. My association with him in this investigation enabled me to realise and to profit by the methodical care with which he conducted his observations, the importance of testing them by repetition and control experiments, and his caution in framing conclusions.[2]

The point at issue — the effect produced on the tissues by the employment of certain chemical reagents — was satisfactorily explained, and on the completion of the paper, Turner received the following letter from Lister:—

[1] Chapters II. and III.

[2] From Turner's letter to Sir Rickman Godlee.

St Leonard's-on-Sea,
September 21, 1859.

I send you by this post the proof of our paper, which I have to-day received. I have added a supplement, and I trust you will not disapprove of the arrangement. The facts are these. Just after you left home I secured Goodsir's attendance at No. 4 High School Yards.[1] On looking at our preparations he spoke of the similarity of some of Stilling's plates to my sketch of the fibres of the medullary sheath, and he has lent me his copy of Stilling's book. When I mentioned to him my observation of the arborescent aggregation of fat, alluded to in the supplement, he was much pleased with it, and thought I ought not to lose the opportunity of criticising Stilling's strange account of the matter. . . . I have omitted the account of the process of the nerve-cell assuming the characters of a nerve fibre: you may remember that you were not so sure of that observation as I was, and my own faith in it has been shaken, partly by finding in the 3rd edition of Kölliker's 'Handbuch' the statement that he has never been able to see such a thing in mammalia, and also by having been myself unable to find another example of it in spite of carefully searching other sections. Will you kindly return me the proof as soon as possible, as the month is drawing to a close.

Hoping that you will not work too hard, but retain a sufficient stock of health for your winter session,—I remain,

Joseph Lister.

Turner's study of minute structure was further exemplified in his classical work upon Placentation, human and comparative, which gave him an outstanding position in the scientific world, in his work upon the thyroid and thymus glands in the Cetacea, and on the structure and mode of implantation of the hair of the scalp in various races of men, as a differential feature in considering certain racial affinities.

His work upon rudimentary structures in man was mainly responsible for the acquaintanceship which was formed between him and Darwin. The latter, while engaged in the preparation of 'The Descent of Man' and 'The Variation of Animals and Plants under

[1] Lister was then lecturing on Surgery at 4 High School Yards.

Domestication,' sought to elucidate how far man's bodily structure showed traces, more or less plainly, of his descent from some lower form of animal life. The question, therefore, as to whether man possessed, in a rudimentary state, organs or structures which were fully developed in some of the lower animals, was one of considerable importance to Darwin in constructing his thesis. Such structures are very variable, because being useless, or nearly so, they are no longer subjected to natural selection. They often, too, become wholly suppressed, but they are nevertheless liable to occasional reappearance through reversion.

Darwin's letters to Turner, though few in number, are of additional interest from the fact that they have not hitherto been published. They also illustrate one of the methods which the great naturalist employed in acquiring accurate information; they show, too, the great consideration and respect with which he treated the opinion of experts, a feature which was a marked characteristic of Darwin's attitude towards his fellow-workers.

Dec. 14, 1866,
Down, Kent.

Your kindness when I met you at the Royal Society makes me think that you would grant me the favour of a little information, if in your power.

I am preparing a book on 'Domestic Animals,' and as there has been so much discussion on the bearing of such views as I hold on Man, I have some thoughts of adding a chapter on this subject.

The point on which I want information is in regard to any part which may be fairly called rudimentary in comparison with the same part in the Quadrumana or any other mammals.

Now the os coccyx is rudimentary as a tail, and I am anxious to hear about its muscles. Mr Flower found for me in some work that its one muscle (with striæ) was supposed only to bring this bone back to its proper position after parturition.

This seems to me hardly credible. He said he had never particularly examined this part, and when I mentioned your

name, he said you were the most likely man to give me information. Are there any traces of other muscles? It seems strange if there are none. Do you know how the muscles are in this part in the Anthropoid Apes?

The muscles of the Ear in Man may, I suppose, in most cases be considered as rudimentary; and so they seem to be in the Anthropoids: at least, I am assured that in the Zoological Gardens they do not erect their ears. I gather that there are a good many muscles in various parts of the body which are in the same state. Could you specify any of the best cases?

The mammæ in man are rudimentary. Are there any other glands or other organs which you can think of? I know I have no right whatever to ask all these questions, and can only say that I shall be grateful for any information. If you tell me anything about the os coccyx, or other structures, I hope that you will permit me to quote the statement on your authority, as that would so greatly add to its value. Pray excuse me for troubling you, and do not hurry yourself in the least in answering me.

I do not know whether you would care to possess a copy, but I told my publisher to send you a copy of the new edition of the 'Origin.'

CH. DARWIN.

Jan. 15, 1867,
DOWN, BROMLEY, KENT.

As you were so kind as to say that I might ask you a few more questions, and as my wishes are now rather more definite, I do so; but you must not suppose that I am in any hurry for an answer.

1. One or two good cases of any rudiment of a muscle would suffice; if any muscle in our arms exists in a rudimentary or nearly rudimentary condition, and which would be of service to a quadruped, going on all fours, such a case would perhaps be best.

2. You reminded me that there were two sets of muscles for moving the whole ear and its parts: which of such muscles are rudimentary in the human ear?

3. I have used your information about muscles to the os coccyx; if my memory does not deceive me, the four coccygeal bones contain spinal marrow at an early embryonic age, and afterwards it retreats. If this is so, are vestiges of the membranes of the spinal marrow retained?

4. Is any other gland rudimentary in mankind besides the mammary glands in male mammals?

5. I may add that I have alluded to traces of the supra-condyloid foramen in the humerus of man, and to the nictitating membrane. By the way, do you chance to remember whether the nictitating membrane is well developed in Marsupials?

Pray forgive me, if you can, for being so very troublesome.

CH. DARWIN.

Feb. 1, 1867,
DOWN, BROMLEY, KENT.

I thank you cordially for all your full information, and I regret much that I have given you such great trouble at a period when your time is so much occupied. But the facts are so valuable to me that I cannot pretend that I am sorry that I did trouble you, and I am the less so, as, from what you say, I hope you may be induced some time to write a full account of all rudimentary structures in man; it would be a very curious and interesting memoir.

I shall at present give only a brief abstract of the chief facts which you have so very kindly communicated to me, and will not touch on some of the doubtful points. I have received far more information than I ventured to anticipate.

There is one point which has occurred to me, but I suspect there is nothing in it. If, however, there should be, perhaps you will let me have a brief note, and if I do not hear I will understand there is nothing in the notion. I have included the down on the human body as the rudimentary representation of a hairy coat.

I do not know whether there is any direct functional connection between the presence of hair and the *panniculus carnosus*, but both are superficial and would perhaps together become rudimentary. But to put the question from another point of view: is it the primary or aboriginal function of the *panniculus* to move the several appendages or the skin itself?

I was led to think of this by the places (as far as my ignorance of anatomy has allowed me to judge) of the rudimentary muscular fasciculi, which you specify. Now, some persons can move the skin of their hairy hands, and is this not effected by the panniculus? How is it with the eyebrows? You specify the axilla and the front of the chest and lower part of the shoulder blades. Now these are all

hairy spots in Man. On the other hand, the back is not hairy. So, as I said, I presume there is nothing in this notion. If there were, then rudiments of the panniculus ought perhaps to occur more plainly in men than in women.

With sincere thanks for all that you have done for me, and for the very kind manner in which you granted me your favour.

CH. DARWIN.

Although Turner's answers to these letters, unfortunately, are not preserved, the information which he was able to supply is embodied and acknowledged in 'The Descent of Man.' The main points dealt with were the rudimentary muscles and tail, the remains of a hairy covering upon the human body, a third eyelid, and the rudimentary mammary gland in man. Amongst the various muscles uniformly present in some of the lower animals, and which can occasionally be detected in man, the most interesting perhaps is the *panniculus carnosus*, a layer of muscular fibres lying just beneath the skin, and capable of producing voluntary movement of the overlying integument. The action of this muscle is well seen in many quadrupeds, as, for example, the horse, which possesses the power of moving or twitching its skin. Remnants of the muscle, both in an active and inactive condition, are observed in the human body. Well-known examples are seen on the scalp and in the muscles of the external ear, by the action of which individuals are enabled to raise their eyebrows, or even to move the whole hairy scalp, while others again have the power of drawing their ears backwards and forwards. Turner had occasionally detected inactive remains of this muscle in other parts of the body, as on the front and back of the chest. The association of this muscle with parts of the skin which are also hairy, led Darwin, in the last of the three letters just quoted, to put forward the proposition that there was probably a developmental association between the panniculus and the hairy coat, and that both structures together became rudimentary in man.

The os coccyx or tail in man, though rudimentary and devoid of function, is representative of the same part in other vertebrate animals, though in certain rare and anomalous cases it has been known to form a small external rudimentary organ. It possesses, too, the remains of a spinal cord, though that is no longer contained within a bony canal.

The nictitating membrane or third eyelid, which is specially well developed in birds and serves as an additional protection to the eye, and which is also seen in some of the lower of the mammalian series—for example, the Marsupials—is in man a mere rudimentary fold.

With regard to the existence of rudimentary mammæ in the male, Darwin has offered the explanation that in some former period the male aided the female in nursing their offspring: at a later period, the males ceased to do so, and disuse of the organs during maturity led to their becoming inactive. At all earlier ages prior to maturity, these organs would be left unaffected, so that they were equally well developed in the young of both sexes.

Such are a few of the structural arrangements which Darwin made use of in building up his conception of man's early progenitors. The manner in which his mind applied itself to the elucidation of these points is also well illustrated in the letters just quoted. In looking at man as he now exists, he attempted to restore during successive periods, though not in due order of time, the structure of his bygone ancestors. They were at one time men covered with hair, and both sexes possessed beards; their ears were pointed and capable of movement; their bodies were provided with a tail having the proper muscles for its movement; while their limbs were acted on by many muscles, which now only occasionally reappear. The main artery and nerve of the upper arm ran through a supra-condyloid foramen, and the eye was protected by a third eyelid.

Turner's attention was early directed towards the arrangement of the convolutions upon the surface of the human brain; and while, at the outset, his work was confined to their study in man, he very soon enlarged its scope so as to include the mammalian kingdom in general. The influence of the evolutionary movement was still at work.

The comparative structure of the brain in man and in the apes was, in the year 1860, exciting the interest of anatomists. The question as to the existence of certain morphological points of difference in their cerebral anatomy aroused a keen controversy between Owen and Huxley, and the interest attached to the debates was not confined to scientific meetings, but spread to the general public, and even the dignitaries of the Church took part in the discussions.

Turner's first important contribution was an elaborate study of the surface arrangement of the convolutions of grey matter of the cerebral cortex, based upon a series of dissections of the brains of apes and man, which was delivered in the form of a lecture before the Royal Medical Society, and published in the 'Edinburgh Medical Journal' in 1866. In this paper he took exception to Gratiolet's description of the posterior boundary of the frontal lobe, and held the position that the fissure of Rolando should be regarded as its posterior limit, and the plane of demarcation between it and the parietal lobe, a view which has since become generally accepted. He also described within the parietal lobe a fissure to which he gave the name of the intraparietal fissure. Though previously figured in drawings of the brain, little attention had been paid to it. Its importance was subsequently recognised, and it came to be regarded as the third of the three primary fissures upon the cranial surface of the brain. Later, he dealt with the relations of the brain to the outer surface of the skull and head, and devised a method of locating the position of the convolutions in the living person.

His interest in the brain, however, soon led him to widen the field of his investigations, with a view to ascertaining whether the arrangement of the folds upon the surface of the human brain corresponded with that which existed in the brains of the lower animals. The method of production of the cerebral convolutions or folds upon the brain cortex or surface is a matter of great interest, and was regarded by Turner, in the main, as a physical problem, due to the resistance offered by the bony walls of the cranial box, comparatively yielding as they undoubtedly are in the earlier stage of development, and becoming more unyielding as the ossification of the bones advances. Their resistance at last becomes so great that the further expansion of the brain surface and of the cerebral hemispheres as a whole ceases, and then the convoluted surface exhibits the arrangement characteristic of the species and of the individual.

If the highly convoluted brain of Gauss, the great mathematician, be contrasted with that of a Bushwoman, a very primitive type of the human species, it is seen that, in both, the plan of arrangement of the folds or convolutions with the intervening fissures or furrows characteristic of the human brain are present, but in Gauss the tortuosity and subdivisions of the convolutions contrast strongly with the comparatively simple distribution in the Bush brain. In volume, Gauss' brain surpassed that of the Bushwoman, and his cranial cavity was of course larger; but it is not unlikely that in him the rate of brain-growth so far exceeded the rate of expansion of the cranial box, that the resistance offered by the walls of the latter induced the complex secondary convolutions or foldings on the brain surface, which gave to his brain its individual character.

By investigating the arrangement of the surface convolutions throughout the mammalian series, it might be possible to determine whether comparative anatomy furnished proof of a continuous evolutionary development throughout the whole series. At the same time, it might be possible to throw some light

upon the function of the various parts of the brain surface in man by determining whether the cortical areas of the human brain had corresponding parts in the brains of lower animals. If an arrangement common to all animals could be established, it would simplify the whole question of experimental investigation into the function of the different areas of the brain.

In the early sixties, when Turner commenced his researches, precise information regarding the functions of the cerebral cortex had not as yet been obtained, consequently exact knowledge as to the localisation of disease in the brain was still in its infancy. The modern era of experimental physiology which was to advance so rapidly through the work of Fritsch and Hitzig, Hughlings Jackson, Ferrier, Beevor and Horsley, Schäfer and Sherrington, had not yet arrived. The localisation of the centre for spoken language had, indeed, just been accurately determined by Broca in the posterior third of the left inferior frontal convolution, as the result of the *post-mortem* dissection of the brain of a man who had been the subject of aphasia (loss of power of speech). It is interesting to record in this connection that four years later (1866), Dr Sanders, Physician to the Royal Infirmary, Edinburgh, and afterwards Professor of Pathology in the University, was the first to record in this country a similar case of aphasia, proving by autopsy Broca's localisation of the speech centre. Sanders was indebted to Turner for assistance in the elucidation of the anatomy of the case by the examination of a series of specimens of the brains of man and apes which the latter had prepared.

It was obviously necessary that the topography of the convolutions should be carefully ascertained and their areas delimited before any exact analysis of their function could be determined. The earlier investigators, Vicq d'Azyr, Gall and Spurzheim, Rolando, Arnold and others, having confined their labours to

the study of the fully-developed brain, were met with difficulties which this limited method of research could not overcome. The adoption of two further lines of investigation was now beginning to throw additional light upon the dark places in the arrangement of the brain surface, to aid in unravelling its complexities, and in discovering some order and method in the pattern of the convolutions. The study of the development of the brain in the human embryo, and the comparative study of man's brain with that of the mammalia, were two methods of anatomical research of the highest value in this connection. To Gratiolet of Paris belongs the merit of approaching the subject by tracing the gradual appearance of the convolutions from the smooth-brained marmoset monkey, through that of the more complex brain of the orang and chimpanzee to man himself; and, in this country, the labours of Huxley, George Rolleston, Marshall, and Flower had materially advanced our knowledge of cerebral topography.

Turner's investigations into the comparative anatomy of the brain dealt mainly with a study of the cerebral convolutions in the carnivora, in the whales, the seals, apes, and man, his object being to harmonise the arrangement of the convolutions in these orders.

His general conclusions upon a subject which he had worked at for so many years were finally summed up in his address to the Anatomical Section of the Tenth International Medical Congress held in Berlin in August 1890. A smooth surface, characterised by the absence of convolutions, is the universal type of all brains in an early stage of their development. In some Orders, such as the Insectivora—*e.g.*, the Hedgehog and the Mole—the smooth-brained surface is preserved throughout life most perfectly in all families; in others, such as the Rodents—*e.g.*, the Beaver and the Rabbit—though almost entirely smooth-brained, traces of subsidiary shallow fissures upon the surface, indicative of an early stage in the formation of con-

volutions are found in some of the genera. Other Orders again, such as the Montremata, the duck-billed Platypus and the spiny Ant-Eater—the lowest in the Mammalian scale—and the Marsupials—*e.g.*, the Opossum and the Kangaroo—contain species with both smooth and convoluted brains. The most complex arrangement of the convolutions is seen in the Elephants, the Whales, the Seals, and the Monkeys, and finally in Man; but even in some of these Orders there are a few species in which the surface of the brain is either smooth or only feebly convoluted.

While certain general features in the plan of construction characterise the arrangement of the convolutions in all these animals from the simplest to the most complicated, nevertheless, from the study of the surface of the hemispheres in the whole series of mammalia, it is obvious that the convolutions do not exhibit a progressive and continuous development from the lower mammals through the apes to Homo. There is no evidence to sanction the view that there has been a continuity of evolution. On the contrary, the brain follows apparently in each Order its own plan of evolution. Hence in the comparison of the brains of mammals with each other, diversities of plan are recognised which make it impossible to determine precisely homologous fissures and convolutions in the whole series of animals with convoluted brains.

The homologies of the cortical areas of the cerebrum, therefore—in many instances at least—must be looked for rather in the similarity in microscopical structure and in function, than in any morphological arrangement.

Turner, like other anatomists in Scotland in the past, Barclay, Knox, and Goodsir, and like his friend John Struthers, fell a victim to the study of the anatomy of the whale. From her geographical position between the North Sea and the Atlantic, Scotland was most favourably situated for the acquisition of the means of carrying on this line of investigation. Her firths and estuaries, her island groups to the

north and west, with their bays and intervening straits and channels, offered special facilities for the capture of these ocean mammals, which found their way into the shallow waters in which they were stranded. The Firth of Forth has proved a happy hunting-ground for these marine monsters, not only in modern times but even in prehistoric days, before land and sea had assumed their present level. In the old "raised beaches" of the Carse land in the upper reaches of the Forth, many specimens of the fossil bones of the whale have been dug out of the soil in the process of road- and drain-making, or during the tilling of the ground in ordinary agricultural pursuits, and along with these cetacean remains, implements made of deer's horn, probably used by the Neolithic people for cutting up the blubber.

He has given us in his descriptive catalogue upon 'Marine Mammals,' published in 1912, an historical account of the finding of many of their remains. The earliest and most complete discovery of the kind was made at Airthrey, near Stirling, in 1819; the length of the whale whose fossil bones were dug out of the 25-30 foot raised beach, was roughly estimated at about seventy-two feet. The bones became the nucleus of the Natural History Collection now exhibited in the Royal Scottish Museum in Chambers Street. The first naturalist to write a detailed account of the large whales frequenting the Scottish seas was Sir Robert Sibbald, one of the founders of the Royal College of Physicians of Edinburgh. He gave a very precise description of the Great Rorqual, seventy-eight feet in length, which was stranded in the Forth in 1692, a typical specimen of the great whale now appropriately named Sibbald's Whale (*Balaenoptera Sibbaldi*). From his own observations, Turner was led to regard the prehistoric Airthrey whale as identical with Sibbald's.

In the Anatomical Museum of the University of Edinburgh, Turner has brought together and described

a collection of Marine Mammals which, in the number and variety of the species it contains, ranks next to that of the British Museum and the Museum of the Royal College of Surgeons of England; while in the species of whales frequenting the Scottish waters, the collection is second to none. It includes thirty-three different species, twenty-one of which had been stranded, or otherwise captured, off the Scottish coast. In addition to his own labours as a collector, he owed much to the enthusiasm and the generosity of many friends: to Sir Wyville Thomson and Sir John Murray, the naturalists of the *Challenger* expedition, to Sir John Struthers, a keen collector like himself, to Dr W. S. Bruce of the *Scotia* Antarctic Expedition, to Mr John Anderson of Hillswick, Shetland, and his three sons, and to many students and graduates, especially Dr Robert Gray, who from time to time took part in the Scottish Whaling Expeditions to the Arctic Circle.

To the biologist the fascination of whale study lies in the fact that they are animals essentially constructed on the plan of a land-living quadruped, which had become adapted to an aquatic life. The modifications in mammalian structure, connected with this complete change of habits, constitute for him one of the great charms in the study of these mammals. When their origin is regarded from the point of view of evolution, the hypothesis might be advanced that the whale was descended from some pre-existing land mammal which assumed aquatic habits, and that, in course of time, it lost the structures which were not necessary to it in its new *habitat*, while it came gradually to acquire structures essential to its altered surroundings. The rudimentary organs with which it was furnished were not to be looked upon as parts which were developing, but as parts in process of disappearing through want of use. "Such speculation from the very nature of the subject was incapable of being demonstrated, but it threw some light upon

the probable signification of parts and arrangements, which without its aid would have been meaningless and devoid of interest, and it assisted the biologist in forming some conception of the affinities which bound together different groups of animals."

Turner worked at their structure and classification, and did much to elucidate points which had previously been somewhat confused. His studies on the Cetacea began in 1866, with a dissection of the Pilot Whale, one of a school which visited the Firth of Forth in that year. His interest, however, was still further increased when, in 1869, a splendid specimen of Sibbald's Great Finner Whale was stranded in Longniddry Bay. Eighty feet in length, it weighed approximately about seventy-four tons. The whale aroused keen interest in Edinburgh and the neighbourhood, and special trains were run to Longniddry to enable the public to inspect it. Sam Bough, the well-known Scottish artist of that period, portrayed it in colours, and his sketch found a permanent place on the walls of Turner's study. The animal was afterwards towed across the Firth to Kirkcaldy, whither Turner and his assistant, Dr James Foulis, followed it in the pursuit of science. Sir James Russell has told us how they accomplished feats of observation and dissection of a somewhat hazardous nature. Foulis was obliged to part with his suit of clothes, while Turner, although more cautious, found that his footprints were an object of interest to all the dogs that crossed his path. At any rate, we know that in his desire for knowledge his health suffered at this period, as it did at no other time in his life.

From that date, many opportunities were afforded him of prosecuting his studies, not only upon the whales, but upon other members of the Great Cetacean Order—the grampus, the porpoise, and the dolphin; the sea-cows, the dugong, and the manatee from the coastal waters of the more tropical seas; the walrus,

the sea-lion, and the seals. One recalls his evident delight and interest in the performances of a large school of whales which disported itself off the Labrador coast when, on the afternoon of a lovely August day in 1897, the Allan liner *Parisian*, carrying many members of the British Association to Toronto, gradually approached the Canadian shores. The sun shone down from an almost cloudless sky upon a sea hardly rippled by the faintest of western breezes. Away over the steamer's bows the rocky coast of Labrador loomed ever nearer, while dotted, here and there, over the wide expanse of waters were innumerable icebergs and floes varying in shape and size, and glistening in the rays of the sun. Suddenly, right ahead, great columns of water were observed to rise from the surface of the sea, resembling more than anything else the fountains playing in the gardens of Versailles, but on a more extended scale; and as the ship steamed forwards, she was soon in the midst of the animals who were thus disporting themselves, and from the high forecastle deck it would have been easy to have dropped a stone upon more than one of the monsters, so close were they to the ship and so near to the surface of the water. How many there were it was impossible to say, but the whole scene left a picture upon the mind which time has not eradicated, and it was jokingly suggested by Captain Barrett, the commander, that he had arranged the spectacle for the special entertainment of his scientific guests.

The voyage was a memorable one for other reasons than those just narrated. The ship carried a human freight of great intellectual value. Seldom, if ever, have so many men of scientific reputation crossed the ocean together under one command, and the question was frequently discussed by those on board as to the effect which would be produced in the world of science at home if a catastrophe should overwhelm the liner and her passengers. Conspicuous on deck was the

genial presence of Lord Lister, the retiring President of the British Association, while Sir John Evans, his successor in office, became a familiar figure. The soldierly bearing of Sir George Robertson of Chitral fame attracted attention, and Mr F. C. Selous on his way to the "Rockies," recounted his experiences of big-game shooting in Africa. Sir William Ramsay, the discoverer of the new atmospheric gases, Helion and Argon, found relaxation in deck quoits and humorous anecdote. Canadian bishops returning from the Lambeth Conference, and riflemen from Canada fresh from their successes at Bisley, mingled with the groups of both sexes in their daily constitutional on deck. Had it been possible to read in some crystal globe what the future held in store for at least four of the voyagers, it would have disclosed to us four future Principals of British Universities, because in addition to Turner, the list of passengers contained the names of three who were afterwards to become known as Sir Oliver Lodge, Sir Donald Macalister, K.C.B., and Sir J. Alfred Ewing, K.C.B., Birmingham, Glasgow, and Edinburgh.

The occupants of no fewer than thirty-four Chairs in Universities and Colleges sat down almost daily in the saloon, and along with them were others who have since attained professorial status. Anatomists, biologists, and physiologists: chemists, botanists, and physicists: the geologist, the mathematician, and the engineer, for a time forgot their calling, and became ordinary travellers, anticipating fresh experiences in the New World. It was not to be wondered at that the commander fully appreciated the increased responsibility of his position upon that eventful voyage.

Amongst Turner's papers there are a number of letters, indicating not only his interest in Cetacean research, but showing how many men recognised the fact and supplied him with information, while others sought his assistance in determining difficult points.

LHANBRYDE, *Dec.* 26, 1912.

I thank you kindly for the presentation copy of your book upon Marine Mammals, which I received safely. I cannot help telling you of my luck.

I read in an Aberdeen paper an account of the finding of a strange fish! After reading the description twice, I came to the conclusion—*genus* Grampus! I started on Monday for Ross-shire by train, and got home the same night with complete head and arm of the beast.

It was a full-grown female grampus, 10½ feet long. It was creamy white all over (just like a white whale) and no trace of grey. The skull is 20 inches long, and the pectoral fin 26 inches: dorsal fin 18 inches high, so there is no doubt of its being Risso's Grampus. Is there a white variety in the Arctic? There was no "calf." It is the first I have seen in the flesh, and I think the first in the Moray Firth.

I had a note from Mr Wallace, Honorary Curator of the Inverness Museum: he says, "I have ordered Sir William Turner's book." So you see we are getting on in the North.

WILLIAM TAYLOR.

A letter from Sir Joseph Hooker had evidently interested him and had been preserved.

KEW, *December* 25, 1872.

Many thanks for your most interesting paper on the whales. The variable nature of the beak of *Ziphius Cavirostris* reminds me how variable all greatly developed organs are in plants; in other words, that when an organ is normally more highly developed in a species than in its congeners, it is very variable in that species.

Your appreciation of Owen's skill as a descriptive naturalist is very just.

The antiquarian interest of the Sperm Whale is new to me. No doubt it was rare always in our seas, or we should find more weapons made of the tooth, which would have been used as the Walrus tooth now is in the north.

I sometimes wonder why more remains of the great arctic mammals do not occur in the glacial drift. The attention of the hoped-for Arctic Expedition should be called to the conditions under which they occur in the uninhabited regions: the Esquimaux no doubt make away with the remains.

I have just found a few odd copies of my paper on *Wel-*

witschia, and shall address one to you for acceptance. Since its publication I received buds which I have placed in young Macnab's hands for study, and he has just communicated a good paper on the development of the floral organs to the Linnæan Society. He regards the ovular coat as carpellary, a very obscure point.

With best compliments to Mrs Turner.

Jos. S. Hooker.

Turner maintained a very active interest in the growth of the whaling stations in the Shetland Isles, which, during the last fifteen years, have developed into a considerable national industry. Every year a large catch is made, the crews of the vessels engaged being mainly Norwegians, while the labour in the shore factories is largely carried on by British hands. The money value of the products obtained in 1914, from the animals captured upon these stations, reached £61,500.

CHAPTER VIII.

SCIENTIFIC WORK (*continued*)—ANTHROPOLOGY.

Anthropology—Sources of material—Methods of study—Prehistoric man—The missing link—Aboriginal hill tribes in India—The peoples of Tibet—Of the Pacific Archipelago—The Maoris—The Australians—The Tasmanians.

ANTHROPOLOGY — the science of mankind — or, as Turner preferred to define it, the science of the races of man, though not the youngest of the themes of human inquiry, had, until the latter half of the nineteenth century, failed to take a well-defined position in the biological world, possibly on account of the somewhat indeterminate character of the science. An additional stimulus, however, was undoubtedly given to its study by the publication of the 'Origin of Species.'

In its restricted sense, anthropology implies the relation of man to the other mammalia; but in its most comprehensive meaning it covers a much wider field—man's origin, his fossil and prehistoric remains, his history, geographical distribution, and racial classification, his language, his physical and mental differences, while his moral being and social welfare must also be included within the full scope of anthropological research. To the inhabitants of Great Britain with her overseas dominions and dependencies, peopled

with various races of men, the study of anthropology should make a strong appeal.

Although an Ethnological Society had been founded in London in 1844, it was not until the year 1863 that an Anthropological Society was established in this country. The two Societies have since been incorporated in the Royal Anthropological Institute. The British Association for the Advancement of Science did not consider the subject to be entitled to the dignity of a separate Section until 1884, in which year the Association held its meeting in Montreal, when Section H, Anthropology, met for the first time under the presidency of the distinguished scholar, Dr (afterwards Sir) E. B. Tylor. Previous to that date, the subject had been discussed for the first time by the Association in 1846, under the title of Ethnology, as a subsection of Zoology, and later in association with the Geographical Section. It was replaced, however, as a distinct Department under the title Anthropology, in connection with Biology, at the Nottingham meeting in 1866. When the Association met in Edinburgh in 1871, Turner was chairman of the Department, and on two subsequent occasions, at Newcastle in 1889, and again in Toronto in 1897, he was President of the Section.

In the eighteenth century Linnæus, the Swedish naturalist, had assigned to man a place in Zoological classification. The Frenchman, Buffon, had described the physical characters of peoples, their varieties in form, feature, and colour, but from want of sufficient material he had been unable to arrive at a proper conception of Race. Blumenbach of Göttingen, at the commencement of the nineteenth century, with the most complete collection of skulls in Europe at his command, utilised craniology as a method of investigation, and established for the first time the basis of Ethnology, or the science of Races. It was not, however, until the middle of the century that Anders Retzius of Stockholm, with a collection of

crania even finer than that of Blumenbach, determined the basis of craniological classification.

Paul Broca, in his learned address to the members of the Anthropological Society of Paris in 1863, discloses the reason why the science had not made more progress before the earlier years of the nineteenth century :—

> The hour had not yet come; the means were not at hand; Comparative Philology had just made its *début;* Archæology had not extended beyond the confines of Western Europe; the twin sisters, Palæontology and Geology, were as yet scarcely able to walk. But within half a century the soil has been prepared upon which to build. The impassable Egyptian Sphinx has revealed his mysteries: the antiquities of America, these patents of nobility of a world which we cannot any more call new, have displayed before our eyes unexpected marvels: Nineveh and Babylon, exhumed from their coffins, now speak again . . . Africa, always inhospitable, has ceased to be impenetrable: the Australian continent has been explored. European ships carry our seamen and missionaries and our philosophers to every coast. Nearly all the peoples upon the globe have been observed and described; our museums have received their remains and casts; skulls and skeletons have rendered the study of the most distant races accessible to the sedentary philosopher.

The comprehensiveness of the science has made it wellnigh impossible for any single individual to do more than apply himself, with any degree of thoroughness, to one particular branch. Turner directed his studies to the physical side of anthropology. As an anatomist and biologist, calling to his assistance a study of geology and archæology, he worked to correct, to add to and to complete, so far as his material permitted him, the classification of human races upon a physical basis. Concentrating his attention largely upon craniology and the other bones of the skeleton, he made this line of research the basis of his anthropological studies. His museum, founded by the Monros and Goodsir, and enriched, as we have seen, by the efforts of his pupils and

friends, provided him with skulls representing all the races of the world, while further very valuable material was obtained from the staff of H.M.S. *Challenger*, on her return from a voyage of scientific research and discovery round the world.

At a time when the laying of the submarine telegraph cables was undergoing rapid development, public interest became aroused in the exploration of the ocean depths: the nature and composition of the sea bottom; the presence or absence of animals capable of destroying the covering of the wires; the temperature of the water through which the cables might have to pass, were matters of the highest importance. A committee of the Royal Society addressed a letter to Mr Goschen, the First Lord of the Admiralty, urging upon the Government the despatch of a circumnavigating expedition, thoroughly equipped for investigation of the great ocean basins. The project was cordially approved of, and on December 20, 1872, the *Challenger* sailed from Portsmouth under the charge of Captain George S. Nares, R.N., upon a voyage which was not completed until 1876. The chief of the civilian scientific staff was Professor, afterwards Sir Wyville Thomson, who temporarily vacated the Chair of Natural History in the University of Edinburgh, in order to superintend the work of the expedition. Amongst his colleagues were Mr John Murray (Sir John Murray, K.C.B.), upon whom devolved the publication of the *Challenger* Reports, Mr J. Y. Buchanan, and Mr H. W. Moseley, in whose hands the scientific investigations were placed. The skulls and other bones of the skeletons which were collected at the various ports of call were entrusted to Turner for purposes of description.

Yet one further source of material must be referred to—namely, the craniological collection of the Henderson Trust. Under the guidance of George Combe, the phrenological doctrines and methods of Gall and

Spurzheim had been keenly discussed and advocated in Edinburgh, and a valuable collection of skulls from various parts of the world had been formed under the auspices of the Phrenological Society. They became the property of the Henderson Trustees, and were housed in the Anatomical Museum of the University. The Craniological Department, the "Golgotha" of the Museum, thus came to be one of the finest in the country, containing no fewer than 1700 skulls representative of all the races of mankind inhabiting the globe.

Turner's chief contributions to Anthropology are contained in the Zoological series of the Reports on the Scientific Results of the Voyage of the *Challenger*, in which he deals with the comparative osteology of the Races of Men, and in a series of Memoirs published in the Transactions of the Royal Society of Edinburgh, as contributions to the Craniology of the People of the Empire of India; of the Natives of Borneo, Formosa, and the Malay Peninsula; the Craniology, Affinities, and Descent of the Aborigines of Tasmania; the Craniology of the People of Scotland, modern and prehistoric, descriptive and ethnographical. His work in this connection covers a period of fifty-two years, as we find him describing at the meeting of the British Association in Newcastle in 1863, a prehistoric skull found in the valley of the Somme near Amiens, and in 1915, reading his paper upon prehistoric Scottish crania before the Royal Society of Edinburgh.

The titles of his various communications hardly convey a true impression of the wide field which his work covered. While he handled the dry bones, and measured them with all his accustomed accuracy and care, his researches were by no means limited to the mere descriptive anatomy which this entailed. In his imagination, he must have pictured many lands and climes, and allowed his mind, too, to dwell

upon their living inhabitants. Esquimaux and Lapps from the ice-bound shores of the Arctic Circle; Mohawks, Cherokees, and Siwash from the banks of the Ottawa River and the Great American Lakes; Patagonians and Fuegians from the rocky wind-swept shores around the Horn; Negroes and Hottentots, Kaffirs and Bushmen from the sun-bathed African veldt; Chinese from Eastern Asia, tribes from the Himalayan slopes, hillmen from the upper waters of the Brahmaputra; Burmese, Siamese, and Malays, and the many native tribes occupying the islands of the Indian Archipelago and the great oceanic groups of the Southern Pacific — all furnished him with a rich and varied field of study. His thoughts dwelt also upon the life-history of the living person whose skull lay before him—his origin, descent, and affinities; his language; his habits and customs; his stature; the pigmentation of his skin; the colour of his eyes and hair, and the shape and arrangement of the latter; his migration by sea or land, and his possible intermingling with other peoples. The dry bones were thus made to live, and to form an important link in the chain of evidence forged for the purpose of establishing their place in the history of mankind. His knowledge upon most of these points was acquired by extensive reading, and from information derived both from correspondence and from intercourse with men who had travelled far, and had been in contact with the races whose bones he studied. His papers reveal the extent of his knowledge, and of his acquaintance with similar work previously carried out by others; they show the careful way in which he made use of the information thus acquired, in building up or pulling down the various hypotheses already advanced regarding the origin and affinities of many of the peoples coming under his observation.

It is very characteristic of his dislike of careless observation to find him commenting more than once upon

the slipshod way in which some travellers wrote of what they had seen: "If many of those who have had opportunities of travel and of pursuing geographical discovery had received, before they set out, a training in the methods of observing and of recording the characters displayed by the different races of men, we, who have to stay at home, would not find so many discrepant statements as to the colour of the skin and eyes, the form of the features, the character of the hair, and other aspects of the external anatomy of the natives of distant countries."

In any attempt to follow the lines along which Turner worked, and in order to obtain a correct appreciation of the deductions that he drew from the great mass of facts which he accumulated, it is necessary to have some conception of the scheme which he kept before him. More than any man of his time, he helped to build up a scientific knowledge of human races upon a solid foundation. When he was investigating variability in human structure, he wrote as follows: "In the development of each individual, a morphological specialisation occurs in internal structure and in external form by which distinctive characters are conferred, so that each man's structural individuality is an expression of all the constituent parts of his frame." Can the same proposition be applied to the study of race? Has a specialisation of structure of form and proportion taken place in each of the different races to such an extent as to stamp them too with definite anatomical characters; and if so, are the numerous variations to which the bones are liable so fixed and so constant as to enable the anthropologist to construct a classification of the races of man upon an anatomical basis? He formed the opinion that sufficient evidence existed to justify him in saying that racial differences, capable of being determined by anatomical methods, did exist, though as yet we were

not able to speak with absolute precision on all their features. "The differences are not limited to colour, but are participated in by the osseous skeleton. In any given race there is undoubtedly a considerable range of variation, which may be estimated by the individual differences existing amongst the people of that race. In determining, therefore, what are the anatomical characters of a given race, the extreme forms either in one direction or in another must not be taken as guides, but we must take those characters which appear most frequently in different individuals, and these must be designated as the mean characters of the race." His investigations into the skeletal characters of the different races of men were all conducted on this principle, and the conclusions at which he arrived express the mean results obtained.

"Owing to the migratory habits of man it is very difficult to obtain specimens of a pure or unmixed race. The lust of conquest, or the desire to extend commercial relations or the area for obtaining food, have led to a great intermixture of races, not merely living side by side but intermarrying with each other. Hence have arisen numerous mixed peoples, in whom the characters of the original races have become generally blended and modified, though individuals may exhibit in a form, more or less marked, the distinctive characters of one or other of the races from which the mixed people have sprung."

He adopted the method of craniological classification introduced by Anders Retzius, who grouped the races into the three great skull types—the long-heads (*dolichocephali*), the short-heads (*brachycephali*), and the middle-heads (*mesaticephali*). While the long-heads and the short-heads form the two extremes of cranium in the human series, they also represent types of mankind which differ from each other in many head characters other than those expressed by the relative length and breadth of the skull. The relation of the

height to the breadth of the cranium, the cubic capacity of the skull, the relative length and breadth of the face, the height and breadth of the orbits, of the nose and of the arch of the palate, while the projecting or upright character of the upper jaw—the prognathous or orthognathous type of face, as it is called—have all had much attention paid to them. When, with but a slight range of variation, the majority of these characters correspond in a particular tribe or people, they may then properly be considered as the cranial and head characters of the race and be of value for purposes of classification. So distinct is each type of skull that, when the races are pure, one may say that, where the cranium is markedly long-headed, then the short-heads do not occur in that race, and *vice versa*. The long-headed African Negro and Esquimaux are examples of pure or unmixed races, with their cranial and other physical characters so decided, that each of these people is distinctively differentiated from all other races. Similarly, the short-headed Andaman Islanders, the Mongolians, and American Redskins are distinguished by definite characters from each other, and from other races.

In the people or races which possess crania of intermediate proportions, the type may be due either to the skulls of individual members of the race generally being intermediate in their relative proportions to the two extreme forms, or, while some are long-heads, others short-heads, the proportion is so distributed that the mean of the race is middle-headed. This type, represented amongst many others by the people of the British Islands and Western Europe generally, is without doubt produced by an intercrossing of the long- and the short-headed races. There are, however, instances of apparently pure races in which the normal form of head is that of the intermediate group. It is seen in the Bushman of South Africa, with so many features distinguishing him from the surrounding people that he would seem to be representative of

a pure race, not improbably the remains of the primitive people of the African continent.

The existence of recognisable variations in the bones of the skeleton, other than in the cranium, also reveals evidence of racial characteristics. Variations in the curvature of the spinal column in the lumbar region, variations in the diameters of the pelvis and in the sacrum, and relative differences in the length of the bones of the upper limb to those of the lower limb, in the proportion borne by the forearm to the upper arm and by the leg to the thigh, in different races, furnish distinctive characteristics, which Turner and other anatomists worked out as further bases of classification.

He has related an incident apropos of cranial classification which may serve as an illustration of what has just been stated. Racial differences in the characters of the soft parts of the face are sufficiently known to most observers: those who have seen the short squat nose with its dilated nostrils in the African Negro, the Bushman, or the aboriginal Australian, have no difficulty in distinguishing it from the more elongated and projecting nose with its less expanded nostrils in the European races. Such differences, however, are equally recognisable in the skeleton of the white and black races. "I received from Sir Arthur Mitchell some skulls which were stated to be from Australia. I measured them carefully in the nasal region, and they all, with one exception, had the relative proportion of length and breadth of nose which one ascribes to the Australian blacks, while the exceptional skull was in accordance with the European standard. A few days afterwards I met my friend, and said to him that I thought there must be some mistake as to the locality of one of the skulls, that from the dimensions of the nose it could not be Australian, and I asked him to look at the specimens. He then recognised that by an error a Scotch skull had been sent to me along with the Australian crania."

Turner's earliest contribution to craniology was made in 1863. The recent discovery in Western Europe of some more or less fossilised human remains, which were regarded as possibly throwing some light upon man's antiquity, had naturally aroused public interest in the question. The fragments had been carefully described by Sir Charles Lyell in his then recently published volume upon the 'Antiquity of Man,' and by Huxley in his lectures upon 'The Evidence of Man's Place in Nature.' One, the Engis skull, found in a cave near Liège, had associated with it the bones of the extinct mammoth, the woolly rhinoceros, the cave bear, and some rude flints. Evidence thus existed of its geological antiquity, proving it to be the remains of Palæolithic man. The Neanderthal skull, discovered in 1857, between Düsseldorf and Elberfeld, furnished no such satisfactory proof as to the time of its living existence. It was characterised by the marked prominence of its supra-orbital ridges, by the low sloping nature of the forehead, by the flattened vertex, and the somewhat small occipital or posterior convexity of its contour. It became the object of much controversy. Did it possess typical race characters or form the lowest term of the human series, or was it specifically distinct from man, representing a transitional or intermediate form between him and the anthropoid apes?

Turner, who had lately come into possession of a skull excavated in 1861, from the quarries of St Acheul near Amiens, applied himself to a comparative study of the three prehistoric crania, and carefully compared them with a number of skulls, both of savage races and of modern British specimens. As a result of his examination, he had no hesitation in concluding that, although it might not be possible to produce another skull possessing a combination of all those characters which were regarded as so distinctive of the Neanderthal skull, yet the examination of an extensive series of crania showed that its characters closely

approximated not only to those seen in the crania of many savage races now existing, but even in the skulls of modern European nations. "How cautious, therefore, ought we to be in generalising either as to the ape-like affinities or psychical endowments of the man to whom it appertained. It is as yet but an isolated specimen; of its history prior to the day of its discovery we are altogether ignorant; its geological age even is quite uncertain. In coming to any conclusion, therefore, we have no facts to guide us save those which are furnished by an examination of its structural characters. And whatever marks of degradation these may exhibit, yet they are closely paralleled in the crania of some of the men, and women too, now living and moving in our midst."

Thirty-one years later, controversy was again aroused over the question of the "missing link" by the discovery, in 1894, of fossil human bones in Java. A skull-cap, a right upper molar tooth, and a left thigh-bone were found by M. Dubois in the Pleistocene alluvial deposits of a river bank. In his memoir upon the subject, Dubois announced that he had established the existence of a man-like transitional form as a connecting link between the apes and *Homo sapiens*. This he named *Pithecanthropus erectus*. Notwithstanding the fact that the skull possessed certain characters which approximated more to the human type than to that of the higher apes—being more spacious, the vault more highly arched, the diameters generally greater, and the supra-orbital ridges less projecting than in the ape—Dubois did not regard it as a human skull. The tooth, although larger than the corresponding molar in man, was not so strongly developed as in the gorilla and orang, while the thigh-bone, though possessing features of similarity with the human femur, presented others which, in his opinion, placed it nearer to the thigh-bone of the anthropoid apes.

It was only natural that statements of this kind would stimulate controversy amongst biologists in all

countries. One of the most notable contributions to the discussion came from Turner's pen. Recognising that the weak point in Dubois' comparative examination was the fact that he had limited it almost entirely to a comparison with the bones of Europeans, neglecting the remains of those of races now dwelling under savage conditions, he proceeded point by point to criticise the author's deductions. Provided with ample material of his own, though only able to utilise Dubois' drawings and measurements, he concluded that the fossil remains furnished no evidence of a new genus or species intermediate between apes and man. "The existence of such a transitional form is still a matter of speculation, and has not been placed on the basis of ascertained fact." There was nothing in the configuration of the skull-cap to place it in a different category from those of the remains of Quaternary man obtained in Europe.

In a letter to Cunningham, dated Edinburgh, May 5th, 1895, he writes :—

> I returned to work on the 1st, much the better of my holiday. I picked up rapidly in Paris; the weather was superb, and the clear dry air most invigorating.
>
> I have now received the Verdhandlungen der Berliner Gesellschaft für Anthropologie, &c.; and on January 19th, Dubois' memoir was discussed by Krause, Virchow, and others. When in Paris I attended a meeting of the Society of Anthropology, and heard a discussion on the same subject and my criticism thereon.
>
> Opinion is divided both in Berlin and Paris as to the significance of the remains. The discussion in the French Society was, I understood, the second which they had had. It will, I suppose, appear in the next number of the 'Bulletin de la Soc. d'Anthropologie.' I cannot say that my opinion is changed by what I have read or heard since my paper was prepared, either as to the skull-cap or the thigh-bone. The tooth is, I admit, more difficult to interpret.
>
> The French Government have applied to the Dutch for a mould of the skull-cap, so that there is a chance of a cast being procured in a little time.

I had read notices of your tourist traffic meetings, and would say that D. J. Cunningham has quite enough in hand without undertaking work of that kind. Cook and Gaze are the people to organise your tours and traffic.

I am to give twenty-five lectures this summer on physical anthropology, and shall have ten or twelve students.

W. TURNER.

Writing in 1910, upon the theory of descent, he stated: "To account for the origin of man's physical structure from a pre-existing lower mammalian form, the pedigree of his body requires to be traced further back than the existing anthropoid apes. It is possible that *Pithecanthropus* may represent a stage in the process of evolution, and from the dimensions of the skull-cap and the apparent capacity of the brain-case, it is in more direct line with existing man than with any form of ape with which we are at present acquainted."

It is not without interest for the reader to glance at some examples of the further use which Turner made of his anthropological material, and to note the lines of reasoning along which he worked. His main object, as we have said, was to determine racial affinities or differences based upon physical characteristics as evidenced in the skull, and in the skeleton in general. By an examination of the skeleton, and more particularly of the skull, data are furnished which demonstrate beyond doubt either racial affinity, or the contrary, between different peoples. External characters of resemblance may be noted, but they do not necessarily imply affinity of race. So, too, a common language must not be regarded as a reason for assigning similarity of race between two peoples. Examples are not unknown of a people having lost its original tongue, and speaking a language acquired from another race, with which it had been brought into intimate contact through conquest or immigration. On

the other hand, when a common language is associated with similarity of skull types, additional support is brought to bear upon the affinity of race. Archæological remains, too, cannot be overlooked in considering the question of descent, and must be given their proper place in the whole scheme of things.

His investigations into the craniology of the people of India dealt entirely with the aboriginal wild tribes occupying the hills and plateaux, who, preserving more or less completely their religion and tribal customs, were distinct from the Hindus who lived in and cultivated the valleys and more fertile plains. But where the Hindus have come into more immediate contact with the aborigines, the latter, while retaining to some extent their ancient forms of faith and customs, have in other respects adopted the Hindu religion and modes of thought.

These tribes, extensively distributed through the Madras Presidency, the hill ranges of the Central Provinces, Orissa, and the hill tracts of Western Bengal, are known as the Dravidians and Kolarians: this classification has been made by writers on philology and ethnology upon linguistic grounds. But it by no means follows that tribes speaking a Kolarian dialect are racially distinct from those who speak Dravidian. From his examination of the skulls of the tribesmen of both groups, Turner drew the conclusion that, for descriptive purposes, all the tribes may be classed as Dravidian: they presented the long type of head with many other features in common—characters which gave support to the view that all of them possessed an essential structural unity.

It has been assumed that the Kolarian invaders had preceded the Dravidians and had migrated into India through the north-east passes, wandering southwards into the Madras Presidency, while the Dravidians had found their way into the Punjab by the north-western routes, spreading thence into

Central India. They are regarded as older inhabitants than the Aryans, who are thought to have entered India, more than 4000 years ago, from the Hindu Kush, the Pamir Plateau, and the high valley of Kashmir, and, in their head characters, they undoubtedly contrast with those of the later Aryan invasion. As to whether India had been occupied by a people even more ancient in origin than the Kolarians, evidence has accumulated, from time to time, of the existence of both palæolithic and neolithic implements and remains. "While we can scarcely expect to trace a direct continuity between the present aborigines and these prehistoric men who manufactured the primitive palæolithic implements, it is worthy of consideration as to whether some of the existing hill tribes may not be descendants of the people of neolithic times. Of the hill tribes which I have described, one at least, the Juangs, are without doubt the most primitive, and from the evidence collected by Colonel Dalton, who regarded them as representatives of the New Stone Age people, there seems to be little reason to consider them otherwise."

Many ethnologists of great eminence have regarded the aborigines of Australia as closely associated with the Dravidians of India, while some also consider the latter to be a branch of the great Caucasian stock and affiliated therefore to the Europeans. If these two hypotheses are to be regarded as sound, a relationship between the aboriginal Australian and the European would then be established through the Dravidian people of India. The opinion regarding the racial unity of Australian and Dravidian has been based upon the employment by both peoples of certain words apparently derived from common roots; by their use of the boomerang; by the possibility that the Indian peninsula had, in a previous geological age, a land connection with the Australian-Malayan Archipelago, and by certain correspondences in the

physical types of the two peoples. Both Dravidians and Australians have dark skins approximating to black; dark eyes; black hair, either straight, wavy, or curly, but not woolly or frizzly; thick lips, with low nose and wide nostrils. But when the skulls are compared, there ought not to be much difficulty in distinguishing the one people from the other. The Australian skull is longer, heavier, and with a more receding forehead, and the jaw is distinctly more projecting; while the cranial capacity of the Australian skull is less than that of the Dravidian. Though corresponding in some particulars, they differ in others; and from a comparative study of his two series of crania, Turner was led to conclude that they furnished no evidence in support of the theory of the unity of the two peoples.

The people inhabiting Tibet, a country so long jealously guarded against the intrusion of Europeans, interested him. Even before the British expedition to Lhasa in 1904, under the command of Sir Francis E. Younghusband, the district had been penetrated by adventurous travellers. The Tibetans were regarded by these explorers as essentially of one race, resembling the Mongolian peoples. They were seen in the semi-nomadic pastoral tribes, though in the towns and villages there was evidence of intermixture with the Chinese in the north, and with the natives of India in the south and west. The pastoral tribes were short-headed, flat-faced, and oblique-eyed, presenting the Mongolian type. But in Eastern Tibet, in the province of Kham, the British expedition had disclosed a type of men never observed in the central and western areas. They constituted the bravest portion of the Tibetan army. Showing little of the Kalmuck features, they were long-haired and hazel-eyed, with well-formed profile and light-brown skin. Their skull measurements furnished additional proof of distinctive race characters,

as the Kham warriors were long-heads and presented other cranial features distinguishing them from the Tibetans. Whence came the long-headed people of the Kham province?

To the east of Tibet and in relation to the mountain ranges north of Burma, where the Brahamaputra and Irrawady rivers had their source, there lived a people speaking closely connected languages and dialects, a Tibetan-Burmese stock. An examination of their physical characters and of the configuration of their skulls was of value as possibly throwing some light upon the origin of the Eastern Tibetan tribe. Turner had opportunities of studying both the Kham warriors and the skulls of the hill tribesmen upon the North-Eastern Frontier of India, and while the latter possessed in the main a Mongolian type of feature, their skulls were long-headed or closely approximating to that standard. As in other skull features also, they corresponded closely to those of the Kham warriors, craniology supported the view, emphasised in this instance by affinity of language, that both belonged to a common stock, the elements of difference between them being no greater than might be found in the skulls of people of the same race.

He also had evidence to show that the tribes of this north-eastern mountainous district had penetrated southwards into Burma many centuries ago. He had examined skulls from an old cemetery in Burma, which were obviously long-heads and quite distinct from the short-headed modern Burmese people. In the course of the ages, these long-heads had become displaced by the short-headed Burmese, allied in all probability to the Chinese. It has been generally assumed that a Mongolian type of feature is exclusively associated with the short-headed skull, because the best-marked Mongolian races are undoubtedly of that type, or closely approximating to it. But in the hill tribes living to the north-east of India and with a prevailing Mongolian aspect, the short-

heads are the exceptions and the long-heads are the prevalent form. Hence, Mongolian type of feature is not necessarily associated with one type of skull.

If we turn to the great aboriginal races of the Pacific islands, two well-defined peoples come under consideration: the Papuan-Melanesians occupying New Guinea and the island groups to the immediate east and south—New Britain and the Solomons, the New Hebrides and the Loyalty Islands, the Fiji, the Admiralty group, and New Caledonia. The natives are characterised by their sooty-brown or black skin, black frizzly hair and well-developed beard, constituting in the main a long-headed people, while a certain proportion of short- and intermediate-heads indicate the presence of more than one race of men. The Polynesians, on the other hand, occupy the more easterly islands—the Sandwich group towards the north; the Marquesas, the Society and Cook's Islands, Samoa and the Friendly Islands, the Ellice Islands, and New Zealand in the south. They are distinguished by their skin of light brown or yellow hue, by their straight black hair and scanty beard, and the short-headed type of skull.

That the two peoples in the Pacific have mixed is evident. A general survey of the islands established upon a sufficiently broad basis the important fact, that in comparatively few of the islands or groups of islands are the crania restricted either to a simple long-headed or short-headed standard. Both forms do, without doubt, occur in their pure state, but along with them, skulls of mixed or intermediate proportions are not infrequently mingled. These variations can be sufficiently accounted for on the theory that the two races, Melanesian and Polynesian, are in some islands pure, in others mingled with each other, either in distinct colonies living side by side in the same island, or by intermarriage; though on the western side of the Pacific region

the short-headed Malay and Negrito, inhabiting the islands of the Indian Archipelago, have, without doubt, exercised an influence in modifying the crania and other characters of some of the islanders in that region.

As to which was the older race, it was difficult to say. Turner, however, had formed the opinion that the Pacific islands generally were, at some remote period, inhabited by the long-headed Melanesian race, which in several islands had been replaced by the Polynesians, in others intermingled, while in others the race had retained its pristine purity.

It is interesting in connection with this point to study the descent of the Maoris. The traditions of the New Zealanders, the study of their language by philologists, and the observations on their external characters by Captain Cook and other voyagers, have all combined to lead to the conclusion that the Maoris are an offshoot of the great Polynesian race, while their traditions point to Samoa as the group of islands from which they had sprung. If this view of their origin be correct, then we should expect that their cranial characters would correspond to those of the people from whom they had originated. But Turner's investigations upon this point show that there is a strong tendency in the Maori skulls to assume the long-headed proportions—though a small percentage are short-heads—and thus they depart from the pure Polynesian type. The conclusion, therefore, to which he came from a study of the skulls, gave support to the view that New Zealand had been occupied by a dolichocephalic (long-headed), and probably Melanesian race before the Polynesian element had been introduced.

Although craniological research into the distribution of the Melanesians and Polynesians furnishes a large mass of facts, yet it does not overtake all the ethnological problems presented by the study of the anthropology of this extensive and widely scattered archipelago.

There are certain residual quantities of which it is not possible to give a satisfactory explanation, on the supposition that these were the only races which had ever occupied the Pacific islands. There are the remarkable archæological monuments which have been found upon some of them. Of these, the megalithic remains on Ponapé or Ascension Island, the megalithic platforms, stone houses, and colossal stone sculptures of the human figure on Easter Island, the curious cruciform stone platforms on Malden's Island, and the megalithic monuments on Tongatabu and some of the Gilbert Islands, are the most noticeable. The natives appear to have no traditions of the construction of these massive remains, and to be themselves unable to erect similar objects. The question therefore arises, have they so far degenerated from some higher grade of intellectual development as to have lost both all memory of the deeds of their ancestors and the power of executing such works, or did these owe their origin to some pre-existing race which inhabited the Pacific region? We cannot look to Australia, as a centre of migration to the northwards, of a race possessing a higher culture and civilisation capable of architectural design and execution, for the aboriginal Australians are, in their intellectual development and knowledge of useful arts, much below either the Melanesians or Polynesians, and, moreover, they are not a seafaring people. Neither does it seem probable that, if these remains had been constructed by early Polynesian settlers, all memory of them would have departed, for there is ample evidence on many of the islands inhabited by the Polynesians, of the propagation by oral tradition throughout hundreds of years of the valorous acts of their great chiefs.

Various theories have been advanced as to the origin of the brown Polynesians. They have been regarded by a few as of American descent, and as having diffused themselves over the eastern islands of the Pacific in the course of the trade winds. Most writers have regarded their origin as Asiatic. Some of these consider that they are derived from the Malays; others again consider that both Polynesians and Malays sprang from a common Asiatic stock, and that they both migrated from this centre along independent routes to their respective geographical areas. Mr W. H. Ranken considers that this stock was Mongolian, as oblique eyes are common in Samoa, and in Tahiti many a Chinese labourer might be mistaken for a native. Others again think that we are to look to Hindustan for the origin of the Polynesians. Others have accounted for the people of the Pacific, both

Polynesians and Melanesians, on the theory, so ably advocated by Darwin, that the Pacific is an area of subsidence, "and its great widespread groups of coral reefs mark out the position of former continents and islands," and that "the races of men now inhabiting these countries are therefore most probably the descendants of the races which inhabited these islands and continents."

Dr Kraus accounts for the Melanesian people of the Pacific by supposing that in prehistoric times a great south oceanic continent existed, which extended from the east of Africa up to the Indian Ocean, over which the black race spread southwards into both Africa and the South Seas, to their present habitat. The deep-sea investigations of the *Challenger*, as well as the absence of characteristic continental rocks in oceanic islands, have, however, by the demonstration of the great depth of the Pacific and Indian Oceans, and by the apparent absence of any great changes in the bed of these oceans since Tertiary times, thrown great doubt upon the possibility of such an extensive continent ever having had any existence in either the Indian or Pacific Oceans.

As regards the hypothesis of Mr Wallace—that the brown and the black peoples are merely varying forms of one great oceanic race, the diversities of which are to be accounted for from "the old but certain effects of the varying physical conditions which have resulted in the present state" of the surface of the land in Oceania—it is difficult to understand wherein such varying physical conditions could exist in islands subject to such uniform or closely allied climatic conditions as the New Hebrides and Friendly Islands, even on the supposition that they had at one time been the tops of continental mountains, so as to produce in one a black-skinned, frizzly-haired, long-headed stock, and in the other a brown-skinned, straight-haired, round-headed people.

The descent and affinities of the aborigines of Australia and Tasmania, two peoples differing as they do from each other, undoubtedly present an ethnological problem which has been much discussed and variously interpreted. The aboriginal Australian, as he is known to-day, is of moderate stature, with black hair, straight or wavy and relatively long, and his skin is of a chocolate-brown colour; he is markedly long-headed with projecting brows, his cranial vault

dome-shaped, but possessing a small cranial capacity. In the now extinct Tasmanian, on the other hand, shorter in stature than the Australian, the hair was more definitely black, and of the short, woolly, frizzled type; the skin black or very dark-brown; he also was long-headed but with brows less prominent than in the Australian, while his small cranial capacity placed him in the microcephalic group. Two peoples presenting such obvious distinctions in the characters of their hair and the colour of their skin could not be regarded as of one and the same race.

The Australian in his racial characters may therefore be distinguished from the long-headed, mop-haired, black-skinned Melanesian; from the short-headed, brown-skinned Polynesian; from the short-headed, straight black-haired, yellow-skinned Malay; and from the short-headed, woolly-haired, black-skinned, dwarf-like Negrito. Many ethnologists of eminence have regarded him as closely associated with the Dravidian aborigines of India; but, as we have seen, Turner was unable to support that view, though he does not appear to have been able to trace the Australian descent.

The question of the affinity of the now extinct Tasmanians is not without interest to the inhabitants of Britain, as they occupied a land which, like our own island in its previous relation to the continent of Europe, was once continuous with the island-continent of Australia, before its separation by the comparatively narrow and shallow Bass Strait. The consideration of the fauna of Tasmania, more especially the Marsupial mammals occupying both Australia and Van Diemen's Land, supports the view of the previous continuity of the two countries. In considering the origin of its human inhabitants, and putting on one side the possibility that they were a distinct species of man, as some anthropologists have maintained, there remains the theory that the Tasmanian aborigines were descendants from immigrants

from other parts. As the islands to the south were not populated, the migration would necessarily have been from the north.

The whole question of their descent is one of great complexity and difficulty. Two theories have been discussed: was Tasmania originally colonised by the people of New Guinea by immigration through Australia or from some of the Oceanic islands in the Pacific? If colonised through Australia, presumably the migration took place across the once existing continuous land bridge. If colonised, on the other hand, from the Oceanic islands, we must look for evidence as to whether they, and presumably their ancestors, possessed suitable transmarine craft for conveying themselves across large tracts of ocean. If such had existed in the days of their ancestors, there is no evidence to show that the art of constructing capacious sea-going canoes had been transmitted to their descendants. If we accept the view that the Tasmanian immigration took place while the country was still linked up with Australia, we are at once met with the important differences in the external characters of the two peoples, and it becomes impossible to accept the descent of the Tasmanian from the aboriginal Australian as we know him to-day.

To the north of the Australian continent, New Guinea and the Asiatic islands reaching westwards from it were occupied by the dwarf-like race of Negritos, with whose physical characters the Tasmanian in some important respects resembled, though in stature he was not a dwarf. It would appear that, at one time, Asia and Australia had been connected through the chain of islands lying between them. It was possible, therefore, that the original dwellers in Australia owed their descent to a primitive Negrito stock which had wandered across the island-continent and found their way into Tasmania before the separation of the land. But while the fauna were identical

in the two countries, the human element when Tasmania was discovered was not the same. On the hypothesis that both lands had originally been peopled by Negritos, that race had disappeared from Australia, and the straight-haired people now known as the aborigines had taken its place. The absence of the latter in Tasmania, however, would point to the separation of the island thousands of years ago, before the new Australian race had reached the southern seaboard of the continent.

"Tasmania thus isolated, its inhabitants were precluded from intermixture with other races. Close interbreeding was thus necessitated, which during the centuries and in a limited population would intensify, perpetuate, and give permanency to physical and other characters which might arise from time to time amongst them, and would accentuate differences between them and the parent stock from which they had sprung. Hence, the Tasmanians would assume characters which would give them the aspect of a race distinct from the other races in more or less proximity to them. The evidence seems to be, therefore, in favour of the Tasmanian descent from a primitive Negrito stock which migrated across Australia, rather than by the route of the Melanesian Oceanic islands lying to the north and east of the Australian continent."

CHAPTER IX.

SCIENTIFIC WORK—ANTHROPOLOGY—*continued.*

Prehistoric and modern inhabitants of Scotland—Conclusions regarding the races of men—Skulls of St Andrew and Robert the Bruce—Origin of term, ravenbone—Summary of scientific work—Distinctions and honours.

TURNER'S work upon the races of men was not confined entirely to the study of aboriginal hill tribesmen, to the Esquimaux and the denizens of Africa, and to the natives of the Indian and Pacific Archipelagoes. One of his most important lines of research was upon the Craniology of the People of Scotland, the first part of which, published in 1903—the year in which he resigned the Chair of Anatomy—was a study of the characters of the crania of the modern Scottish people. Prior to its appearance, no systematic descriptive account of Scottish crania had been written, though isolated observations had been made by Sir Daniel Wilson, Barnard Davis, Cleland, and Sir William Flower. Turner had begun to form his collection many years earlier, recognising the necessity of acquiring sufficient material if satisfactory deductions were to be made; at the same time, he took pains to ascertain, so far as was possible, the exact localities from which the skulls were obtained. His collection of Scottish crania numbered one hundred and seventy-six.

A letter which he received from Huxley in 1865, is not without interest in this connection :—

LONDON, *Nov.* 18, 1865.

I know that you are a sufficiently busy man to be able to forgive me for being dilatory in the matter of correspondence, but I thank you very much for your last letter and paper.

Your Australian pelvis fits in perfectly with the series of measurements of male Australian and Papuan pelves, which I had already obtained. I drew attention to the remarkable peculiarities of the Australian pelvis in my Hunterian Lectures two years ago, and especially to the small size of the intermediate diameter, and all the measurements I have met with since have borne out the statements I then made.

It would appear from what you say about Scottish skulls that Thurman's rule about English crania applies north of the Tweed—"Long barrows, long skulls; short barrows, short skulls." What we want now mainly is a set of careful measurements of a couple of hundred Scottish skulls of known localities.

When you are looking at crania, will you have the goodness to note any cases in which the frontal and maxillary bones come into contact in the inner wall of the orbits, so as to separate the lachrymal bone from the *pars plana* of the ethmoid. I have noted two or three cases, but it seems to be a very rare occurrence. In the union of the *pars plana* and lachrymal, the Orang and Man resemble one another and differ from the Gorilla and Chimpanzee.

I quite agree with you about the anthropologists. They are a pestilent set of scientific snobs and incapables!

T. H. HUXLEY.

It was not until the end of 1915, a few months before his death, that Turner completed his memoir upon the Scottish people, by publishing a second comprehensive article upon the prehistoric crania, in which he discussed the prehistoric peoples of Britain in their general ethnographical relations. It furnishes ample evidence of his acquaintance with the geology and archæology of North Britain, derived in part from his own observations, but amplified by the work of his friends, Professor James Geikie, Sir Arthur

Mitchell, Dr Joseph Anderson, Dr Robert Munro, and Mr A. O. Curle.

During the thirteen years of his office as Principal he devoted many hours to his craniological investigations, notwithstanding the administrative duties which his position demanded of him. He regarded his scientific work as a form of relaxation, and the completion of his study upon the Scottish crania gave him the greatest satisfaction. During his last summer vacation in August 1915, which he spent in North Wales, he finished the correction of his proof-sheets, while residing within a few miles of Peny Gwyrd, where fifty-nine years before he had spent another August holiday completing his translation of Virchow's Cellular Pathology, in the preparation of Paget's Lectures.

In order to obtain a correct estimation of the geological age of many of the skulls which he examined, it was necessary that he should know something of the manner of their burial. For this purpose he visited the scene of a number of the Scottish excavations which were made from time to time, and he examined for himself the character of the soil, the shape of the tombs, the position of the skeletons which they contained, and the other contents of the graves. His earliest experiences were gained in 1864, when he accompanied Sir James Simpson, an archæologist of no mean reputation, to the Catstane field at Kirkliston, where Mr Robert Hutchison of Carlowrie was engaged in excavating the long cist burials. From these graves Turner obtained four imperfect skulls, which formed the first specimens of his own collection of early Scottish crania.

In Scotland, as in other countries, man existed before the time of written history.[1] In Western Europe, of which Great Britain formed an integral part, the remains of prehistoric man have been found

[1] Sir William Turner on Prehistoric Man in Scotland. Lecture at the Royal Institution.

in association with those of the great mammals then extant, and along with them, the rudely chipped and fashioned flints, and portions of bone and horn made from the large mammals, the implements of his hand. These tools and the men who made them, belonged to Palæolithic times, the Pleistocene or Quaternary age of the Geologist. Palæolithic man wandered into Britain along the bridge of continuous land which then united it with the Continent. He was distinctly a long-head, with strongly projecting frontal ridges, as the Engis and other skulls testify.

Although recent evidence has been adduced by the finding in the Tertiary gravel-beds of fractured flints which, according to some observers, show marks of design, the case for man's existence in the Tertiary or pre-Palæolithic days can hardly as yet be regarded as proven. We know not, therefore, whether man lived in Europe before the Ice Age.

Although geology can tell us that in Palæolithic times man lived upon the earth, it can furnish no precise statement as to the date of that period in the world's history. While in Scotland, the interglacial beds have yielded remains of the mammoth, the red-deer and the Irish elk, no trace either of Palæolithic man or of the work of his hands has been discovered. If he ever did exist in North Britain—and there is no reason why he might not have migrated northward from England—the grinding effect of the second ice-sheet over the surface of the land, and the wearing away of the alluvial deposits, would obliterate the relics of the interglacial period. The absence of massive limestone caves, such as are found in England and in which his bones were preserved, affords sufficient explanation of the reason why he has not been discovered north of the Tweed. It is possible, however, that some day traces of Palæolithic man may yet be found in Scotland.

We must look, therefore, to a period subsequent to the melting of the second great ice-sheet for evi-

dence of the existence of early man in Scotland, and although there is no trace of him during the formation of the 100-foot beach or terrace, one can speak with certainty of his presence during the period of formation of the later beaches. At the edge of the Carse lands of the Forth estuary in the 45-50 foot raised beach, the shell mounds or kitchen middens of Neolithic man have been brought to light, along with the skeletons of the large whalebone whales and implements made from the horn of the red-deer. In the basin of the Clyde and in the Carse clay of the Tay estuary, dug-out canoes have been found embedded. No human skull or skeleton, however, has been seen along with these relics, the oldest evidence of the handiwork of man in Scotland.

In the caves formed by the action of the waves at the period of formation of the 25-30 foot beach, the first traces of human remains in Scotland are found. In the rock shelters situated in the cliff which bounds the esplanade at Oban Bay, bones representing human skeletons, along with those of the red and roe-deer and many other animals were unearthed in 1869. Other caves in the same district have been opened at later dates. The presence of polished stone implements and shallow vessels of coarse clay associated the human remains with Neolithic man, obviously of the same race as the builders of the English long barrows.

The question has frequently been discussed, whether on the Continent as well as in Britain, the Palæolithic race had become extinct before the advent of the Neolithic, or whether they had co-existed and the Neolithic people in course of time had displaced them without destroying them. With climatic changes the large mammals, their cotemporaries, had disappeared; but man, with his greater power of adapting himself to changes in environment, probably survived, and it is possible, therefore, that Neolithic man brought with him into North Britain a strain of Palæolithic blood,

derived from intercrossing in more genial southern climes, with the Palæolithic peoples who had preceded him. He entered Britain from the Continent possibly before the disappearance of the continuous land bridge, but if the intermediate strait had formed, then he crossed in coracles and dug-outs, though it is difficult to conceive that his domestic animals could have been thus conveyed along with him. But a secondary land bridge may have become elevated, across which the migration took place.

Hence the Scottish people have a long ancestral descent, modified in type throughout the centuries by a succession of invasions from the continent of Europe. Their ancient Neolithic ancestors, the people of the polished Stone Age, possibly with a strain of Palæolithic blood, were short in stature, but not dwarfs; they were the builders of the Long Barrows in England and of the Chambered Cairns in Scotland, and they knew not the use of metals. Inhumation was their more common practice, but cremation was employed. Their crania were long and relatively narrow, of a purely dolichocephalic type; the face was long in relation to the breadth, the nose was narrow and the upper jaws did not project. If the conjecture be correct that they were descended from the South European people of the Mediterranean basin, then their skin would have been brunette, the hair jet-black, and the eyes black or dark-brown.

The recognition of ores, the discovery of the methods of extracting metals in order to provide a more suitable material for the manufacture of implements and weapons than the flint, stone, and bone already in use, marked important advances in the development of human intelligence. Neolithic man was followed by the people of the Bronze Age, of a different type: the builders of the Round Barrows in England and the short Cists in Scotland, amongst whom cremation was at first an occasional accompaniment of inhumation, but subsequently became general, thus giving a marked

character to their interments. Evidence of inhumation and cremation has been found in excavations all over Scotland, so that there is abundant information that she had her Bronze Age. As the ores of tin and copper do not occur in North Britain, they were doubtless brought from the southern part of our island, and were substituted for the more primitive materials previously employed. As in the Neolithic period, there is no evidence of the buildings which can be distinctly regarded as dwelling-places for the men of this time, but there is ample proof in the cinerary urns and in the short stone cists, or coffins, of the manner of their interment. Along with ashes and human skeletons, articles of bronze and gold were found, and in addition to the metallic objects, implements of flint and stone have been discovered in many of the localities examined, indicating that in the earlier occupancy of Britain by the Bronze Men, their weapons and tools resembled those of their Neolithic predecessors.

In stature the men of the Bronze Age were, as a rule, taller than their predecessors, though, in some of the cists, shorter skeletons have been obtained. Their crania were shorter and relatively broad, a brachycephalic or short-headed people, but in some of the short cists, as in the English Round Barrow burials, a proportion of longer skulls occurred, indicating that the Neolithic people had commingled with their short-head successors. The face was short in relation to its breadth, the nose was narrow, and the upper jaws did not project. On the supposition that they were derived from the Mid-European Alpine stock, the hair was probably dark-brown or black, the eyes brown or hazel, and the skin a pale brunette. The short-heads, for more than a thousand years, occupied Britain from north to south, and from east to west. They were a most important factor, which persisted during later invasions and is in evidence at the present day.

In the course of centuries, the Bronze Age people ceased to be the dominant race in Britain, and they

were followed by successive invasions of other races from the Continent—the Celts, the Norsemen, the Anglo-Saxons, the Danes, the Romans, and the Norman-French. The Celts, as their immediate successors, introduced the use of iron implements, so that the Iron Age gradually displaced the Bronze. Coming from Gaul and the country of the Belgæ, and perhaps intermarrying with North European tribes bordering upon mid-Europe, they became a mixed people. Owing to their habit of cremation, archæology does not offer much evidence of their physical characters, though the more recent opening of cists in Mid- and East-Lothian, containing human remains and objects of the Iron period, have enabled Turner's old pupils and assistants, Professors Bryce and Waterston, to show that the crania approximated to the long type of head. As a race, however, there was no uniformity, as short-heads, long-heads, and heads of intermediate proportions existed.

Subsequent invasions of Scotland by the Romans, and the conquest of England by the Norman-French, exercised no permanent influence upon the physical character of the people. The Norsemen, on the other hand, from the three Scandinavian countries of Northern Europe, have left their relics upon various parts of the coast, and an account of their burials in Caithness, Sutherland, the Orkneys and Shetlands, has been given by Dr Anderson. Implements and weapons of iron, various objects in bronze, and silver ornaments have been found, and the skeletons in some cases would appear to have been encased within wooden frames held together with iron rivets, as if the Viking had been buried in his ship. The Viking burials in Scotland have, unfortunately, given few opportunities for measuring the skulls of the Norsemen. The type, however, was that of a long-headed race with a proportion of short-head comrades; they were tall in stature, with fair skin and hair, and with blue eyes.

At the close of the Roman occupation in the fifth

century, the Anglo-Saxons from Jutland, Schleswig-Holstein, the Frisian Coast and the Netherlands, conquered the greater part of England, and found their way along the Eastern coast of Scotland, colonising the Lowlands and the Lothians, superseding the Christian worship with their Pagan rites, like the Danes who followed them. These people were, in a large measure, of Norse descent, though the Saxon element had doubtless undergone some intermixture with mid-European people.

Turner thus describes the modern Scot :—

> Owing to constant intermarriage amongst these races in the course of centuries, it has become difficult to discriminate in the densely-populated areas of the British Isles the several strains of blood. Where the inhabitants are fewer in number and, through local conditions, scattered and relatively isolated, evidence of descent from an original stock or stocks can be traced. The characters of the modern Scottish crania present their own individual points of interest. The skull is generally capacious, with the mean cubic capacity in the male exceeding that of the female: it belongs to the type occupying the intermediate position between the long-heads and the short-heads, though a strong brachycephalic strain prevails, probably evidence of their Bronze Age ancestry. The face is high in relation to the width, the nose is prominent, long and narrow: the lower jaw has a well-defined angle and a pronounced chin. From intermarriage, a mixed and virile people have been evolved, endowed with physical frames capable of great endurance, provided with and acting under the governance of brains of energy, quality, and volume, which have enabled them to gain and retain a dominant position among the nations.

Turner's general conclusions upon the races of men and his attitude towards the part played by evolution, so far as ascertained anatomical facts justified him in going, are summed up in the following paragraphs abstracted from more than one of his addresses :[1]—

[1] Address to the Royal Medical Society, Edinburgh. Presidential Address, British Association, Bradford, 1900.

We have no knowledge at what period of time the great divisions of mankind came into existence. We do know, however, that it was long before any written history. The ancient monuments of Egypt have carved or painted on them types of certain human races as distinct as those which now inhabit the earth, and which show that when a race preserves itself from intermixture it can secure a permanency of type. These races must have existed long before such monuments were constructed. But whilst we speak of different races, or of distinct types or varieties of man, we must not be led away with the idea that these races, or types, or varieties are different species. The anatomical differences between them are not such as to justify that conclusion, and further, all the races of mankind are fruitful with each other, and can beget fruitful offspring. They are to be put into the same category, as regards their mutual relationship, as the various breeds or varieties of oxen, sheep, or other domestic animals.

The perpetuation of anatomical differences in a race is an illustration of the great physiological law that the peculiarities of the parent are transmitted to the offspring, so that, whilst room is permitted for individual variation, the mean characters of the race are retained from generation to generation. To some extent, undoubtedly, the habits of a race will affect the configuration of the skeleton. Within certain limits the forms of the bones are without question influenced by the muscular apparatus which is attached to them. If, then, the habits of life of one race call into play some special group of muscles, which are not, through a difference in habit, so constantly employed in another race, then I have no doubt that the form of the bone, not merely as regards the prominence of the processes to which the muscles are attached, but the relative area of the surfaces of attachment, would undergo a corresponding modification.

But muscular action is not the only force that has to be considered as exerting an influence upon the skeleton. Weight and pressure also play an important part, especially in the spinal column and the pelvis, though these parts of the skeleton also have their form and curvatures materially influenced by the action of the muscles. I believe, therefore, that we may in some degree ascribe the differences in the configuration of the skeleton in various races of men to the influence of habit operating through muscular action and pressure upon the bones when in a comparative plastic condition, and in the course of years moulding them into the form which they present in the adult man. But although this explanation may,

I think, be accepted as accounting for some of the differences which one sees in the skeletons of different races of men, there are others which it is more difficult to explain.

The cranial bones are subject to pressure—viz., the pressure of the growing brain, which so closely fills the cranial cavity; and it may be said that the form of the cranium is determined by the direction in which the brain grows. But if we were to accept this as a sufficient explanation of the force at work in producing these different forms of cranium, there would still remain to be accounted for, why the brain should grow proportionally more in breadth in one than in another race. These differences in the relative length and breadth of the skull, with its contained brain, are not of necessity associated with a small size of skull and brain in the one form, and a larger skull and brain in the other. For amongst the long-headed races we find some with large brains and vigorous intellects; others with much smaller brains and feeble intellectual powers, and similar differences exist amongst the short-heads. In all probability the growth both of the skull and brain is regulated by the same force, whatever that may be. The box and its contents both grow contemporaneously, and the bones are moulded on the organ which they enclose.

The differences in the form of the skull which are expressed by the terms dolichocephalic, brachycephalic, and mesaticephalic are not confined to existing races. Although our knowledge of the races which inhabited the earth in the early part of the human period is very imperfect, yet, in various parts of Europe, crania have been found in deposits which belong to the glacial period. Of these very ancient skulls, some are long-heads, others short-heads, and others are intermediate in form. Whatever may have been the cause which originally occasioned the divergence of the two extreme forms—dolichocephalic and brachycephalic—the types would become perpetuated by hereditary descent. In various other respects also, the skeletons of primeval man exhibit characters similar to those which are found in more than one race of existing men, so that we may say that the differences which have as yet been recognised in the skulls and skeletons of primeval man are no more, either in degree or kind, than are to be seen in the corresponding parts of the men of the present day.

In the examination of the skeletons of existing races of men, characters at times present themselves in some races, which one recognises as more in accordance with the ordinary mammalian arrangements, than is the case with the corre-

sponding parts of other races. These characters are sometimes spoken of as degraded, or animalised, or ape-like. From the point of view of the theory of evolution they would be regarded as marking a stage, or stages, in the evolution of the human organism, from a form or type lower than man, to the most perfectly developed condition of the human skeleton, or as reversions from a human to a lower mammalian type. Undoubtedly they do express a stage in the evolution of the individual man.

Descent and habits are therefore two great factors to be considered in the study of the variations which one meets with in the skeletons of different races of men, and of the causes which have induced them. It would be difficult to assign to each of these factors its exact value in the production of the variations, and the line between them cannot indeed be sharply drawn. For a variation originally engendered by habit in a race may be perpetuated, after the habit has ceased to be practised, through the influence of hereditary descent; although it is not unlikely that, under such circumstances, the variation would become less strongly marked in successive generations, and perhaps in time disappear. Conversely also, the influence of hereditary descent might be more or less neutralised by the introduction of some habit, the effect of which would be to produce a variation in a direction different from that which has been hereditarily transmitted.

It is not possible to fix with absolute certainty the geological epoch when man first appeared on the face of the earth. We know nothing of primeval man in those parts of the globe which are now inhabited by the black and yellow races, and we cannot fix the period when the pigmentary differentiation took place which led to the production of their characteristic colour of skin and hair, and to the modifications of the skeleton which we find them to exhibit. Skeletons of prehistoric men have been found in various parts of America, and the crania belonging to them are in some cases long-headed, in others short-headed, in others of intermediate form.

From the examination of the skeleton in the different races of men, so far as we have had opportunities for making a comparison, we should not be justified in stating that any single race, or any group of races, was in all the relations of the skeleton more highly developed than the rest; or that any other race, or group of races, in all its skeletal relations was more lowly developed than all other races. By highly

developed, I mean a condition of the skeleton which is further removed, either from the characters and proportions of the skeleton in mammalia other than man, or from the infantile condition of the man himself; and by lowly developed, one which is either more closely approximated to the mammalian characters and proportions, or to the infantile condition of the human skeleton. For, whilst Europeans in many of their skeletal characters, such as are exhibited in both skull and pelvis, are more widely removed from mammals generally than are aboriginal Australians, Bushmen, Negroes, and Kaffirs, yet on the other hand, in the proportions of the shaft of the lower limb to the shaft of the upper limb, and of the thigh to the upper arm, the black races are more widely removed from the apes than are Europeans. The tendency to produce a thigh-bone with a prismatic shaft, which is the very opposite of an ape-like character, is more marked in the Australian blacks than in the white and yellow races; whilst the Lapps and Esquimaux, of all the races which I have measured, most closely approach the apes in the proportions of the thigh to the upper arm, and of the shaft of the lower limb to that of the upper limb, they are amongst the races most widely removed from the apes in the proportions of the forearm to the upper arm, and of the leg to the thigh. The different varieties of man, so far as we know them, do not seem, therefore, to exhibit such a graded condition of the skeleton as would indicate that by successive stages a human type had been produced, which in all its skeletal relations was superior to all other varieties of man; or that the white races, which we will assume to be the most highly developed, have been derived by successive stages of slow and gradual perfecting of all their structures from the lowest existing black race, or indeed from any one of the existing black races.

Various lines of evidence point to the continent of Asia as the original home of man, from which he probably spread by slow migration over the habitable globe. Whether he did or did not originate by a process of evolution from some ape-like mammal it is impossible to speak with certainty. Much has been advanced, and will doubtless continue to be advanced, in support of this hypothesis of the origin of man. But, so far as the methods of scientific inquiry will carry us, we have no direct evidence. Man's first appearance on the earth is so obscured in the mists of a bygone epoch as to be beyond the range both of observation and experiment, and from the very nature of the case is incapable of being demonstrated. We may speculate if we choose as to his mode of origin, but we

must not forget that our speculations are matters of inference only, and their value is to be estimated by the weight which one may attach to particular groups of facts. So far, however, as the evidence is at present before us, the so-called ape-like characters, sometimes described as present in the human skeleton, are not such as would lead any competent anatomist to mistake a human bone for that of an ape, or to say that in the fossil remains of man, so far as we know them, the existence of a transitional form between man and the higher apes has as yet been discovered.

We know not as regards time when the fiat went forth, "Let there be Life, and there was Life." All that we can say is that it must have been in the far-distant past, at a period so remote from the present that the mind fails to grasp the duration of the interval. Prior to its genesis, our earth consisted of barren rock and desolate ocean. When matter became endowed with Life, with the capacity of self-maintenance and of resisting external disintegrating forces, the face of nature began to undergo a momentous change. Living organisms multiplied, the land became covered with vegetation and multitudinous varieties of plants—from the humble fungus and moss to the stately palm and oak—which beautified its surface and fitted it to sustain higher kinds of living beings. Animal forms appeared, in the first instance simple in structure, to be followed by others more complex, until the mammalian type was developed. The ocean also became peopled with plant and animal organisms, from the microscopical diatom to the huge leviathan. Plants and animals acted and reacted on each other, on the atmosphere which surrounded them, and on the earth on which they dwelt, the surface of which became modified in character and aspect. At last Man came into existence. His nerve energy, in addition to regulating the processes in his economy, which he possesses in common with animals, was endowed with higher powers. When translated into psychical activity, it has enabled him throughout the ages to progress from the condition of a rude savage to an advanced stage of civilisation.

The physical aspect of the question, although of vast importance and interest, yet by no means covers the whole ground of man's nature, for in him we recognise the presence of an element beyond and above his animal framework. Man is also endowed with a spiritual nature. He possesses a conscious responsibility which enables him to control his animal nature, to exercise a discriminating power over his actions, and which places him on a far higher and altogether different

platform from that occupied by the beasts which perish. The kind of evolution which we are to hope and strive for in him, is the perfecting of this spiritual side, so that the standard of the whole human race may be raised and brought into more harmonious relation with that which is holy and Divine.

The human intelligence is still in process of evolution. The power of application and of concentration of thought for the elucidation of scientific problems is by no means exhausted. In science is no hereditary aristocracy. The army of workers is recruited from all classes. The natural ambition of even the private in the ranks, to maintain and increase the reputation of the branch of knowledge which he cultivates, affords an ample guarantee that the march of science is ever onwards, and justifies us in proclaiming that great is Science, and it will prevail.

Turner's intimate knowledge of skulls and bones, human and other, led to his being the recipient of many osteological remains, often accompanied with the request that he would throw some light upon their nature and possible origin. But in addition to this, his advice was sometimes sought upon anatomical matters presenting undoubted historical interest. A photograph of a portion of the cranium of the Scottish patron saint was submitted to him for further information regarding it, on behalf of the late Marquis of Bute, who was a distinguished archæologist. Turner received a letter from his friend Professor Bell Pettigrew of St Andrews :—

THE UNIVERSITY, *April 20th*, 1895.

Our Lord Rector, the Marquis of Bute, who is a great archæologist, has sent me a photograph of what remains of the head of St Andrew, our patron saint. It is the upper part of the head—the bones of the face and lower jaw being absent. His lordship is anxious to get any information about the head which scientists can give him—shape, size, capacity, brain power, phrenological development, probable race, &c.

The history of the skull is briefly as follows: St Andrew was crucified at Patras in the province of Achaia. When taken down from the cross he was buried by Maximilian at

Patras, where he lay until the Emperor Constantine removed him to Constantinople. After the sacking of Constantinople in 1204, the papal legate, Cardinal Peter Capuano, who was a member of a noble family of Amalfi, brought the remains to Italy, and presented them to the cathedral of his native city in May 1208. There they remain to this day, with the exception of such portions as have been distributed to other religious institutions.

There is a tradition that the head of St Andrew is at Rome, and a skull which figures as such is there exhibited. The mass of evidence, however, is greatly in favour of the Amalfi skull.

Of course one might very well doubt the authenticity of either skull after the lapse of eighteen centuries, but I give you the facts as known to me. As you have paid much attention to crania, I thought the accredited skull of St Andrew would interest you, and I shall be very glad to have your opinion regarding it. J. Bell Pettigrew.

The photograph, which he received for purposes of examination, depicted a skull-cap enclosed in a glass shrine, supported upon the shoulders of two small cherubs. It was obviously difficult for him to arrive at any very precise conclusions as to the type of skull thus portrayed, and he was unable to furnish Pettigrew with any really instructive facts. The skull was evidently that of an aged person of the male sex, the sutures between the different bones composing it being obliterated. Its two halves were symmetrical; Turner placed it in the brachycephalic or short-headed group.

In the spring of 1914, while spending his vacation in Southern Italy, Turner remained for a few days in the old town of Amalfi, and, following his usual custom, he visited the cathedral. Anxious as he always was to see everything of interest, he descended to the crypt below the high altar, and, by the aid of a lighted taper, was shown the remains of the bones of the Scottish saint reposing in their glass shrine.

Lord Finlay has related how he drew Turner's attention to a criticism which he had read in some

publication, to the effect that the skull of Robert the Bruce belonged to the Neanderthal type. As Turner had seen and carefully examined Bruce's skull, he was able to give an emphatic denial to the criticism, pointing out that it was entirely unfounded, and that the head to which Scotland owed so much was, from the craniologist's point of view, of a very good type.

In 1891, the following communication was addressed to him by Mr Adam W. Black, at that time the head of the publishing house of A. & C. Black :—

4 Soho Square, London,
February 17*th*, 1891.

I must apologise for taking the liberty of troubling you with an inquiry which I hope you will excuse my intruding upon you.

In preparing a new edition of Scott's Works for the press, our reader has been arrested by the words "Raven bones" in the Bride of Lammermoor, and his efforts at finding an explanation or definition of the word have hitherto proved fruitless.

Dr Murray, the editor of the New English Dictionary, has, among others, not been able to throw light upon the word. It may be and probably is an old hunting term, but possibly it may have been made use of by surgeons or anatomists some centuries ago, and if so, you may have come across it.

The "flankard"—the word immediately preceding it—signifies, I believe, the protuberance on the haunch or loin: so it is given in the best dictionaries, but all are silent as to "raven bones." I enclose you a copy of the passage where the term occurs, and if you can oblige me with any explanation of it I shall regard it as a favour.

Adam W. Black.

That he was able to assist Mr Black is evident from a second letter he received :—

London, *March* 14, 1891.

I am very pleased indeed to be put in possession of the long-looked for definition of "ravenbones."

The question may now be regarded as completely answered, and I beg to thank you for all the trouble you have so kindly bestowed in solving it. A. W. BLACK.

The word "ravenbones" occurs in the description of the hunting scene in the 'Bride of Lammermoor,' when Bucklaw proceeds, after the death of the stag, to display his skill in the method of cutting it up. "Soon stript to his doublet, with tucked-up sleeves and naked arms up to the elbows in blood and grease, slashing, cutting, hacking, and hewing, with the precision of Sir Tristran himself, and wrangling and disputing with all around him concerning nombles, briskets, flankards, and ravenbones, then usual terms of the art of hunting, or of butchery, whichever the reader chooses to call it, which are now probably antiquated."

Turner, in his inquiry, sought the assistance of the late Mr Webster, then Librarian of the University Library, and as a result of their investigations they were able to furnish Mr Adam Black with the required information. Unfortunately Turner's letter to Mr Black has been destroyed, but in the glossary attached to the Dryburgh Edition of the Waverley Novels published by the Blacks in 1891, the definition of ravenbones is given, and this is believed to be the gist of his explanation. It reads as follows: "The spoon-bone of the brisket, thrown by hunters to the ravens, in cutting up the stag." Turner obtained his information by consulting Turberville's 'Art of Venerie,' in which the following definition of the term was found: "There is a little gristle which is upon the spoon of the brysket which we call the Ravensbone, because it is cast up to the Crowes or Ravens which attende hunters."

Dr Murray had evidently not given up his search for an explanation of the term, as we find Mr Black sending to Turner the following passage from Ben

Jonson's "Sad Shepherd," which he had received from the Lexicographer:—

Rob. Pull'd down and paunch turn'd out.
Mar. He that undoes him
Doth cleave the brisket bone, upon the spoon
Of which a little gristle grows; you call it— ?
Rob. The ravens bone.
Mar. Now o'er head sat a raven.

On referring to the New English Dictionary, edited by Murray, we find that the above quotations from Turberville and Ben Jonson have been introduced under the definition of Ravenbone. The word "spoon" is defined as the hollow at the lower end of the breast-bone, the little gristle upon it being the "raven's morsell." The student of anatomy is more familiar with this as the ensiform cartilage.

During the long period of sixty-two years Turner worked at the science which he loved; from 1854, when he read his first paper as a student at St Bartholomew's before the members of the Abernethian Society, to 1915, when he communicated his last memoir upon prehistoric Scottish crania to the Royal Society of Edinburgh. He very wisely published in pamphlet form a complete list of his papers, classified according to the subjects treated, with the name and date of the Journal or Transactions in which they appeared, thus rendering useful service to any one engaged upon similar lines of research. The list includes 277 papers.

When we recall the fact that he worked to the age of 84—and the intrinsic value of what he recorded was not lessened in spite of his advanced years—we cannot but marvel at his energy. The majority of men are ready and willing, and indeed justified, as regarding themselves entitled to take a well-earned rest at a much earlier age, while some,

unfortunately, have no choice in the matter. But that was not Turner's way.

His papers upon the Marine Mammals were sixty in number, his work in the field of Comparative Anatomy and Zoology was recorded in one hundred and four papers, while his studies in Anthropology embraced fifty-one publications. "Without detracting from his contributions to Comparative Anatomy, it may be said that it was in Anthropology that his work and his influence were most fruitful. To the power of his teaching is largely due the eminent position of British Anthropology—its richness in detail, grasp of principles, and boldness in speculation; qualities in which its only rival is the French School."[1] What he accomplished in any one of these three lines of research might be justly regarded in itself as a highly satisfactory performance in his scientific career, especially when, as in his case, so many other duties demanded his attention. It was characteristic of his methods that he could concentrate upon and carry through to completion, as far as the material at his disposal permitted, all that he undertook. He showed no tendency to pass from one subject for the purpose of taking up another, which merely presented prospects of giving more striking results. He worked indeed at a variety of subjects; but the same line of thought, the same object in view, can be traced through them all—the determination to show by ascertained facts that the Darwinian theory, so far as it involves hereditary transmission, could be proved on an anatomical basis, but that the same basis furnished no clear proof of the evolution of new species from pre-existing forms.

He wrote no large text-book upon Human Anatomy, which perhaps, in one sense, was a misfortune, if we may judge from the high standard of his handbook on Human Anatomy and Physiology, which he wrote very early in his life, as an extension of his article

[1] 'British Medical Journal,' February 1916.

on Anatomy in the ninth edition of the 'Encyclopædia Britannica.' He was approached with a view to assisting in the production of one of the editions of "Quain's" Anatomy, but he held somewhat decided views upon the question of collaboration, views which he saw no reason to alter later in life. When consulted by Cunningham on this point, he wrote as follows:—

> A number of years ago, the late Allen Thomson spoke to me about associating myself with Quain. I gave no encouragement to the suggestion, as I did not wish to sink my individuality under the general heading "Quain," and my idea of how I would compile a text-book, were I to undertake one, did not coincide with the order and method of Quain.
>
> The matter therefore went no further, and my ideal text-book has not been written. You will see, therefore, how the suggestion presented itself to my mind, and I have never regretted my decision, for it left me free to pursue my own course and line of work. No question arose as to remuneration, for I did not look to text-book writing as a source of income. It seems to me to be a conflict between freedom to pursue your own work, and the possible payment to be derived from writing for the publishers.

Whether Cunningham was influenced or not by what Turner wrote to him we do not know, but he never collaborated in the production of any edition of Quain's Anatomy.

Turner consistently acknowledged the work previously done by others in similar fields of research, and one cannot but be struck with his modesty in the method of stating the advances which he himself had made.

In estimating the value of his scientific work, other aspects of it stand out in bold relief, concerning which there cannot be two opinions. It is marked by the careful manner in which he performed it and by the extreme accuracy of his observations; no detail was regarded as too insignificant to record. It may be at once assumed that the results obtained from his

observations were correct, whatever criticism may be passed upon the deductions drawn from them. There is nothing of a slovenly character in his work, nothing hastily or unnecessarily produced, merely for the sake of publication. His written words, like those which he spoke, expressed his statements in the clearest manner and leave no doubt in the mind of the reader as to their meaning. He has accumulated a rich store of facts in all the subjects to which he devoted his attention. Whoever in the future may seek to follow along similar lines of research, must of necessity consult his writings, from which he will derive not only much useful knowledge, but a valuable insight into the correct methods by which such knowledge may be obtained.

In a letter dated from University College, London, November 1913, Professor Thane wrote :—

> I thank you most cordially for Part IV. of the 'Contribution to the Craniology of the People of the Empire of India.' In reading it I cannot refrain from the wish that some of our younger colleagues could be made to appreciate the value of precision in statement, and accuracy in language and expression, and not be so anxious to make changes, often precipitate and ill-considered, which, it seems to me, are causing great confusion, and will continue to do so for a long time to come.
>
> I hope that you are well, and that you will continue your valuable work, which will persist as fundamental rock when the hypotheses of the day have passed away.
>
> G. D. Thane.

"Whatever may become of hypotheses," Cuvier wrote, "the man who has made a permanent addition to our knowledge of facts has rendered an imperishable service to Science." While facts are undoubtedly necessary before any deductions can be drawn, the mere process of recording such is not in itself a sufficient means to an end. "To reach the end, facts which are common to groups of detail must be carefully sifted out and classified, and expressed in

general propositions, and then, after all, may require to be accepted in a tentative spirit. Science is always advancing, and every advance provides a fresh platform from which a new start may be made."

Turner's deductions are characterised by a spirit of caution and an absence of that ill-conceived speculation which has not always been based upon a reliable foundation. "He did not confuse the positive results of science with the unverified theories which may be spun from them." His cautious conclusions are always based upon the facts which he accumulated, and he did not allow his imagination to run riot and lead him into propounding hypotheses, which he could not substantiate upon the data already obtained, though, as he has himself reminded us, a touch of imagination is undoubtedly of assistance in scientific inquiry. The spirit of caution was an innate characteristic of the man which revealed itself not only in his scientific work, but in matters of everyday life, and in the administrative and financial problems with which he was called upon to deal. It was not only this natural trait in his character that led him to weigh carefully the opinions which he expressed upon the scientific facts revealed to him, but the further knowledge that in anthropology, at any rate, much harm had at one time been done to the best interests of the specialty, by many ill-judged hypotheses.

No more fitting tribute has been paid to the memory of his scientific achievements than that which was accorded to him by his friend, Professor Arthur Keith :—

> When the medical history of our times comes to be written, Sir William Turner's name will find a place in the very first rank. To those who love the spectacular, his work will not appeal: like another man, with whom he had much in common —John Hunter—he never startled his contemporaries with any single outstanding discovery. Yet his life was a continuous succession of discoveries. As they were made, he

fitted them deftly into the mosaic work of acquired and growing knowledge. To appraise his life-work at its proper value, it has to be viewed not as a series of isolated, often splendid, fragments or pieces, but in its proper setting—as an intrinsic part of the general progress in medicine, which has been made in our time. Like Hunter, he was a builder, not restricted to one single line of endeavour, but covering many fields. Like Hunter, he built a great museum; he realised that specimens could still live and speak, when the printed word was dead. Unlike Hunter, he was a statesman. The progress of the community was as much to him or more than the success of his own affairs. On the thread of his life are strung all the beads of British Anatomy for half a century and more.

The earth may yet disclose her hidden secrets and reveal them for man's investigation. Future generations may witness the development of some more perfect doctrine than that of Darwin. New epochs may emerge and react upon those which have gone before, and the origin of all animate creation may be presented to us upon a perfect scientific basis of reasoning.

Amongst Turner's pupils who were inspired by his zeal of work and devoted themselves to anatomical study, no one has taken a higher position, or contributed more successfully to the field of comparative anatomy and anthropology, than D. J. Cunningham. His memoirs upon the brain, the spinal column, and the structure and configuration of the skull are examples of constructive work of the greatest value to anatomists. By his premature death science was deprived of one of her most able exponents. Amongst his pupils also, who have continued to work in the department of anthropology, are Professors Arthur Thomson, T. H. Bryce, David Waterston, and R. J. A. Berry.

The honours which Turner received in recognition of his scientific attainments were very numerous. The city of his adoption was not slow to recognise the value of his work. He was elected an Honorary Member of the Royal Medical and Medico-Chirurgical

Societies and an Honorary Fellow of the Obstetrical Society. The Royal Scottish Academy chose him as their Honorary Professor of Anatomy, a position which he retained for thirty-eight years, and he was the recipient of the Academy's silver medal. He was twice elected President of the Royal Physical Society, first in 1863 and again in 1885, having the unique distinction of holding the office on each occasion for four successive years. He became President of the Scottish Microscopical Society, and it is worthy of note that he did not accept these honours and at the same time disregard their responsibilities, but he attended the Societies' Meetings and contributed to their scientific work. He became President of the Royal College of Surgeons of Edinburgh in 1882. He was made Deputy-Lieutenant of the City and County of Edinburgh, when his friend Sir James Russell was Lord Provost.

His association with the Royal Society of Edinburgh was a long and honourable one. Elected a Fellow in 1861, he became a member of Council in 1866, and in 1869 he succeeded Professor Allman as one of the Secretaries to the Ordinary Meetings, holding the office for twenty-two years, at first, along with his colleague Professor Tait, and afterwards with Professor Crum Brown. In 1891, he was elected a Vice-President, occupying the position for ten years. Finally, when the Presidential Chair became vacant in 1908, through the death of Lord Kelvin, he was appointed his successor, remaining in office for five years. The Transactions and the Proceedings of the Society bear eloquent testimony to the scientific work which he contributed, and in their appreciation of it the Council awarded him, in 1871, the Neill Prize, and again, in 1903, the Keith Prize for his memoirs upon the Craniology of the Peoples of India and Scotland. Turner was deeply attached to the Royal Society, whose welfare was to him second only in importance to that of the University.

When, in 1906, the National Galleries Bill for Scotland foreshadowed the removal of the Royal Society from its old habitat in the Royal Institution in Princes Street, Turner took an active part in helping to secure the Society's new premises at 22 George Street, where it is now accommodated rent free, in a building which is Government property, and where it receives from the Treasury a grant of £600 per annum. The chief merit of carrying out this important reform was undoubtedly due to the energy and ability of Professor George Chrystal, the Society's General Secretary, at the time when negotiations were being carried on with the Government. Turner was selected as the spokesman of the deputation which interviewed the Secretary for Scotland (Lord Pentland), and in a powerful speech he so impressed the Government with the reasonableness and justice of the claims of the Royal Society for suitable accommodation for its library and offices, that the matter was speedily brought to a satisfactory termination.[1]

Turner was elected a Fellow of the Royal Society in 1877, and he became a Member of Council in 1890. The Anatomical Society of Great Britain and Ireland elected him as their President in 1892, on the resignation of Humphry, and the blue ribbon of science in this country came to him in 1900, with his election as President of the British Association at the meeting held in Bradford. The Royal College of Surgeons of England, who had appointed him as their Lecturer on Anatomy for 1875 and 1876, elected him an Honorary Fellow of the College in 1893. The Athenæum Club of London selected him for membership in recognition of his eminence as a man of science.

Turner was an Honorary Member of the Royal Irish Academy; a Foreign Member of the Anthropological Societies of Paris, Brussels, Rome, and Berlin; a Corresponding Member of the Royal Prussian Academy,

[1] I wish to acknowledge my indebtedness to Dr Cargill Knott for the information bearing upon this, with which he kindly provided me.

and of the Academy of Medicine of Petrograd. Many Universities both at home and abroad honoured him: he received the D.C.L. of Oxford, Durham, and Toronto; the LL.D. of St Andrews, Glasgow, Aberdeen, Montreal, and the Western University of Pennsylvania; the D.Sc. of Dublin and Cambridge.

The distinction of Knight of the Royal Prussian "Ordre pour le Mérite" was conferred upon him by the German Emperor in 1912, in recognition of his scientific attainments, and was a source of great gratification to him. The same honour had previously been bestowed upon Lord Lister, and upon a few of Sir William's contemporaries in this country—Sir William Ramsay the chemist, his old friend Sir John Murray the oceanographer, on William Stokes the physician, and one or two others. The vacancy in the Order which had occurred through Lister's death earlier in the year was filled by Turner's appointment. The satisfaction which it had previously given him began to undergo a change during the first year of the War, and as successive months disclosed the hypocrisy of the Kaiser, and revealed the true character of the man, he no longer retained the same feeling of pride in its possession. In order to show his repugnance at the events which were taking place, he gave instructions to have the distinction deleted from the list of honours attached to his name in the various public records in which it appeared. Had it been possible for him during the War to have returned the insignia pertaining to it, he would not have hesitated to do so. The incident reminds us of Pasteur's feelings of bitterness in the Franco-Prussian War of 1870-71, and of the action which he took under somewhat similar circumstances. The story is related in his Life by Réné Vallery-Radot. In 1868, the University of Bonn had conferred upon Pasteur the Honorary Degree of Doctor of Medicine, and he had been much pleased with this acknowledgment of his scientific work. With his mind embittered by the outrages and inexcusable

violence of the Prussians, he wrote in January 1871 to the Head of the Faculty of Medicine in Bonn : "I am called upon by my conscience to ask you to efface my name from the Archives of your Faculty, and to take back the Diploma as a sign of the indignation inspired in a French scientist by the barbarity and hypocrisy of him who, in order to satisfy his criminal pride, persists in the massacre of two great nations."

Should the University in which Turner worked for so many years, and whose interests he so loyally served, seek to bestow upon his memory a posthumous honour, surely no more fitting recognition could be made than by the foundation of a Memorial Chair of Physical Anthropology. His museum, with its rich store of material for illustration, could hardly be excelled, and there would thus be established a permanent memorial of one who must always be regarded as the founder of the Scottish School of Anthropology.

CHAPTER X.

EARLY WORK IN THE SENATUS ACADEMICUS.

Members of the Senatus—Sir Robert Christison—The Senatus and the University Court—Women and the Study of Medicine.

At the meeting of the Senatus Academicus held on April 24th, 1867, Turner was introduced and presented the Commission in his favour as Professor of Medicine and Anatomy. With his admission to the Senatus, he at once commenced to take the personal and active interest in University affairs which he retained until the end of his career. Nine years had elapsed since the Universities (Scotland) Act of 1858 had been placed upon the Statutes, an Act which left the control of University administration in the hands of the Senatus, subject to the supervision of a new body, the University Court, and the preliminary difficulties associated with the radical changes in University government, which the Act had imposed, had been largely surmounted. Matters of educational importance, however, were constantly presented for consideration, and to these he turned his attention and added the weight of his opinion.

Sir David Brewster, who had succeeded Lee as Principal in 1859, presided over the deliberations of the Senatus. At the time of Turner's appointment, Brewster's failing health made it increasingly difficult for him to discharge his University duties, and he

appeared for the last time officially at the meeting of the Senate in October 1867. After his death in February of the following year, his place as Principal was filled by the appointment of Sir Alexander Grant, Baronet. Amongst Turner's colleagues in the Faculty of Arts, we find the venerable figure of Campbell Fraser, the Dean, Professor of Logic and Metaphysics in succession to Sir William Hamilton. W. Y. Sellar, the scholar, who had followed Pillans, was Professor of Humanity; John Stuart Blackie, always a picturesque figure in the streets of the city, was in the Chair of Greek; David Masson, the friend of Thackeray and Douglas Jerrold, had brought back to Edinburgh something of her old membership in the universal republic of letters, and was inspiring his students from the Chair of Rhetoric and English Literature. Peter Guthrie Tait maintained the fame of the Chair of Playfair and of D. J. Forbes, his old teacher, whose place he had been called to fill in 1860. Cosmo Innes was the occupant of the Chair of History and Constitutional Law, and Philip Kelland of Mathematics, while P. C. MacDougall taught Moral Philosophy in the Chair made famous by Dugald Stewart and "Christopher North." Herbert Oakley was Professor of Music, and John Wilson discharged his duties in the Chair of Agriculture along with those of Secretary of Senatus. Charles Piazzi-Smyth was Astronomer-Royal for Scotland.

In the Faculty of Law, James Muirhead was Dean and Professor of Civil Law, and James Lorimer, Norman Macpherson, and James Stuart Tytler were his colleagues. Theology was represented by Robert Lee, T. J. Crawford, David Liston, and William Stevenson.

During the thirteen years of Turner's demonstratorship, several changes had taken place in the personnel of the Medical Faculty. Laycock had succeeded Alison in the Chair of Medicine in 1855, Lyon Playfair had been elected to the Professorship of Chemistry vacated by William Gregory in 1858, Douglas Maclagan had

taken Traill's place as Regius Professor of Medical Jurisprudence in 1862, and James Spence had followed Miller in the Chair of Surgery. Christison, Syme, Simpson, Hughes Bennett, Allman, Henderson, and John Hutton Balfour, the Dean of the Faculty, still held office. Turner's association with some of his medical colleagues was destined, however, to be but a brief one. In the year following his appointment, Lyon Playfair resigned, and was elected first Parliamentary Representative of the Universities of Edinburgh and St Andrews; James Syme and William Henderson retired in 1869, on the ground of ill-health, the former being then in his seventieth year. In 1870, James Young Simpson died, and Allman resigned the Chair of Natural History. Alexander Crum Brown, Joseph Lister, William Rutherford Sanders, Alexander Russell Simpson, and Charles Wyville Thomson were elected to the respective vacancies. With the resignation of Sir Douglas Maclagan in 1897, Turner remained, for nearly twenty years longer, the one active connecting link between his famous colleagues of the earlier part of last century and the younger generations who knew them not, but who were taught to honour their memory and to value the importance of their scientific achievements, and what they had done to enhance the reputation of the Edinburgh Medical School.

The outstanding personality amongst the group of medical men in the Senatus in 1867, was Sir Robert Christison. The active days of Syme and Simpson were at an end; they had fought their battles, and the evening of life was closing in upon them. Hughes Bennett was still in fighting vein, but Christison, having entered the Senate in 1822 at the early age of twenty-five, was the veteran in University affairs after forty-five years of experience. He had taken part in many contests in the interests of his Alma Mater, struggling to maintain her rights and to increase her usefulness. He had been Dean of the

Medical Faculty. Though seventy years of age and approaching the termination of his professional life, he was Convener of the Finance Committee, the representative of the Senatus upon the University Court, and Crown Representative for Scotland upon the General Medical Council. Between Christison and Turner there were many points in common, and looking back now, when both men have laid down the burthen of life, it is interesting to observe how, not only in their careers, but also in their mental qualities, they resembled each other in several respects. Christison, in addition to the appointments just enumerated—all of which Turner subsequently held, though representing the Senatus and not the Crown upon the Medical Council—became President of the Royal Society of Edinburgh, and was offered the Presidency of the British Association, the state of his health alone preventing his acceptance of it; while his nomination to the Principalship of the University was pressed upon him by many of his colleagues and friends. In the possession of a powerful voice and a dignified manner, and with a clear head for business and a most retentive memory for detail, he administered the finances of the University with great care and good judgment. The University held the first place in his affections, and he devoted the greater part of his life to her interests. Christison died early in the year 1882, at the age of 85, his vigour but little impaired, until the closing months of his life. His love of mountain climbing and his power to satisfy the desire remained with him to the end, as in the autumn preceding his death he had been able to reach the summit of Aonach-More. During his first ten years in the Senatus, Turner had the advantage of working in association with Sir Robert, and when failing health forced the retirement of the latter in 1877, his mantle fell upon the shoulders of his younger colleague.

Turner soon made his influence felt in University affairs. It was entirely contrary to his nature to remain a mere passive spectator when there was work to be done, and when matters of importance, which required careful consideration and prompt decision, came under discussion. He was put upon the Finance Committee of the Senate in 1870; he was elected as their representative on the Medical Council in 1873, and he became Dean of the Medical Faculty in 1877. He very early familiarised himself with the statutes which regulated the business of the Senatus and the Court, and the relations which the two bodies held to each other. He recognised, too, the value to be derived from a thorough knowledge of business procedure, a fact which serves to explain his later success as chairman of the various committees and councils over which he was called to preside. An illustration of his acquaintance with the regulations is furnished by the position which he took up at a meeting of the University Court, held in November 1869, which he, along with the Dean of the Medical Faculty, was asked to attend as representatives of the Senatus Academicus.

On the resignation of Professor Syme, an attempt was made on the part of certain members of the Faculty and of the College of Surgeons to suppress the Chair of Clinical Surgery. It was proposed that each surgeon and physician on the Infirmary staff should teach clinical surgery and clinical medicine, so that the certificates of all these men should qualify for graduation. The College of Surgeons had presented a memorial to the Court relative to this subject, which was to come under consideration by that body at its meeting in November. As the Senatus had given their two delegates no instructions as to the line which they were to take up in the discussion, they considered that they were free to exercise their own discretion. They came to the

conclusion that for the Court to consider and adjudicate upon a subject which had not previously been before the Senate, was an irregular mode of procedure, and an infringement of the rights of that body. The following protest was signed by Turner and presented to the Court :—

As the representatives of the Senatus Academicus appointed to be present at the meeting of the University Court called to take into consideration the memorial from the Royal College of Surgeons, we beg to take exception to the mode of procedure which has been adopted, and to protest against any action being taken by the Court with reference to the question of clinical teaching, until it has been considered by the Senatus, and a decision has been come to by that body. It is scarcely necessary that we should remind the Court that the power which it exercises under the 12th Section, paragraph 1, of the Act of Parliament, "to review all decisions of the Senatus, and to be a Court of Appeal from the Senatus," has been a matter of dispute between the Senatus and the Court, and that the respective rights of the two bodies have not yet been absolutely defined. Our objection, however, to the mode of procedure, which it is proposed to adopt on this occasion, is not based upon any question as to how this particular clause ought to be interpreted as regards the point in dispute between the Court and the Senatus. But it is based on the more general grounds that no decision has been come to by the Senate on this matter, that there is nothing therefore for the Court to review or to consider in the form of an Appeal, and that the whole proceedings are informal and incompetent.

We can picture Turner convinced of the justice of his protest and determined to maintain his point, notwithstanding the more matured experience of the body before which he appeared. The Court, however, decided that under the second paragraph of the section of the Act[1] already referred to, it was competent for them to take up the question.

[1] Section 12, para. 2, reads : "To effect improvements in the internal arrangements of the University, after due communication with the Senatus," &c.

I then stated that I was still of opinion that the protest was valid and proposed to leave the room. But I was requested to remain, as it was possible some questions might arise in the course of the discussion relative to the Commissions of the Professors of Anatomy and Surgery, on which I might be able perhaps to give information to the Court. I remained therefore, but on the understanding that the Senatus was not to be regarded as committed in any way by my non-withdrawal from the meeting.

Early in the year 1869, the University was called upon to consider the question of the admission of women students to the classes in the medical curriculum. The lively discussions which the subject aroused, the public interest evinced in the movement, and the litigation which followed upon the refusal of the University authorities to open the door to the graduation of women in Medicine, have become matters of history, and have recently been dealt with in great detail in the biography of Dr Sophia Jex-Blake, the great protagonist of the movement.[1] Public and academic opinion was divided upon a question which was taken seriously by some, but treated in a lighter vein by others. After striving for nearly fifty years for complete recognition of their claims to equal consideration with the men, the women were finally admitted to the University of Edinburgh for instruction in medicine, in the summer of 1916, a few months after Turner's death.

To those who have witnessed the close of the struggle, it cannot be without interest to recall some of the earliest events of the movement. Miss Sophia Jex-Blake applied for leave to attend some of the classes in medicine. At a meeting of the Medical Faculty held on March 23, 1869—from which Turner was absent—it was resolved to recom-

[1] 'The Life of Sophia Jex-Blake,' by Margaret Todd, M.D., 1918.

mend the Senatus to allow Miss Jex-Blake to attend the classes of Botany and Natural History as an experiment during the ensuing summer session. The resolution of the Faculty was not carried unanimously, as we find that Professor Laycock dissented. The Senatus approved of the recommendation, but Turner and Laycock, along with Professor James Muirhead, appealed to the University Court against the decision of the Senate. Turner based his protest against the introduction of mixed classes in the medical curriculum upon the following grounds: (1) That class discipline would be impaired; (2) that some restraint would be put upon the teacher in connection with certain aspects of his subject; (3) that it would be repulsive to male students; and (4) that it would become impossible to carry on efficient practical instruction in anatomy. The Court, influenced possibly by a protest from the male students, sustained the appeal and recalled the resolution of the Senate, stating that there were difficulties at present standing in the way of carrying out the wishes of the Senatus as a temporary arrangement in the interests of one lady, but they were not prepared to adjudicate finally on the question whether women should be admitted to the medical classes of the University.

In view of the decision of the Court, the outlook was far from favourable. Miss Jex-Blake, however, was no longer the only applicant for medical instruction, four other ladies having signified their desire to study medicine. She proceeded, therefore, to make a further appeal, but altered the terms of her request. She now asked that women should be matriculated and examined, and that they should receive their instruction in separate classes, taught either by the Professor or by recognised extra-mural lecturers. Both the Medical Faculty and the Senatus expressed approval, Hughes Bennett, Douglas Maclagan, Spence, and Balfour voting in the Faculty in their favour. The Court also took a favourable atti-

tude, and remitted the question to the consideration of a Committee for the purpose of formulating a working scheme. The final arrangements were laid before the General Council of the University, and were agreed to by a large majority. The regulations admitting women to the study of medicine within the University, and giving permission to the Professors to teach them in separate classes, received the assent of the Chancellor on November 12, 1869.

This was the end of the first phase of the movement, outwardly satisfactory enough; but as the majority of the Professors refused to have anything to do with the instruction of women, an *impasse* was speedily reached. The recalcitrant Professors became the target of various forms of abuse.[1] Their attitude was attributed by some to jealousy, and to the fear of rivalry from feminine competition, and they were branded by others as trades unionists. A more charitable explanation was probably to be found in the fact that the labour involved in teaching twice daily did not appeal to busy men. Amongst the minority supporting the cause, Crum Brown and Hughes Bennett taught the women separately in their respective subjects; while outside the University, Alleyne Nicholson held a mixed class in Natural History, and Handyside opened his dissecting-rooms to them along with the men. After receiving instruction in some of the extra-mural classes, which the statutes of the Act of 1858 permitted, the women found that they could not proceed further.

They were not, however, to be denied. The women had their supporters both within and outside the University. Masson and Calderwood gave them their assistance, and the "Association for the Higher Education of Women," which had recently been inaugurated in Edinburgh, gave them its support. Miss Louisa Stevenson, who worked indefatigably in the interests of her sex, sent a letter to the Univer-

[1] Sir Alexander Grant's Story of the University.

sity Court in November 1871, detailing alternative methods of supplying medical instruction. The Court reiterated its desire to give the women full instruction in separate classes, but pointed out that it could not compel the Professors to conduct them, and that they were not prepared to appoint lecturers to give the required courses. They urged the women to forgo the demand for graduation, as the conferring of degrees upon them was of very doubtful legality. To this communication Miss Jex-Blake retorted that she intended to claim attendance on classes qualifying for graduation, if graduation should be declared to be legal. The Court replied that, as no complete course was available, graduation was impossible, even if it should be declared legal. If the applicants would be content to seek the examination of women by the University for certificates of proficiency in medicine, instead of University degrees, the Court believed that arrangements for accomplishing this object would fall within the scope of the powers given to them by the Universities Act of 1858, and they would be willing to consider any such arrangements which might be submitted to them. The Senatus took counsel's opinion, and having found that they had no power to confer degrees upon women, they declined to make any arrangements for tuition.

The last phase was conducted in the Courts of Law. The women, naturally aggrieved, raised an action to compel the University to complete their education and to confer graduation upon them, and judgment in the case of Jex-Blake *v.* the Chancellor and the Senatus Academicus of the University of Edinburgh was given by Lord Gifford, the Lord Ordinary, in their favour. He affirmed that there was no foundation for the proposition that the University was founded for and existed for men only, and that the regulations already enacted by the University Court, and approved by the Chancellor in 1869, were valid and binding in every respect. On appeal, the judg-

ment was reversed, on the ground that the University Court had acted illegally in admitting women in 1869, and consequently the authorities were excused from all responsibility towards them.

Thus terminated the early history of the women's movement in Edinburgh. Had the Senatus, at the outset, ascertained the legal position of the University in regard to the conferring of degrees upon women, the latter would have had no cause of complaint. They might have accepted, as they liked, the teaching of those Professors who were willing to instruct them, on the distinct understanding that they could not proceed to graduation.

Turner's attitude towards the question of instructing women in medicine remained the same throughout his life, and as a teacher of anatomy he would have nothing to do with mixed classes. His views are best expressed in his own words, when giving evidence before Lord Elgin's Committee in 1909.

> The attitude which I have held with reference to this question is a consistent attitude, and it is one which I have held ever since the matter was mooted, and that is a good many years ago. I am opposed to the teaching of medicine to women in mixed classes, and I have always consistently opposed it. I am not opposed to the teaching of medicine to women, provided that suitable accommodation can be given to them, and that proper teaching is available. I consider that women have as good a claim as men to be taught medicine, but I object entirely to their being taught along with men. This is not an objection merely on my part, but I would point out that the male students object to it. The University Court received two memorials last year (1908) upon the subject: a memorial which had to be prepared in a great hurry, signed by 450 male students, and a memorial from the Students' Representative Council, both objecting to the admission of women students to the ordinary classes, and stating that the interests of all parties would be best preserved by women receiving their training in a separate College. I entirely agree. I give you my individual opinion that if this Committee can persuade the Treasury to allot a sum of money—I cannot give the figure—for the teaching of

women, then I, as Principal of the University, am quite prepared to see that the money is properly applied for that purpose.

Future legislative enactments enabled the Universities to confer medical degrees upon women, and in Scotland this power was granted by the Universities Act of 1889. But for many years Edinburgh was unable to open her doors to them for purposes of instruction. Financial disability, the large number of male students of medicine, and the difficulties in the way of accommodating both sexes, were important reasons which militated against a suitable working arrangement. The changed conditions brought about by the influence of the Great War materially altered the situation. The young manhood of the nation had responded to the call of military service. The women too, actuated by patriotic motives, had in their turn "made good," and in large numbers responded to their country's needs for national service. They came forward to meet the claims demanded by the ever-diminishing number of male practitioners in medicine. In the session of 1916-17, no fewer than 230 women matriculated in the Faculty of Medicine in Edinburgh, and in the following year, the total enrolment was 285. Mixed classes, with certain reservations and restrictions, came almost automatically into being. The whole aspect of the question had altered in fifty years. In 1869, the University had been asked to materially change her teaching arrangements for the benefit of one prospective woman student. In 1916, at least one-fourth of the students studying medicine in Edinburgh were women. The long antagonism and the bitter feelings that the early controversy had aroused may well be allowed to remain at rest under the shadow of the world's crisis.

CHAPTER XI.

THE MEDICAL ACTS OF 1858 AND 1886— "A THIRTY YEARS' WAR."

Medical Act of 1858—Position of the Scottish and English Licensing Boards—Mr Robert Lowe and the Scottish Universities—The General Medical Council and a Conjoint Board—Legislation and the One-portal System—Mr W. E. Forster's Committee—The Medical Acts Commission, 1881—Medical Bills of 1883 and 1884—The Medical Act of 1886.

WHEN Parliament gave its sanction to the Medical Act of 1858, whereby the Medical Register and the General Council of Medical Education and Registration were established, it undoubtedly improved the conditions under which qualifications to practise were granted. The Act was the outcome of a general desire to form a central authority in the medical profession. Previous to that date, the various licensing bodies had been wholly without control or supervision. The titles and certificates which were granted by some of the bodies were insufficient evidence of qualification, and so slight was the legal restraint upon imposture, that it was sometimes difficult to be certain that those who used the licences had really been granted them. For the most part, too, the licensing qualifications were recognised only within certain localities. The Act did away with these territorial restrictions, and licentiates of the Scottish

Corporations became qualified to practise in any part of the United Kingdom. By means of the Register, duly qualified practitioners could be distinguished from those who had no legal qualification to practise.[1] To the General Medical Council was given the power of inquiry into the several courses of study, the examinations, and the character of the qualifications of the different licensing bodies, and if dissatisfied with the same, it could report to the Privy Council. It was lawful for the latter body, upon representation being made, to remove, if it saw fit, the right of any licensing body to qualify persons for registration. Up to a certain point, therefore, both the public and the different bodies granting the qualifications were safeguarded.

There remained, however, something of an unsatisfactory nature in the framing of the Act, which was a danger to the public, and which affected unfairly those teaching institutions which already gave both a complete medical education and a thorough examination test to their students. Medicine and surgery had grown up separately, and, in a sense, they had been cultivated and practised by two groups of persons, each becoming incorporated under separate Royal Charters and founding institutions for their own specific purpose. Colleges of Physicians and Surgeons qualified their licentiates to practise in their respective departments, medicine not including surgery, or surgery, medicine. But, in course of time, each of these branches of medical study came to be practised, in the great majority of cases, by the same persons, but many of them did so only upon one qualification, and often with the knowledge of all the professional subjects untested by examination. Hence it had become a question whether the mode of licensing should not undergo a corresponding change.

The Act of 1858, unfortunately, did not abolish

[1] The Medical Act of 1858, however, did not compel duly qualified practitioners to register, but it was to their disadvantage not to do so.

the legal distinction between medical and surgical diplomas; it left the question of the complete or double qualification unsettled. The 31st section of the Act declared that every registered person "shall be entitled according to his qualification or qualifications to practise medicine or surgery, or medicine and surgery as the case may be." In other words, the clause implied that a registered person could in the eyes of the law still practise upon a single qualification, although his examination in some cases had failed to test his ability to do so. For instance, if he were a Licentiate of the Society of Apothecaries of London, he was not legally entitled to practise Surgery, nor had he been examined in the subject, but being registered upon that qualification, he could pose before the public as a fully qualified man. Similarly, if a man held the diploma of membership of the Royal College of Surgeons of England, he had not the legal right to practise Medicine, in which his knowledge had not been thoroughly tested, but being registered, the public accepted his services as a fully qualified practitioner. Further, it must be borne in mind, that even if equipped with both of these qualifications, the practitioner's knowledge of Midwifery had not been tested by examination, though obstetrics formed a large part of his professional work. In order to overcome this difficulty, the College of Surgeons of England instituted later an examination in medicine and midwifery so as to make its diploma qualify in the three recognised branches of practice. Nevertheless, the Act had failed to secure that even the minimum standard of the qualifying examination was sufficient for the proper conduct of practice, and it left it optional to the Colleges to form a Conjoint Board for conferring the double qualification.

In Scotland, the Universities and the Medical Corporations, though hitherto conferring a single qualification, had given both a complete medical education and a thorough examination test to their candidates in all

the professional subjects. In order to overcome the difficulty of the single qualification, the Commissioners appointed under the Universities (Scotland) Act of 1858, substituted the double degree of Bachelor in Medicine and Master of Surgery, in place of the Doctorate in Medicine previously conferred. Their power to take such a step was challenged by the Corporations and litigation followed, but the Law Courts decided in favour of the Universities. The Colleges of Surgeons and Physicians in Edinburgh then conjoined voluntarily in 1859, and granted the double Licence in Medicine and Surgery, mainly as the result of the efforts of Dr Andrew Wood and Dr John Struthers, and the College of Physicians of Edinburgh co-operated with the Faculty of Physicians and Surgeons of Glasgow, a body which had previously granted a surgical licence only, for the purposes of a double qualification. These licensing authorities were perfectly entitled to carry out this procedure under section 19 of the Medical Act.

Notwithstanding that the Act sanctioned the voluntary union and co-operation of any two or more colleges or bodies for the purpose of conducting examinations necessary for qualification and registration, the medical authorities in England took no efficient steps to deal with the situation which had arisen. It was unfortunate that the clause in the Act which dealt with collaboration of examining bodies had not been made compulsory. The Corporations in England continued to act as separate licensing authorities, giving their "half" diplomas and licences, which entitled the holders to admission upon the medical register, while the measures taken to improve their imperfect examinations were not always satisfactory. Their inaction lay at the root of a prolonged and wearying period of contention, extending over nearly thirty years. It led to numerous and futile attempts at legislation for the solution of the problem, and it aroused hostile feel-

ing between men who were on all other points most friendly disposed to each other. Scotland, confident in the value both of her teaching and examination system, naturally resented interference, and throughout the whole period of uncertainty as to what would be the eventual outcome of legislation, she was constantly exposed to the risk of suffering from the shortcomings of the English medical bodies. The final solution of the controversy was only adjusted and settled by the Medical Act of 1886, which was based mainly upon the suggestions put forward by Turner in his Memorandum upon the Report of the Royal Commission of 1881, of which he was a member. He took an active part in the struggle to maintain the position of the Scottish medical licensing bodies, especially the Universities, and the history of the events of that period forms part of the story of his life.

After various endeavours to arrive at a solution of the matter, the Education Committee of the General Medical Council took up the question in 1868, and urged the principle of a Conjoint Examination Board as a means of obtaining efficiency through the union of the licensing bodies, and in this way establishing complete or double qualifications. The Conjoint Scheme was not a new idea; while the prospective legislation which terminated in the Act of 1858 was before a Select Committee of the House of Commons in 1856, a report was made in favour of the granting of a "Licentiateship in Medicine and Surgery" which should be all-sufficient to enable its possessor to practise his profession, but the Medical Corporations were sufficiently strong to defeat the recommendation. In 1868, the Medical Council, on the advice of its Education Committee, voted almost unanimously in favour of a Conjoint Examining Board, and the majority included its English, Scotch, and Irish members. They presented their resolution to the Privy

Council, and, in this way, they probably influenced the Government to bring in the bill of 1870.

Of the various bills which were from time to time introduced into Parliament with the object of achieving some *modus operandi*, by which a uniform method of examination and qualification might be obtained, perhaps the most notable of the earlier ones was Lord Ripon's Bill of 1870. Its main purport was to set up a Medical Examining Board in each of the three divisions of the United Kingdom. Through this Board alone was the licence to register and to practise to be conferred. It was in effect a "one-portal" system of entry into the profession, and it became indeed the *Leitmotiv* of all the legislative measures which were undertaken for the projected settlement of the difficulty. The final examinations of Universities and Medical Corporations were to be superseded by the establishment of Divisional Examination Boards, success in which would alone qualify for registration. Universities and Medical Corporations were to have full liberty to do as they pleased with honorary degrees and distinctions.

The supporters of the one-portal system saw in a Conjoint Examining Board a method of obtaining the highest guarantee that the best possible staff of examiners would be secured. They felt that a combination of all the medical authorities would give a better selection than any individual body, and that, along with a uniform standard, a sufficient minimum examination would be obtained for the purposes of general practice. The bill was opposed by a section of the medical profession, because the Government did not reconstruct the Executive, whose duty it would be to carry out the working of the Act. It refused to give the general body of the profession representation upon the Medical Council, and for that reason strong opposition was raised against the bill as a whole.

Although the bill of 1870 failed to become law, it was evident that the State premeditated some such

scheme as the above, and a champion had been found in the person of the Right Honourable Robert Lowe, Parliamentary Representative of London University, and Chancellor of the Exchequer in Mr Gladstone's Government of 1871. Captivated by the spirit of the University which he represented, which was essentially an Examining Board and not a teaching institution, he advocated that the function of a University was to examine, and not to teach; indeed, he went so far as to say, that teachers should not be examiners; and he maintained that it was the duty of the State to decide upon the list of subjects on which the examination was to be held. He aimed at converting the teaching Universities of Scotland and Ireland into Examining Boards after the manner of the University of London.

In his speech at Halifax on December 5, 1871, Lowe foreshadowed future legislation along these lines, and in the course of his address he stated that large numbers of young men entered regularly for the examination for the medical degree at the London University, and that many of them were rejected. They accepted their rejection, however, conscious of the fact that if they had been successful, they would have obtained a certificate which would be of immense value to them in after life. "Many young men," he continued, "go up to Edinburgh to be admitted to the medical profession. The examination in the Edinburgh College may be easily passed, but I am glad to testify that numbers of these men prefer to come to pass the more severe examination imposed upon them by the London University. This I wish to make clear, because there is a wrong impression on the matter prevailing with regard to these examinations."

It was hardly to be expected that a statement of this kind would be allowed to go unchallenged on the part of the University of Edinburgh. Turner, in a letter to 'The Scotsman,' at once dealt with the matter and exposed its injustice:—

In the passage quoted above, Mr Lowe, in the first place, insinuates that the examination for medical degrees in the University of Edinburgh "may be easily passed," and then boldly asserts that "numbers" of our students prefer to submit themselves to the more severe examinations imposed by the London University. I have tested the accuracy of the statements made by the right honourable gentleman, and as I find them altogether opposed to the facts, I wish with your permission, sir, to make these facts known.

Whether the examinations of Edinburgh University may be easily passed or not can be gathered from the following return, which shows—first, the number of candidates who have presented themselves during the past three years at the different examinations for the medical degree; secondly, the number rejected at each examination; thirdly, the percentage of rejected candidates:—

	Candidates.	Rejections.	Percentage of Rejections.
1st Professional . .	395	122	30·8
2nd Professional . .	320	96	30
Final Examination . .	201	16	8

From the above it will be seen that, in the first and second examinations, nearly one-third of the candidates are rejected, and though the ill-prepared and less industrious students are thus eliminated, yet even at the final examination as many as 8 per cent are remitted. The many young men who have been rejected will scarcely, I think, echo the sentiment of Mr Lowe, that the examinations in the Edinburgh College are easily passed; and the facts which I have adduced prove that examiners, though they may at the same time be teachers, are prepared to do their duty, notwithstanding the sneer in which Mr Lowe indulges in an earlier part of his speech, that for teachers to be examiners seems to him like a man auditing his own accounts.

As to whether numbers of Edinburgh medical students go to pass the London University examinations may readily be ascertained from the Calendar of that University, in which are printed not only the names of its medical graduates and undergraduates, but the medical schools at which they were educated. An analysis of this list shows that of 539 graduates in medicine of that University, only eight received their education in the Edinburgh Medical School. To these facts drawn from the official calendar I may add another, based on the personal knowledge I acquired during the five years in which I acted as examiner in Anatomy in the University of

London, during which period only two Edinburgh candidates appeared before the Board of which I was a member. It appears that since 1839, when the degree of Doctor of Medicine was first conferred by the University of London, the names of only fourteen Edinburgh medical students have been enrolled on its calendar, though thousands of young men, during that period, received their medical education in this city.

It was clearly evident from the nature of Mr Lowe's speech that the future of the Scottish Universities as teaching institutions was threatened. Lyon Playfair, the member for the Universities of Edinburgh and St Andrews, was alive to this fact, and wrote to Turner as follows:—

4 Queensberry Place, South Kensington,
December 1871.

I was much pleased to see your letter in 'The Scotsman' yesterday. I also had examined the Calendar, but I did not get so many Edinburgh candidates as you.

I attach the utmost importance to Lowe's speech, as he was clearly sent by the Cabinet to prepare the public mind for changes in the University system, first in Ireland and secondly in Scotland. The gauntlet thus thrown down must be taken up, and for want of a better champion, I propose to answer his speech in Edinburgh in January.

I have written to the Principal to get some educational body to ask me to address them on "Examining and Teaching Universities," as I do not like to address my constituents against the usual University rule. The occasion is important, and I would gladly receive any hints from you and others.

Lyon Playfair.

The opportunity was given to Playfair to address the Philosophical Institution of Edinburgh on January 31, 1872. The main theme developed in his speech showed that, when examining and teaching were divorced from each other, the Universities had undergone an intellectual impoverishment. In France, prior to the Revolution, the provinces, imitating the example of Paris, possessed twenty-three Universities, each with a separate autonomy and adding largely to the intellectual development of the nation. When

Napoleon I. reconstituted the University of Paris, it became the single University of France and the great department of State instruction. Even the dictation of the curriculum and the examination of the scholars became the business of the State, and in the opinion of many leading Frenchmen—De Tocqueville, Pasteur, and Renan—this had led to increasing poverty in the number of her eminent men. The old Universities of Italy, so long as they were the objects of interest and pride to municipalities, and while their examinations were independent of Church and State, were famous and productive, but when attempts were made to reconcile them to a standard, they fell into comparative decrepitude.

Germany, on the other hand, was multiplying her Universities and establishing amongst them a salutary emulation. Though supported by the State, they were invariably left with freedom as regards their instruction and methods of examination.

The fundamental constitution of the Scottish Universities had done much to stamp the national character of Scotland, and had added largely to the material prosperity of the whole kingdom. The main function of a University was to promote the higher education, and to produce the educated man. An Examining Board, on the other hand, looked only to knowledge, however acquired, and that knowledge may have been obtained by a system of cramming. It is true that absence of unity in degree may indicate different levels of qualification, but public opinion would soon correct this, if they fell too low; but the same diversity produces a variety in intellectual attainments and modes of thought, which are infinitely preferable to a stereotyped system of examination, such as would inevitably result from the establishment of a common Board, set up for the sole purpose of conferring registrable qualifications.

For a brief period, the attempt to settle the vexed

question of the qualifying examination passed into the hands of the Medical Council. The great protagonist of the Conjoint Board in England was Sir John Simon, K.C.B., formerly Medical Officer of the Privy Council, and as a member of the Medical Council he urged the adoption of such an arrangement. In the summer of 1871, the Council addressed a letter to each of the Licensing Bodies in the country, pressing upon them the consideration of a scheme for the constitution and regulation of a conjoint examining board in each division of the Kingdom, and requesting the various bodies to transmit the same to the Medical Council. Schemes were submitted in 1872, and the Conjoint Board, as finally amended in 1877, by the Conference of the Representatives of all the medical authorities in England, contained the following important recommendations. Each Licensing Body agreed to abstain from exercising the independent privilege, which it had previously held, of admitting its students to the Medical Register, it being understood, however, that each might confer, as thought proper, their honorary distinctions and degrees. A Conjoint Board of Examiners was to be nominated by a Committee of Reference, consisting of two representatives from each of the Universities and Medical Corporations in England, but the examiners appointed by the Board were to be selected from the Colleges of Physicians and Surgeons, and from the Society of Apothecaries of London. Candidates who were not University students were to be examined in all the professional subjects before receiving their licence to practise, and their examination fees were not to be less than thirty guineas. Matriculated students of an English University, however, who had completed not less than four years of medical study, and had passed the subjects of the earlier examinations, were then eligible for the final examination of the Conjoint Board, on payment of a fee of five guineas. If successful in this, they were also entitled,

upon the further payment of twenty-five guineas, to receive the Licence of the Royal College of Physicians of London, along with the Diploma of membership of the Royal College of Surgeons of England, and the Licence of the Society of Apothecaries of London, and their names were to be placed upon the Medical Register. The University degrees could then be sought as degrees with honours, by such students as were desirous of obtaining a higher qualification after registration.

It is difficult to understand how the Universities of London, Oxford, Cambridge, and Durham could thus part with the birthright of their students, and were prepared to accept not only no share in their final examination for qualification, but to deprive many of them of the opportunity of obtaining their degree. But the attitude of the Universities in England towards medical education differed considerably from that which existed in Scotland. While a great development in the Medical Faculties, as parts of the educational machinery of the Universities in Edinburgh and Glasgow, and in Dublin also, had taken place during the eighteenth century, no corresponding advance was made in Oxford and Cambridge until the middle of last century. Their proximity to London, with its abundant opportunities for study, attracted the practitioners, teachers, and students of medicine, and the influence exercised by the Corporations of Physicians and Surgeons in the Metropolis, with their power to grant licences to practise, was antagonistic to the development of medical education at the English Universities. England, undoubtedly, suffered also from not having a metropolitan University at that period of her history, and when the University of London came to be established in the nineteenth century, it was a mere examining board, and provided no educational training. "Hence there arose in the minds of many Englishmen a conception of the relations of the Universities to medical education and to

the medical practitioner, which to us in Scotland seems quite erroneous. They looked upon a University training as not intended for the profession generally, but as an especial privilege of the select few. We, on the other hand, hold that the more that the great body of the profession is brought into relation with the thought and culture and scientific methods of our Universities, the wider and more precise will be the basis on which to found rational methods of practice, and the more will the profession advance in the estimation of the public." [1]

That there was a lack of enthusiasm for the scheme in England, even amongst some of those who were engaged in drawing up its details, is evident from letters [2] which were written by Sir James Paget, the Chairman of the Conference of the English Delegates. "I see a constantly increasing dislike of the scheme in the Council of the College of Surgeons," he wrote to his brother in 1875, "some being averse to all change, some hating the association with the Apothecaries." And again—"I wish the affair were well at an end; I believe on the whole that a Conjoint Board would be right, but the balance of my mind in favour of it is very small; I cannot be enthusiastic for it."

In Ireland, there was at first a general consensus of opinion that it would be expedient to form a Board before which all students should appear for their final examination. The Queen's University pointed out that such a Board could only be effectively established and maintained by legislation, and in the event of this being introduced, they would give their co-operation to promoting the attainment of a satisfactory measure.

That a scheme, similar to that formulated in England, would be accepted as a model upon which to base the future of the Scottish Universities and the Medical Corporations in Scotland, was most impro-

[1] Address by Sir William Turner.
[2] 'Memoirs and Letters of Sir James Paget,' 1901.

bable. Their traditions, the excellence and completeness of their teaching and examination systems, and the fact that they had already put their house in order, and were able to grant the double qualification in medicine and surgery, seemed to them to meet sufficiently all the demands that were being made upon them. When Lord Ripon's Bill was introduced, opinion in Scotland regarding a Conjoint Board was divided, many persons, though undoubtedly in a minority, being in favour of it. The Universities never looked favourably upon the scheme. They felt that if such a system were introduced, the majority of their students would not proceed to the higher degree examination. To many of them, drawn from a class who were obliged carefully to consider ways and means, the disbursement of additional fees would be a matter of serious consideration. The degree in medicine in Edinburgh was highly valued both by the profession and by the public, and, before the Universities in the Overseas Dominions were founded and developed, it attracted men from all parts of the Empire. Moreover, the association with a particular University, and with the degree which it has conferred, engenders in the mind a natural feeling of pride, and a continued interest in the old School. The greater the success of the School, and the higher the position to which it attains, the more powerful is the influence which it disseminates—an influence which becomes reflected in the eyes of the public. The continued welfare of the University is ever a matter of interest to the many thousands of her graduates who have passed beyond her walls, and her progress is watched and her reputation jealously guarded, just as much by those who have settled in distant lands, as by the men who remain at home and are more immediately engaged in carrying on her work. It is difficult to imagine that the interest aroused in the Scottish student for his Alma Mater could be developed or maintained for his Divisional

Board. It was further held that the establishment of such a scheme would have a detrimental effect upon the education of the student. Teachers and schools would arise and become recognised as giving special preparation for the examination, and a system of cramming or coaching would thus be set up, inimical to the best interests of medical education.

Nevertheless, the medical authorities in Scotland willingly made an attempt to meet the request of the Medical Council, and they proceeded to hold a number of Conferences for the purpose of discussing some common line of action. Finally, an amended scheme was drawn up and submitted to the Medical Council for their consideration. It differed in one or two important particulars from that which had been proposed by the delegates from the English bodies. Scotland claimed the right of continuing to give her degrees and diplomas to those who had satisfied the Conjoint Board, conditionally however, upon the requisite legal sanction being obtained. They limited the conjoint examination to the clinical subjects of the final professional. The Examiners of the Conjoint Board were to be chosen in equal numbers by each of the Co-operating Medical Authorities, the regulations for the examinations being placed under an Honorary Committee of the Scottish Branch of the Medical Council.

The mere submission of this scheme did not imply, however, that all the licensing bodies in Scotland were willing to adopt the principle. While the two Medical Corporations in Edinburgh and the Faculty of Physicians and Surgeons in Glasgow gave their assent to it, the Universities were unable to agree to the proposal. In Edinburgh, the Medical Faculty reported at some length, and expressed the opinion that the object aimed at by the Medical Council, namely, to ensure that all the examinations for a licence to practise should be kept at a proper standard of efficiency, might be attained without any disturbance of the

existing institutions, provided that the system of inspection by visitors appointed by the Medical Council was more fully carried out. They regarded the existence of a number of independent examining bodies as an advantage, in that they promoted an honourable rivalry, while a common portal of entry would of necessity imply a minimum in the examination and in the degree of attainment demanded. They could not agree with the opinion frequently expressed by those who had no experience of the Scottish system, that the examination of students by their own teachers was wrong in principle, and they regarded the presence of their non-professorial examiners, who had been appointed under the Universities (Scotland) Act of 1858, as a safeguard against any possible partiality or prejudice on the part of the teachers.

Very little progress was made towards a final solution of the difficulty. Although the Conjoint Scheme proposed by the English medical authorities had received the approval of the Medical Council, it had not been put into operation by the spring of 1878. No attempt was made to bring it voluntarily into force, as it was felt by some that it would be incomplete if confined to England alone. Indeed, it seemed doubtful whether any working arrangement could be effected, unless it was made compulsory by legislation for the three divisions of the Kingdom, and opinion in the profession, even in England, was beginning to undergo some modification with regard to the value of the scheme. Some criticism was levelled against the Medical Council on account of its apparent inaction, but it must be clearly understood that the powers of that body under the Medical Act of 1858 were very limited. They could ask for information, and to a certain extent pass judgment, but they had no legal powers to enforce any of their proposals upon the licensing bodies. Had it been possible for the Council to do more than issue recommendations and sanction

the approval of such, when accepted by the medical authorities, doubtless many years of controversy would have been avoided. Hundreds of men holding a single qualification were being placed annually upon the Medical Register after only a partial examination. The Council might have sought the remedy which lay to its hand, by reporting to the Privy Council the inadequacy of certain diplomas and qualifications, but under the terms of the Act, the offending licensing bodies might have justly argued that the complaint lodged against them was *ultra vires*. Those who criticised the inaction of the Medical Council, alleged that the licensing bodies were too strongly represented upon it to permit of that body proceeding to any measure which would militate against themselves.

In 1878, a Medical Act Amendment Bill was introduced into the House of Lords by the Duke of Richmond, the Lord President of the Privy Council. In its general lines it closely followed Lord Ripon's Bill of 1870, but no result was attained. In the following year, the Lord President again attempted legislation, being pressed by the Medical Council to arrive at some conclusion in the best interests of medical education. Sir Lyon Playfair, who figured prominently in all the debates in the Commons, kept closely in touch with the Scottish Universities when a bill was before the House. In March 1879, he wrote to Turner :—

ATHENÆUM CLUB, LONDON, S.W.,
March 8, 1879.

MY DEAR TURNER, — From not knowing the habits of the House, you are unnecessarily alarmed about Lusk's Bill, which is never intended to pass.[1] It will be opposed by the Government and be referred to the Committee which is to sit in the House of Commons on the Government Bill.

No serious legislation is in contemplation until the Government Bill comes down from the Lords. The battle will then be chiefly in the Select Committee, and not on the floor of the

[1] A private bill introduced by Dr Lusk.

House, and you must be prepared to send witnesses to state the University case.

I had hoped that you would have made some arrangements for making a Conjoint Board in Scotland, which was not hostile to University interests. My own opinion is against these Conjoint Boards, and in favour of the independence of the Universities.

But medical opinion in England and Parliamentary opinion are dead against us on the question, and if you do not adjust your sails to the wind (which is not likely to change) you will find legislation go very injuriously to our interests.

If the Duke of Buccleuch does not present the petition, I think Lord Rosebery would be the man to do so.

LYON PLAYFAIR

After a second reading in the House of Commons, the bill was referred to a Select Committee under the Chairmanship of the Right Honourable W. E. Forster, and Turner appeared as a witness before the Committee. In his evidence he pressed the claims of the Scottish Universities to be left alone. He reviewed the history of the *Staats Examen* in Germany, which, when instituted in 1825, was virtually a one-portal system. It had proved a failure. The examination, which included anatomy and the clinical subjects, was carried out by a board appointed by the State, from which all the University professors were, as far as possible, excluded. The candidates were required to go to Berlin to be examined. The advocates of the one-portal system in Germany, like those who favoured it in this country, claimed for it the importance of securing a uniformity of examination. It gave rise, however, to great complaints both from students and teachers, on account of the inconvenience and expense necessitated by the journey to the capital and residence therein during the examination. It was found quite impossible to obtain a sufficient number of good examiners without taking University professors, and the complexity of the system led to frequent disputes as to privileges, which, along with the rapid growth of medical science, caused its final breakdown. In 1869,

a fresh *Staats Examen* came into operation, but the system differed materially from the older method. It became a multi-portal system. The examination board, though appointed annually by the governing body of each State in which Universities existed, consisted practically of the professors and teachers of the Universities in which the examination took place. Although in some of the large cities, practitioners of eminence were placed upon the board, the Universities were always communicated with before any of the examiners were appointed by the State. As there were twenty Universities in Germany in 1879, there were therefore twenty legal modes of access to the medical profession.

Turner submitted some interesting figures bearing upon the position of the University of Edinburgh as a medical school at that period. He had analysed the birthplaces of her students, and found that of the 1290 men who matriculated in the Medical Faculty in 1878, 565 or 43 per cent were born in Scotland; 445 or 34 per cent in England and Wales; 22 or 1·7 per cent in Ireland; 75 or 5 per cent in India; 149 or 11 per cent in the different British Colonies, while 34 or 2 per cent came from foreign countries.

Of 2319 Edinburgh graduates whose names were enrolled at that time, and who were engaged in the practice of their profession, exclusive of those employed in the public services, 572 were in practice in Scotland, forming 30 per cent of the total number of medical practitioners in Scotland; 274 practised in London, or 9 per cent of the total practising there; 857 were in England and Wales, forming 8 per cent of the total practitioners, while 108 or 4 per cent practised in Ireland; 256 Edinburgh graduates were in the public services and mercantile marine, and 252 practised abroad. There was ample evidence, therefore, to justify the work that the University was carrying out.

It was a mistake, he said, to regard the Scottish

Universities as imperfectly restricted and at liberty to fix the conditions and apply the tests upon which they granted their licence. Their regulations were framed by the Royal Commissioners appointed by the Act of Parliament in 1858, and every regulation was sanctioned by the Privy Council; no change was possible unless that body approved of it. The standard of the Edinburgh curriculum was a higher one than that recommended under the Conjoint Scheme. The Edinburgh examinations were based upon a more extended system of education—scientific, practical, and clinical—and they embraced a wider range of subjects.

There is a profound difference as regards medical education between the Scottish and English Universities. The former are great teaching and graduating bodies not only for Scotland, but for the Empire. I do not think at the present moment there is a single University in England which can give a complete medical education, so that they are in an entirely different position. The English Universities may yield some of their existing privileges for the sake of carrying out a Conjoint Board Scheme, and actually give up very little. If we were to yield, we should give up rights and privileges, interests and duties, which we feel that we cannot part with. We do much more than the Medical Corporations in England, who examine but do not teach. Their educating bodies are in the schools attached to the hospitals. We both educate and examine, and we fulfil in Scotland completely the ancient function of a university which is fulfilled all over the continent of Europe.

Turner held the opinion that, unless the Legislature determined upon a lower standard than that which the Scottish Universities exacted, it would not be possible to obtain the number of entrants into the profession which the needs of the public required. He suggested to the Select Committee a proposal that, as regards University students, the Conjoint Examination should be restricted to the clinical subjects, thus testing each candidate in his knowledge of what was necessary for practice, as that was one of the points raised in the

present agitation. If there was to be any legislation, that, in his opinion, seemed all that was necessary.

Writing to John Struthers in February 1880, shortly before the latter was to give his evidence before the Committee, Turner said—

The Select Committee of the House of Commons is to meet on Friday to choose a Chairman. Mr W. E. Forster is unwilling to act any longer in that capacity, and it is thought that Lord George Hamilton will be appointed. Mr Robert Lowe has been put upon the Committee in place of the deceased Mr O'Leary. Mr Lowe is a strong opponent of the Scottish University system, and his appointment adds to the Committee a powerful antagonistic element.

Our Faculty has now decided not to enter into the question of a compromise. You will be quite at liberty to refer to the English Conjoint Scheme and to quote it.

The Chairman in the main followed my précis, and I had before me a duplicate copy with copious notes, so that I more than once called him back to the line of evidence when he was diverging from it.

As you will probably be asked what you would propose should be done if legislation is recommended, you should carefully consider with Gairdner what proposal should be made. Let me refer you to the Duke of Buccleuch's Amendment and to the alternative proposal which I made in my evidence, as possible forms of compromise. I have not yet got a copy of the Government Bill of this year.

The Government Bill was re-introduced in 1880 with little change, and was again referred to Mr Forster's reconstituted Committee. Parliament, however, dissolved unexpectedly, Disraeli went out of office, and a new administration was formed under Gladstone.

The Government now appointed a Royal Commission, known as the Medical Acts Commission, 1881, and Turner was invited to take a seat upon it.

SPENCER HOUSE, ST JAMES'S PLACE, S.W.,
April 2, 1881.

SIR,—The Government are about to appoint a Royal Commission to consider Medical Education, the method of

Registering and Licensing Practitioners, and the Constitution of the Medical Council.

The inquiry will extend to the United Kingdom.

I should be very glad if I could secure your services.

Your wide experience and knowledge of the subject, both in England and Scotland, would make your appointment acceptable to all who are interested in this important subject.

I hope, therefore, that you will permit me to submit your name to the Queen for the Commission.

SPENCER.

The Commission, under the Chairmanship of Lord Camperdown, was a strong one, and the interests of the general public were fully guaranteed by the appointment of such men as Sir George Jessel, Master of the Rolls; William Connor Magee, Bishop of Peterborough; Professor James Bryce of Oxford University; and George Sclater Booth, M.P. The other members of the Commission, in addition to Turner, were Sir William Jenner, Sir John Simon, Thomas Henry Huxley, Robert M'Donnel, and W. H. F. Cogan. The Commissioners sat for six months, and their work covered a very exhaustive field of inquiry. It would be superfluous to enter here into the reasons which influenced the Commission in drawing up their final conclusions as to the methods of granting licenses to practise; suffice it to say that the following proposals were submitted:—

There shall be one Medical Council, and in each of the three divisions of the United Kingdom there shall be a Divisional Board, representing all the Medical Authorities of the division;

That the right of admitting to the Medical Register and a general control over the proceedings of the Divisional Boards shall rest in the Medical Council;

And that, subject to such control, each Divisional Board shall, in its own division, conduct the examinations for license.

The Commission were of the opinion that the Final Examination in Medicine, Surgery, and Midwifery

ought to be conducted by the Divisional Board. The one-portal system, therefore, was again advocated.

The Commission was unable to accede to the request of the witnesses representing the Scottish Universities, that they should be allowed to retain their licensing power on the condition that they admitted a certain number of external examiners. While readily acknowledging all that the Scottish Universities had done for medical education and examination, and recognising its cheapness and excellence, they nevertheless felt that to accede to their request would be to raise these Universities above all the existing medical authorities, and to leave to them alone the licensing power which they proposed in every other case to take away. The Scottish Universities were to have a preponderating influence upon the Divisional Board, the examinations would doubtless be held in their halls, and it was only natural to suppose that any request which they might make would have great weight with the Scottish Divisional Board and with the Medical Council. They hoped, therefore, that the Universities would admit that the privilege which they sought was incompatible with the institution of a common licensing system.

To the General Report of the Commission, which was signed by all the members, three Minority Reports dealing with the licensing proposals were added, and signed respectively by the Bishop of Peterborough, Huxley, and Turner. The Bishop was in favour of the *Staats Examen*, which was suggested in the General Report as an alternative scheme. The examination, he considered, should be conducted on behalf of the State, prior to enrolment on the Medical Register; and it should only be open to those who had previously obtained a complete qualification, whether by licence or degree, from any of the existing medical authorities. It would effect, with the least cost of time and expense to the student, and with the least disturbance of existing

interests, the reform of these defects, which admittedly existed in the present licensing system. Huxley, while admitting the right of the State to ask for efficiency, on the ground that it required certificates from medical experts, or the evidence of certain persons as such, and that it employed a large number of medical practitioners, considered that this efficiency might be obtained without interfering with the privileges of the Universities and Medical Coporations. He therefore proposed that, if the examining bodies satisfied the Medical Council or other State authority of the efficiency of their examinations, and if they admitted a certain number of coadjutor examiners appointed by the State, the desired end would be obtained.

Turner's proposals, which were supported on very similar grounds to those submitted by Huxley, were four in number: (*a*) No person shall receive a licence to practise and be admitted to the Medical Register who does not possess complete qualifications in Medicine, Surgery, and Midwifery. (*b*) Diplomas granted by the Universities which conduct complete examinations and confer degrees in Medicine and Surgery shall also be licences to practise and admit to the Register. (*c*) The Corporations which grant diplomas in Medicine alone, or in Surgery alone, shall combine in each Division of the Kingdom, conduct a complete examination, and confer a qualification in Medicine and Surgery which shall admit to the Register. (*d*) The Medical Council shall appoint assessors to attend the several examinations, to report after each examination if it be satisfactory or not, and the Medical Council shall have power to suspend all examinations which are not of a sufficient standard of efficiency.

As regards the two Societies of Apothecaries, he held the opinion that their existence as Licensing Bodies was an anachronism, and that they should in future cease to take part in conducting examinations for a licence to practise. The proposals "would

secure a satisfactory standard of examination, and would induce the various bodies to be always on the alert to perfect their system and readjust it to the advancing state of knowledge and new methods of education. They would not destroy the individuality of the Universities and the Royal Colleges and the Faculty of Physicians and Surgeons, and would utilise their existing examination machinery, and their revenues, derived from examinations, would be in the ratio of their deserts. An efficient inspection of their examinations would be secured: no person would gain access to the Register without a complete qualification, and the number of Licensing Authorities would be reduced. If the State is dissatisfied with the examinations conducted by the medical authorities of the United Kingdom, and thinks it necessary to impose a central control in the form of Divisional Boards, then I would submit that the additional cost of this machinery should not fall upon the already heavily weighted candidate, but should be borne by the State."

Turner took exception to the one-sided expression of opinion made in the Report of the Commission as to the character of the examinations of the Edinburgh College of Surgeons and the Glasgow Faculty of Physicians and Surgeons. Some of the witnesses had commented unfavourably upon them. "It would only have been fair to these Bodies," he wrote, "to have stated also that other witnesses had expressed themselves very decidedly that the examinations of these Bodies are satisfactory and of a thoroughly practical character."

In 1883, the Government introduced into the House of Lords a bill to carry out the proposals suggested in the majority Report of the Royal Commission. As we have seen, the Commissioners had recommended that the Scottish Universities should have a "preponderating" influence upon the Divisional Board in

Scotland, and the bill provided that they should have eight representatives, and that the Medical Corporations should have three members. It was unfortunate that the unity, which had hitherto existed throughout the greater part of the controversy between the Universities and the Corporations, threatened to break down over this particular point. The Royal Colleges in Edinburgh were afraid that the University majority upon the Board would have a prejudicial effect upon extra-mural teaching, and that there would be a tendency to exclude the extra-academical teachers from election as examiners. This risk, however, seemed to be sufficiently safeguarded against by the fundamental principle contained in the constitution of the Board, which required that the examiners should be representative of both Bodies, and that their names should be submitted to the Medical Council, and, if necessary, to the Privy Council. Nevertheless, a feeling of hostility was aroused. Turner, who had been elected President of the Royal College of Surgeons of Edinburgh in October 1882, found his position upon the Council of the College a very trying one. The meetings of the Council evoked some stormy scenes, and, finding his position as President incompatible with his University interests, he declined to be nominated for a second period of office, and resigned his Presidency in the autumn of 1883.

Deputations from both parties interviewed the Government authorities and put forward their respective claims for just treatment. The Lord Advocate, who received the deputations, might well have exclaimed with Mercutio, "A plague o' both your Houses." There was every expectation that the bill would be passed, and that the long-drawn-out controversy would at last be settled, but owing to the pressure of business the Government were obliged to withdraw it.

It was quite obvious that the State was determined

to carry through legislation in favour of the one-portal system in each division of the country, and accordingly the Amendment Bill of 1884 was introduced with certain modifications. The position of the Scottish Medical Corporations upon the Divisional Board had been improved by raising their representation from three to five, the Universities retaining their eight members. Prior to its introduction, however, an important step was taken by the Royal Colleges in England, which largely took the ground from under the feet of the bill. The Colleges of Physicians and Surgeons voluntarily presented to the Medical Council a scheme of co-operation for purposes of examination and of granting a double qualification for admission to the Register. The two Medical Corporations in Edinburgh, along with the Faculty of Physicians and Surgeons of Glasgow, at the same time agreed to combine upon a scheme for granting a triple qualification, which was approved of by the Medical Council on March 31, 1884. In Ireland, where the feeling in favour of the Conjoint Scheme had gradually grown weaker, the Royal College of Surgeons and the King and Queen's College of Physicians also resolved upon a scheme of co-operation, though the Medical Act of 1886 probably determined this finally, as it was not until that year that the scheme was ratified. The bill of 1884 shared the same fate as its predecessors. Gladstone's Ministry went out of office, and Lord Salisbury came into power for a brief period.

The curtain rang up upon the last Act, when a bill, introduced in 1886, became law in the same year. The result of the protracted delay in legislation had caused a gradual breaking-up of every measure framed for the adoption of Conjoint or Divisional Boards. The various Licensing Bodies, which, by default, had failed to secure for their candidates either a proper standard of education or a complete test by examination, had at last voluntarily done what the Scottish Universities and the Medical Corporations in Scotland had carried

out nearly thirty years earlier. The Medical Act of 1886 set its seal upon the attitude which the Universities in Scotland had consistently maintained, and they had their reward for the many years of persistent but patient endeavour to maintain their position.

The Government accepted the situation, and the bill in its main features, for which Sir Lyon Playfair was largely responsible, was drawn up along the lines of the four proposals which had been suggested by Turner in his Minority Report presented to the Royal Commission in 1881. The existing machinery for the purposes of examination was utilised, and the individuality of the different Licensing Bodies was preserved by the Medical Act of 1886.

"It is not so many years ago," Turner wrote in 1891, "that the medical profession in England raised for itself a fetish, which was called the one-portal system—a method of admission to the privileges of practice which, had it ever come into operation, would have widened the breach between teaching and examination to an extent much greater than now prevails. It would, I believe, have discouraged healthy and legitimate study, and have encouraged a wholesale system of cramming. Fortunately for the future of our profession, the cry for a single examining Board, either for the whole Kingdom or for each division, has practically ceased from the passing of the Medical Act of 1886."

Amongst the men who at that time took a prominent part in upholding the position of medical education in Scotland, were William Tennant Gairdner, the Professor of Medicine and the accomplished advocate of the claims of Glasgow University, and Daniel Rutherford Haldane, who, as President of the Royal College of Physicians of Edinburgh, used his great gifts on behalf of the Medical Corporations. But three vigorous personalities accomplished more than any of the others who took part in the controversy. Much of the development and organisation of the Scottish attitude against the Conjoint Scheme was due to

the influence of the striking personality of Andrew Wood, a former President of the Royal College of Surgeons of Edinburgh. Though, at first, a supporter of the scheme, his views underwent a notable change, and he threw himself against it with all the energy of the *perfervidum ingenium Scotorum*, so characteristic of a complete change of faith. He was a powerful force both in the profession in Scotland and in the deliberations of the Medical Council. John Struthers championed Aberdeen University with that tenacity of purpose which was so characteristic of the man in all things which he set his hand to accomplish, and he vigorously combated all opposition. William Turner, equally determined, but quietly and firmly, threw all the weight of his well-balanced judgment into the cause of the Scottish Universities, in order to maintain their existing status. He visioned clearly not only what it meant to preserve their autonomy at that time, but how much their future progress and success depended upon a definite and final settlement of an unduly protracted controversy. The "Thirty Years' War" in which he fought had been followed by thirty years of peace, when he laid down his generalship in 1916. New generations may arise who may not hold themselves bound by the verdict of their forefathers, and may seek to reopen a contest for a one-portal system; but the question of the outbreak of future hostilities lies in the womb of the future, and no one can say who may arise to take his place, and lead the fight against it, should the occasion ever arise.

CHAPTER XII.

THE GENERAL MEDICAL COUNCIL OF EDUCATION AND REGISTRATION.

1873-1905.

Constitution and Function of the Medical Council—Original Members of Council—Turner elected in 1873—Sir Henry Acland—Edinburgh and Oxford—Turner's Colleagues on the Council—Direct Representation of the Profession and Turner's Opposition—The Reconstituted Council of 1886—Turner's new Colleagues—Midwives' Act and Medical Reciprocity—Election as President—Resignation of Chair and Retirement.

TURNER'S activities outside his sphere of work as a teacher and investigator were directed mainly towards advancing scientific education in his adopted University, and in endeavouring to improve the means necessary to make it thoroughly effective. Had it been his lot to live in the first half of the century instead of in the second, it would have been sufficient for him to have focussed all his interest and energies in this field of usefulness, without expending either time or thought upon the educational development of the other teaching and licensing institutions in the kingdom.

With the Medical Act of 1858, however, a great change came over the position and the relations of these Bodies. They could no longer regard themselves as isolated units. Previous to this date, each had

followed more or less independently its own educational path and exercised its judgment, both as to the training required and the knowledge to be expected of its candidates. It was possible, too, for one body to undersell another, by cheapening the standard of its examinations, to exchange titles for fees, rather than bestow them upon evidence of merit; and the candidates in their turn, once they were qualified, were largely restricted in their choice of area of practice by territorial limitations. By the establishment of a central authority, the various licensing institutions were deprived, to some extent, of their power of independent action, and had to conform to certain regulations in the matter of educating and examining their students of medicine. The intellectual standard that was to be exacted from the Universities and Corporations became, from that time, a matter of moment to all who laboured in the best interests of the profession, and thus it was necessary for the men endowed with administrative ability to enlarge their outlook and to use their talents for the improvement, not only of their own Schools, but of those of their neighbours. Each of the licensing and degree-conferring bodies was called upon to send a representative to constitute the central authority which was required to deliberate upon such matters as were prescribed under the Act.

The Medical Council which Parliament set up in 1858 had two main functions to discharge. It was to be a Board of Registration and a Council of Education. In the former capacity it had to prepare and maintain the Medical Register, upon which it placed the names of all duly qualified medical men. The Council was further provided with the power of removing the unworthy from the Register. "In fulfilment of this function, partly by the force of necessity and partly in virtue of the interpretation of the law by Judges, it has become a professional Court of Justice, a domestic forum for the trial and determination of grave charges against registered practitioners in their professional

capacity. It has no authority to compel the attendance of witnesses, to administer oaths, or to call for the production of documents. It has only one judgment to give when a charge is proved to its satisfaction, namely, 'guilty of infamous conduct in a professional respect': and only one sentence, when judgment is given, namely, 'erasure from the Register.' From this sentence and judgment, given after proper inquiry and without malice, the High Court of Justice has pronounced that there is no appeal."[1]

As a Council of Education, its statutory powers were strictly limited. The Council had to frame a system of medical instruction applicable to all the teaching and licensing bodies; to suggest what, in their opinion, was a minimum standard of education; but it had no power to lay down a compulsory curriculum. It could require from these bodies information concerning their course of studies, the means adopted for teaching, and the conduct of their professional examinations. It could visit and inspect the examinations held by the Universities and Colleges, and though it might find the latter insufficient, it had not the power either to disallow them or to amend them. If, after reporting to the medical authority, the Council still found the examination insufficient, the position was laid before the Privy Council, which then dealt with the body concerned, removing its further power to give licences, if it thought fit, and reinstating it if the conditions were again improved.

Legislation did not aim at introducing absolute uniformity throughout the Schools. One great merit in the teaching system lay in the freedom which was left to each of the educational institutions to enhance its reputation, by providing for its students something more than the bare necessities for acquiring the minimum knowledge expected of them. The individuality of each University and Medical Corporation

[1] Sir Donald Macalister, K.C.B. Introductory Address delivered at the University of Manchester, October 1906.

was not interfered with. Competition between the different Schools was not discouraged, but each was left free to stimulate its best qualities. "The institution which, *cæteris paribus*, affords the most efficient teaching will have the best reputation, and be the most resorted to. The interest involved in the competition is the interest of improvement."[1]

Other subsidiary duties were relegated to the Medical Council. The preparation and publication of a British Pharmacopœia was entrusted to it. The control of Diplomas in Public Health, and the regulations regarding midwives and the Register of the Dental Profession, came under its supervision. Bills coming before the Legislature bearing upon medical and scientific subjects were carefully considered by the members, their advice was sought by the Privy Council, reports were drawn up and deputations appeared before Ministers of the Crown. The work of the Council could never be regarded as at an end. With a science so constantly progressive as that of medicine, some authority must always be necessary to introduce and sanction alterations in education and examination in order to meet the constantly changing conditions, and, unfortunately, the function of the Council as a professional Court of Justice is only too frequently called into requisition. Created in the interests of the public rather than of the profession, it has no authority to legislate for the latter body: it can levy no subscriptions; it has no word to say on the matter of rates of pay, hours of work, or disputes with employees; it offers no pecuniary benefits or strike pay. The Council is neither a Parliament of the profession, nor a medical trades union.

The Medical Council met for the first time on November 23, 1858. To the profession, the meeting

[1] *Op. cit.*

was undoubtedly one of historical interest, marking the commencement of a new epoch in the relation of the practitioner to the public, and in the conduct of medical education. Summoned by Her Majesty's Secretary of State for the Home Department, the members assembled in the Hall of the Royal College of Physicians of London. In the terms of the Medical Act, the Council consisted of twenty-four members, appointed for a term of five years, and eligible for re-election. Seventeen, chosen by the governing bodies of the different Universities and Corporations, represented the nineteen licensing institutions in the country, while six were nominated by the Crown on the advice of the Privy Council, four from England and one from Scotland and Ireland respectively. The membership was completed by the election of the President, which was the first duty devolving upon the Council at its inaugural meeting.

The choice of the members fell unanimously upon Sir Benjamin Collins Brodie, Bart., who was at that time the most distinguished and authoritative member of the profession. Almost simultaneously with the receipt of this, however, Brodie was elected President of the Royal Society, and was thus the recipient of two singular distinctions within the space of a few days. He had bestowed much thought and care upon the subject of medical education, entertaining views which were both liberal and enlightened. Sixty-five years of age at the time of his election, an increasing physical disability due to failing eyesight unfortunately rendered his occupation of the Presidential Chair a brief one, and in 1860 he was obliged to resign.[1] The Council chose as his successor Joseph Henry Green, one of their own number, and the representative of the Royal College of Surgeons of England. The disciple, friend, and literary executor of Coleridge, Green was generally looked upon as an authority on medical education and reform. He

[1] Sir Benjamin Brodie. Masters of Medicine Series.

remained in office until his death in 1863, when the succession fell upon Sir George Burrows, the physician, Turner's old teacher at St Bartholomew's. Thus the Council, in the first five years of its existence, had been called upon to select three Presidents. In order to maintain the proper numerical constitution of the Council in the early period of its history, it was necessary that the licensing body whose representative was called to the Presidential Chair should send a fresh member to fill the place thus vacated. This arrangement ceased to exist when the Council was reconstituted in 1886.

Amongst the original members who met in London in 1858, in addition to the three men elected to the Presidential Chair, we find Sir Thomas Watson, Bart., the distinguished physician and Professor at King's College, whose text-book on Medicine, apart from its intrinsic merit, possessed a literary charm which has made it a classic in English medical literature. Sir Charles Hastings, a graduate of Edinburgh in 1818, and practising in Worcestershire, was a leading spirit in all that pertained to the improvement of the medical profession. To his influence and energy it is indebted for the founding of the British Medical Association. Hastings sat upon the Council for five years as one of the four nominees of the Crown for England, and associated with him in the same position were Sir William Lawrence, Sir James Clark, Bart., and Thomas Pridgin Teale of Leeds.

In 1825, the graduation roll of the University of Edinburgh contained the names of forty-seven men who claimed Ireland as the country of their birth. Of these, two at least had climbed to fame, and in 1858 were amongst the representatives on the Medical Council: William Stokes, one of the founders of Clinical Medicine, and the Regius Professor in the University of Dublin, the disciple of Laennec, and one to whom, as the advocate of the science and practice of the stethoscope, this country stands

for all time indebted; the second, Sir Dominic Corrigan, the witty and brilliant Irishman, five times President of the College of Physicians of Ireland, and afterwards a Parliamentary representative of Dublin city.

Scotland sent a strong representation. Sir Robert Christison was nominated by the Crown, and for fifteen years he gave the Council the benefit of his wide experience. As convener of the first British Pharmacopœia Committee, he presided over its conferences in the stormy days which attended its early endeavours to decide many controversial "national" differences as to the preparations and dosage of various drugs. The four Scottish Universities sent two members—Dr J. A. Lawrie from Glasgow and St Andrews, and Professor James Syme from Aberdeen and Edinburgh. Syme's broad views on education were of special value in the early deliberations upon this important subject. From time to time the old combative spirit, which could never be entirely repressed, broke out, and the atmosphere of the Council Chamber became distinctly enlivened when Scotsman and Irishman crossed swords in debate.

The Medical Corporations of Edinburgh were represented by the two Woods. We have already learned something of the force of character and untiring energy of Andrew Wood, President of the Royal College of Surgeons, in the part which he played in the struggle against the introduction of the one-portal system. He retained his seat on the Council until his death in 1881, and during a period of membership lasting twenty-three years, he took an active share in the Council's affairs. Alexander Wood, President of the Royal College of Physicians, had made his mark in the counsels of his College, and no one was more fitted than he to enter that wider sphere of usefulness which the work of the Medical Council offered. A regular and unfailing attendant at its meetings, he advocated his views with a force and

clearness, and with a sincerity of purpose, which carried conviction to the minds of his audience. During the fifteen years of his service, he was chairman of no fewer than thirteen committees. He frequently found himself in opposition to Sir Dominic Corrigan, "when the humorous and sparkling jokes of the Irish Baronet were met by the cool, calm, and judicious reasoning of the Scot, who was generally regarded as coming off victorious in the fight."[1]

In November 1873, Turner entered the Medical Council as the representative of the Universities of Aberdeen and Edinburgh. On the resignation of Professor James Syme in 1868, Dr James Macrobin had filled the vacancy as the nominee of Aberdeen University, and when the five years which constituted his period of office had expired, it was natural that Edinburgh should desire to appoint a successor. Turner commenced his work by attending the meeting of the Scottish Branch of the Council in the month of December, but it was not until July of the following year that he took his seat at the General Meeting in London, along with two new Scottish representatives, Daniel Rutherford Haldane, the successor of Alexander Wood, and James Warburton Begbie, the Crown nominee, on the retirement of Sir Robert Christison.

The year 1874 marked two interesting events in the history of the Medical Council. The members, who for fifteen years had met in the Hall of the Royal College of Physicians of London, with the exception of a brief period at 132 Soho Square, now occupied for the first time their new premises at 299 Oxford Street, which remained as the home of the Council for forty-two years. In 1916, the new buildings at 44 Hallam Street, Portland Place, in the planning of which

[1] 'Alexander Wood, M.D.,' by the Rev. Thomas Brown.

Turner had taken great interest, and at whose formal opening he had hoped to attend, were occupied a few months after his death. The foundation-stone of the old building in Oxford Street, which had become the Council's offices, had been laid by the Prince Consort: the stone was transferred to the Hallam Street house, where it has been placed in the wall of the entrance hall as a memorial of the Council's first home. The mere change of premises is not in itself a matter of outstanding importance, but in recording Turner's life we see the commencement and termination of so many events contemporaneous with his entrance and exit, that the coincidence leaves a definite impression upon the mind.

The year was further signalised by the election of Sir Henry Wentworth Acland, the Regius Professor of Medicine in Oxford, as President, in succession to Sir George Edward Paget of Cambridge, who had occupied the chair since the resignation of Sir George Burrows in 1868. Henry Acland was one of the original members of the Council in 1858, and his period of service extended to twenty-nine years, during the last thirteen of which he was President. In this capacity he expended much time and labour: the term of his Presidency was a specially difficult one, as it synchronised with a great part of the protracted controversy upon medical reform both within and outside the Legislature. "His academic and social position, and the innate nobility of his nature, had from an early period of his life gained for him the friendship and confidence of the leaders of the medical profession, of statesmen of both parties, and others eminent in public life, and contributed in no small measure to ensure harmonious relations between the Medical Council and the departments of Government with which it is brought into official communication."[1]

[1] Sir William Turner. Obituary Notice of Sir Henry Acland, Transactions of the Royal Society.

Turner had made Acland's acquaintance during those brief but not infrequent visits to Rolleston at Oxford, which he was in the habit of making in his early days in Edinburgh. The friendship which he then formed with Acland, who was seventeen years his senior, became a very intimate one, and during the period when they worked together upon the Medical Council, Turner became one of Acland's most trusted friends. It was a source of unfeigned pleasure to the latter to learn, shortly before his death, that Turner had been elected to the Presidential Chair. For the one, there was always an open house in Oxford—for the other, a cordial reception in Edinburgh; and at Holnicote, the home of the Aclands on the borders of Exmoor, "where the happy valley opens towards the west upon the Bristol Channel," Turner was certain of receiving a friendly welcome.

Their association in work was not limited, however, to the Council Chamber. In Acland's struggle for the due recognition of a scientific school of biology in Oxford during the seventies, he had Turner's wholehearted support. The early days of science in the southern University had been closely connected with the Edinburgh Anatomical Department, the first link in the chain having been forged as far back as 1844. Acland, during his student days at St George's Hospital, migrated to Edinburgh for a period of study, and while living with Professor Alison in Heriot Row, he came under the influence of John Goodsir, who was then the Curator of the Museum. When, in 1845, the Lee's Readership in Anatomy at Oxford became vacant, the appointment was offered to Acland, who, with Goodsir's guidance and assistance, collected and prepared his material for the illustration of his lectures, and in the company of Edward Forbes he dredged the waters round the Orkneys and Shetlands in order to supplement his collection of marine fauna. The fourteen large packing cases containing the fruits of his labours were

safely transhipped to Oxford, after being held up at the London docks on the suspicion that they contained a quantity of smuggled whisky. When the new Anatomical Department of the University of Oxford was completed in 1893, Turner travelled south and assisted in the opening ceremony. The links in the chain are as yet unbroken, for in the hands of Professor Arthur Thomson, Turner's former Senior Demonstrator, the teaching of Anatomy in Acland's old school is still carried on year by year.

With Sir Henry's promotion to the Presidency, the representation of Oxford University became vacant. His place on the Council was taken by George Rolleston, and thus the three friends became closely associated in the deliberations of that body. Two years later, Sir James Paget took his seat along with Joseph Lister. Paget, Turner and Rolleston, the master and the pupils in the old days at St Bartholomew's, renewed their earlier intercourse. In 1876, Paget was President of the Royal College of Surgeons of England, and entered the Council as its representative. But the work never proved congenial to him. The controversy on medical reform was constantly occupying the attention of the members, and little progress was made with it. It was perhaps not unnatural that he should find the business unsatisfactory. His desire not to desert Acland greatly influenced his decision to continue his membership until 1881, the end of his appointed term of office. Writing to Turner in 1896, three years before his death, Paget said—

> I was sorry, but not surprised, that I did not see you during the meeting of the Medical Council. I am much less active than I used to be, and could not come at the right time to the office, and this house is so much further off than the old one used to be. Very evidently, too, your work was constant and heavy, and the whole business of the Council is constantly becoming more political. And the direct representatives will not improve it, but will steadily diminish its influence on the advancement of science and all forms of useful knowledge.

But, bah! I am growing old, and my judgment on political affairs may be as little fit for use, as my thoughts on pathology fifty years ago would now be.

Joseph Lister had succeeded Warburton Begbie as Crown nominee for Scotland, and was introduced to the Council by Turner. He resigned in the following year upon his appointment to King's College, and he did not seek re-election.

At this period Sir John Simon, K.C.B., became a member, nominated as one of the Crown's representatives for England. In 1848, Simon had been appointed the first Medical Officer of Health for the City of London, and, in his 'English Sanitary Institutions,' a work fitly described as a philosophy of sanitary reform, he revealed himself as the greatest public health authority of his time. A man of literary and artistic pursuits, the "dear brother John" of Ruskin, and the intimate friend of Sir Edward Burne-Jones, Simon formed one of that conspicuous group of outstanding figures in the medical profession during the Victorian era. His opinion and advice carried the greatest weight in the Council, and as a master of correct English, its reports bear proof that he was not only a scholar, but a most capable man of business.

In 1876, Lord Carnarvon introduced the Cruelty to Animals Bill into the House of Lords, and the vivisection question, already investigated at some length during the previous year by a Royal Commission, aroused considerable public attention, and called for the close scrutiny of the Medical Council. Lister was appointed the chairman of a committee of the Council, with Turner and Rolleston as two of its members, to consider and report upon the Bill. Lister was opposed to legislation, and endeavoured to mitigate the severe restrictions imposed by the Bill, but he was unable to carry his point of view, that vivisection experiments should be permitted in unlicensed premises. Turner took up the position that while legislation should give

all reasonable security against any possible abuse, it should not interfere with the progress of knowledge. The stringent provisions of the Act were in great measure framed on Rolleston's recommendations in his evidence before the Royal Commission. "I am greatly delighted with Mr W. E. Forster," he wrote to a friend. "He has made the Government accept an amendment which I, in my smaller sphere, had made the Medical Council accept, whereby frogs are not to be left to the tender mercies of every would-be experimenter. The passing of this Cruelty to Animals Bill is a great step in the history of mankind."[1]

This was not the only piece of legislative work to the consideration of which the Council had to turn its attention at this period, and its Parliamentary Bills Committee, of which Turner was an active member, had many questions upon which to deliberate. In addition to discussions on the several Medical Act Amendment Bills, the placing upon the British Register of women who had taken degrees in foreign Universities, and the removal of sex restrictions in the granting of qualifications to practise in Britain, claimed its attention; while the proposal that the holding of a diploma in State Medicine should be sufficient in itself to admit upon the Register, formed another source of discussion. Upon all these matters the Council reported to the Privy Council. With regard to the registration of women holding a foreign degree, they pointed out, that it was obvious they could not enrol upon the Register a degree over which they had no means of exercising any control, in connection with the education and examination of the candidates who had obtained it. To adopt such a principle would be entirely contrary both to the spirit and letter of the Medical Act; while on the general question of the admission of women to the medical profession, the Council felt that any such proposal

[1] Life of Dr Rolleston, by Edward B. Tylor, in Scientific Papers and Addresses, arranged and edited by William Turner.

should be left to the discretion of the various licensing bodies, and should not be made obligatory. Finally, they were of the opinion that a degree or diploma in State Medicine or Public Health could not in itself constitute a claim for enrolment upon the Register.

In 1878, the general body of the profession had begun to move for a reconstitution of the Medical Council. Hitherto, it had only been represented indirectly through the delegates of the different Universities and Medical Corporations. Some, indeed, held that the profession had no representation at all, as the election of members to the Council was made by the governing bodies of the various institutions, upon which the profession as a whole had no voice. We have seen [1] how Lord Ripon's Bill to amend the Medical Act was wrecked in 1870, because it made no attempt to reconstruct the Executive, through which the Act was to be worked. The profession, indeed, had preferred that there should be no legislation at all, rather than accept legislation which did not reform the Medical Council. A deputation representing the profession was received by the Council, and after it had heard the various statements and arguments put forward in favour of direct representation, it promised to give the subject careful attention. As a result of their deliberations, a resolution was carried, to the effect that the direct representation of the whole profession would not afford sufficient guarantee for the selection of the persons best qualified to perform those duties, and consequently the Council could not recommend that the principle should be adopted. At the same time, there was a feeling amongst a number of the members that the profession, as a body, should be more largely represented, and suggestions were put forward that this might be accomplished, not by the direct vote of the profession, but by increasing the

[1] Chapter XI.

number of Crown nominees, who should not be members of the governing bodies of the Universities and Medical Corporations.

The reconstitution of the Council was made one of the subjects of inquiry by the Medical Acts Commission of 1881, and in the report of the Commission the opinion was expressed that it would be advisable to give the profession an effective voice in the deliberations of the Medical Council, as that body was the principal authority of the medical profession. Two members of the Commission, however, Turner and Sir John Simon, were unable to concur in this general conclusion, and presented a Minority Report.

They based their dissent upon the grounds that the Council did not stand in any relation of trust or duty towards individual members of the profession, such as to make it reasonable for them to expect any electoral privilege in relation to it. It was in no sense a trustee in regard to separate beneficiary interests, nor did it govern the profession or tax them. It could remove the name of a practitioner from the Register, but except in that case, the status of the registered practitioner was outside the jurisdiction of the Council, and was entirely uninterfered by it. The registration fee paid by the practitioner, an account of which was rendered to Parliament, showed the intention of the law, that the money was held by the Council on behalf of the public, and not on behalf of the profession. Any claim which was made for a vote showed a false idea as to the nature of the responsibilities of the Council.

Turner also objected to the mode of election by direct vote, on the ground that it was not likely to secure the best possible selection of men. Few would possess personal means of judging between the qualifications of the different candidates. The men chosen by the Crown and by the medical authorities were selected because they had the qualifications that were required, but in universal suffrage it would be but a

haphazard choice. If a few well-known men were competing against comparatively unknown men, their eminence would tend to their election, but they would not necessarily be the most fitted. Associations and irresponsible agencies might push candidates, and many good men might dislike to associate themselves with such influences. Moreover, the Council as already constituted had never failed to have general practitioners as members. If any change were to be made in the Council, it should be in the direction of curtailing the number of representatives.

The Medical Act of 1886 reconstituted the Council so that its membership was increased to thirty. Five direct representatives of the profession were added, three from England and one from Scotland and Ireland respectively, while each of the Scottish Universities was given a representative. The Crown nominees were reduced from six to five. The president was no longer to vacate his seat as an ordinary member on his election to the chair. Any new University that was founded, or any body capable of granting a medical diploma in the future, which in the opinion of the Council was worthy of representation, was to obtain a seat, while registered medical practitioners might also have an additional member in the future. Before such changes could be effected, the Privy Council was required to lay the suggestions before both Houses of Parliament. The Medical Council as constituted to-day has a membership of thirty-eight.

In 1883, Turner having completed ten years of service upon the Council, felt that it was incumbent upon him to retire in favour of a representative from Aberdeen University. Writing to Acland to announce his intention, he said—

> I was much pleased on Sunday to hear the old Museum in Christ Church referred to from the pulpit, in terms which

showed that the preacher, when an undergraduate at Oxford, had realised the object you had in view in developing, now so many years ago, and in collecting material for the study of organic structure and life, so as to place within the range of Oxford studies material for acquiring a knowledge of the physical side of nature and man, in addition to the opportunities for mental and moral culture, with which she had so long been abundantly provided.

As to my reappointment to the Medical Council, that cannot be entertained at the present time. The University of Edinburgh is bound in honour to give Aberdeen her turn in the joint representation. I have held the appointment for ten years, and I feel that I should not be acting fairly to our sister University if I were to press for re-election. My retirement from the Council will not, however, diminish my interest in its work. I value very much the privilege which I have enjoyed of taking a part in the public life of my profession, and in forming an acquaintance, and in many cases a friendship, with so many men of eminence in it.

Let me further say that nothing do I value more than the personal communion I have had with yourself.

In 1886, after an interval of three years, Turner was returned to the reconstituted Council as the representative of the University of Edinburgh, retaining his membership for a continuous period of nineteen years. When the Council met in February 1887, under the new conditions enforced by the Medical Act of 1886, the vexed question of the method of licensing the medical practitioner had been settled, and so the ground was cleared for the discussion of other important matters. The Medical Council was given no new coercive powers; it could, as before, only report to the Privy Council, if defects were discovered in the educational and examining methods of the licensing bodies. But the extent of the qualifying examinations became enlarged and better defined, and the scope and method of the system of inspection were now placed upon a wider basis.

Direct representation had been established with the object of ensuring that the profession would have a fuller and more complete confidence in the Council. The five members elected by the votes of their professional brethren took their seats for the first time, Scotland being represented by Dr William Bruce of Dingwall, a graduate of Aberdeen, who retained his seat for twenty years.

Turner found that some of his former colleagues had gone, while others remained to welcome his return amongst them. Sir Henry Acland still occupied the Presidential Chair, but his resignation was accepted in the month of May, and Mr John Marshall was elected the sixth President. Although a surgeon by profession, Marshall had been an anatomist in his earlier days. A man of wide interests, he was thoroughly conversant with the needs of professional education, and as Chairman of the Council, he was at pains to subordinate the interests of the College of Surgeons which he represented, for the sake of what was best for the profession as a whole. In addition to Acland, two other members of the original Council of 1858 still retained their seats. Dr Aquila Smith was one of the Irish representatives who resigned in 1889, after thirty-one years of service, during which he had never missed an attendance at the general meetings, while his absence from one of the Executive meetings was due to a severe snowstorm which interfered with his journey from Ireland. Thomas Pridgin Teale became the Father of the House, serving continuously from 1858 to 1901, and sitting under eight successive Presidents.

Amongst Turner's new colleagues were John Struthers of Aberdeen, and J. Bell Pettigrew of St Andrews University. The association of the three men in 1887 revives memories of 1867, when they competed for the Chair of Anatomy in Edinburgh. They again found a common interest in the business

of the Council Chamber. It is not unworthy of note to find how frequently the trained anatomist has been selected by the governing body of the Universities to represent them upon the Medical Council. Turner, as we have elsewhere pointed out, had a firm belief in the value of a sound anatomical training, combined with experience in teaching the subject of anatomy, as one of the best preparations for a business career; and proof of the truth of this statement is furnished by the large number of trained anatomists who have found seats on the Council—Turner, Struthers, and Pettigrew; Acland, Rolleston, and Arthur Thomson of Oxford; George Murray Humphry of Cambridge; Allen Thomson of Glasgow; Alfred H. Young and Elliot Smith of Manchester; John Yule Mackay of Dundee; Sir Bertram Windle, formerly of Birmingham; Johnson Symington of Belfast; David Hepburn of Cardiff; Francis Dixon of Dublin; and Robert Howden of Durham. Three of the Council's Presidents—Acland, Marshall, and Turner—could lay claim to the same valuable training, though, in the case of the two former, the teaching of anatomy had not constituted their life's work.

Old friendships were strengthened and fresh friendships were formed at this period. Turner found James Matthews Duncan, now actively engaged in professional work in London, as one of his colleagues, while two of his former pupils in the dissecting-rooms in Edinburgh in the days of Goodsir — Sir Dyce Duckworth and Sir William Mitchell Banks—were participating in the Council's work. Sir John Batty Tuke became a member in 1887, and it was then that Turner, Tuke, and Heron Watson cemented their friendship, and for many years travelled to and from London together on the Council's business.

Some new friendships were made. With Sir William S. Church, Baronet, on the staff of St Bartholomew's Hospital, and a President of the Royal College of Physicians of London, whose grace-

ful memorial tribute to Turner,[1] so ably expresses his appreciation of his life and work, he became intimately acquainted. "I first made Turner's acquaintance in Oxford in 1860," writes Church, "and I used to meet him occasionally in London, chiefly in the house of Sir Thomas Smith; but it was during the ten years that I was a member of the Medical Council that I got to know him really well, and from that time I may say our friendship began." In the society of the Rev. Samuel Haughton, M.D., Fellow of Trinity College, Dublin, the versatile Irishman, whose professional career embraced mathematics, geology, the affairs of the Church, and medicine, Turner enjoyed much pleasant intercourse; and for his compatriot, Sir Richard Quain, Baronet, brimful of geniality and good nature, and with a fund of humorous anecdote, related in a rich Irish brogue, he preserved a warm and affectionate regard.

Robert Brudenell Carter entered the Council as representative of the Society of Apothecaries of London. A man of perfect temper, genial and courteous, he won the regard and retained the affection of a large circle of friends. In the Council's debates, his views were expressed with a clearness and precision which secured for him the attention and the approval of his colleagues. He was responsible for introducing a useful measure in the method of dealing with registered practitioners, found guilty of some comparatively trivial offence, towards which the Council, by its regulations, had no choice, save to condone the act, or to order the extreme penalty of erasure from the Register. By adopting the expediency of postponing the Council's decision in such a case until its next session, an interval of probation was granted to the offender, and the simple admonition, thus administered, proved a sufficiently salutary lesson in many cases of slight misconduct.

In 1892, Sir David Caldwell M'Vail succeeded Sir

[1] St Bartholomew's Hospital Reports, 1917.

George Macleod as Crown representative for Scotland. An acknowledged leader of the profession in Glasgow, David M'Vail was responsible, in his position as a member of the University Court, for many of the important reforms which led to the improvement of medical education in the Scottish Universities under the Act of 1889. As an effective speaker, and as one who never took up any subject without first mastering the details and all the circumstances bearing upon it, he was a force to be reckoned with in the affairs of the Council. A man of marked individuality of character, and with the courage of his convictions, he rarely erred in his judgment, and served the Council for twenty years as a vigorous and useful member.

In James Little, the Regius Professor of Medicine in Dublin, the Council numbered amongst its members one who endeared himself to all his colleagues. As the *doyen* of the medical profession in Ireland at the time of his death in December 1916, Little, who was an Ulster man by birth, happily blended a rich vein of southern geniality with all the shrewdness of the north. He was a leading spirit in all social functions, and an active participant in the proceedings of the Council.

It is beyond the scope of this brief sketch to give any detailed account of the work undertaken by the Medical Council during the last nineteen years of Turner's membership. He served upon a number of Committees, both statutory and special, and he became chairman of the Business, Examination, and Dental Committees, obtaining his seat upon the Executive in 1887. He took a leading part in the Council's deliberations upon the English Bill for the Compulsory Registration of Midwives, a piece of legislation which came into operation in 1902, and which was subsequently followed by an Act for Scotland. He insisted upon a greater stringency in the conditions under which midwives should be permitted to register, otherwise the profession would be flooded with a number of ill-educated persons. He con-

sidered that it was just as important that the women should produce a certificate of character and competency as show proof of their occupation as midwives.

The question of the establishment of medical reciprocity between the United Kingdom on the one hand, and the British overseas possessions and foreign countries on the other — a subject which received the attention of the Council for a number of years — was one in which Turner was specially interested, and for the attainment of which he was constantly working. When, in 1901, the privilege of registration upon the British Register was granted to graduates of the Italian Universities, the event gave him the greatest satisfaction. Reciprocity has now been arranged, under the regulations of the Medical Act, 1886, with all parts of the overseas dominions, with the exception of British Columbia; a large number of qualified practitioners, holding the degrees of the several Universities in distant parts of the Empire, are now enrolled upon the British Register, and are practising their profession either permanently or temporarily in this country. On the foreign list of the Register, Belgium, Italy, and Japan are represented, the majority of the names being those of Belgians holding degrees of the Universities of Brussels, Ghent, and Louvain. The establishment of medical reciprocity had thus made it possible for this country to meet some of the exigencies which have arisen during the Great War.

In 1897, Sir Richard Quain, who had become President on the death of Mr John Marshall in 1891, was seriously ill and unable to attend the autumn session of the Council. In accordance with his desire, Turner, who was then Chairman of the Business Committee, was elected to discharge his duties on that occasion. He evidently realised the prospective difficulties of his position, as we find him writing to Cunningham shortly before the opening of the session:—

I was not unprepared to hear of Dr Haughton's illness and death. I am glad that I saw him last summer, so bright and relatively well; my last recollections of him will always be pleasant and reminiscent of his geniality and heartiness.

I have a somewhat anxious and responsible duty before me. Owing to Sir Richard Quain's illness I shall have to take charge of the business of the Medical Council, which, with so many contending elements on it, and in it, will not be an easy task. However, with patience and tact I hope that I may preserve the peace.

On the death of Quain in the early months of 1898, there was no doubt in the minds of the members of the Council as to Turner's claims and fitness for the office of President, and he was unanimously elected on April 5, 1898. For the first time in the history of the Council, the honour had been bestowed upon one who lived north of the Tweed. Some doubt had been expressed as to whether it was possible for the chief executive officer to attend to the many duties which devolved upon him between the sessions of the Council, when residing so far from the centre of business. But Turner overcame the difficulties, and personally attended to his administrative duties, partly by correspondence and partly by frequent visits to London. In this way he overtook a great deal of preliminary work, and thus was successful in reducing the period of the Council's sessions. His orderly methods, and his aptitude for grasping a point quickly and coming to a rapid decision, proved invaluable to him in his new position, and greatly assisted the progress of business. "He had a forward policy, in regard both to education and discipline, and his action usually carried the Council onward in the direction which events showed was the right one. His task at first was not an easy one, and his firm grip of procedure was not wholly welcome to some, who liked to be a law unto themselves, but respect for his judgment steadily increased, even among the more eager juniors. The Council's finance reports had showed year by year a growing deficit, which was

giving rise to fears of insolvency, but during his Presidency most of these difficulties faded away."[1] Turner's addresses from the Chair at the opening of each session were brief, but they were characterised by the clearness and completeness with which he recounted the work which he had overtaken in the interval, and they stated the chief points in the business which lay before the Meeting.

In his address on November 22, 1904, Turner announced his intention to retire from the Presidency. He regarded the occasion as a fitting one in which to present the Council with a mace, "emblematic of ceremonial dignity and authority." "I am desirous," he said, "of giving to this Emblem objective form, and I ask to be allowed to offer for the acceptance of the Council an example which, in its design, expresses our identification with the great profession of medicine, and our place as the administrative body representative of the three divisions of the United Kingdom." Continuing, he said—

> Upon December 3, 1901, you re-elected me President for a further period of five years, provided that I remained a member of Council. Although my appointment as representative of the University of Edinburgh does not expire until December 1906, I have formed the opinion, after giving the subject mature consideration, that the time has come when it is advisable that I should retire from the Presidentship. I have to bear in mind that my duties in Edinburgh, as Principal of the University, are of an onerous and absorbing nature, and have the first call on my time and energy.
>
> Through your favour and confidence, gentlemen, for which I cannot too strongly express my grateful acknowledgment, I have occupied the Chair during six years; but for some months past I have become conscious of the fact that, having entered upon the stage of life which entitles me to be called a septuagenarian, the vital mechanism cannot be driven at the speed, and with the continuity of effort, which was both possible and pleasurable a few years ago.

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[1] Sir Donald Macalister, Student Memorial Number, 1916.

The business of the Council is ever on the increase, and from the strain to which I am subjected when the Council is sitting, and the bulky correspondence to be attended to during the interval between sessions, I have come to the conclusion that I ought no longer to retain the Presidential Chair, as I feel that I should not be able to discharge efficiently the duties of the responsible office to the satisfaction either of myself or my colleagues. I have to request you, therefore, to arrange for the appointment of my successor before the Council rises at the end of the present session.

His resignation was accepted, but at the request of Sir Donald Macalister, his successor in office, Turner remained for another year as a Member of the Council, which continued to receive the benefit of his advice and experience until his final retirement on October 21, 1905. At a farewell banquet given to him in London, which was attended by past and present members, and by representatives of the departments of the Government with which the Council was more immediately associated in its work, he had ample proof that he was leaving not only his colleagues in work, but men with whom he had formed a whole-hearted friendship.

When addressing the members of the Royal Medical Society of Edinburgh in February 1909, Sir Donald Macalister thus spoke of his friend :—

You awarded your diploma to Sir Benjamin Collins Brodie, and thirty-six years afterwards he became President of the General Medical Council. In 1868, you chose William Turner for the same distinction, and thirty years later he was called by acclamation to occupy the same Chair. Of the two gifts to the Council, the better and the greater was the latter, for the Council never had an abler, a wiser, or a more just President. At its Jubilee last November, it offered him its tribute of gratitude and affectionate regard. To-night you will not think it inopportune that I cordially recall that tribute, and add my own personal expression of admiration and esteem for a Chief, who is also yours. He made the place he vacated harder to fill indeed; but he also made it more honourable by his tenure, and therefore more worthy of the best efforts of his successors to follow his example.

CHAPTER XIII.

THE UNIVERSITIES (SCOTLAND) ACT OF 1889 AND THE CHANGES IN THE CONSTITUTION OF THE UNIVERSITY.

Commission of Inquiry of 1876 — Huxley and Turner — Lord Kinnear's Commission of 1889—Changes in the University Court—Patronage of University Chairs—The Payment of Professors' Salaries—Autonomy of the Scottish and English Universities—Parliamentary Control—The Students' Representative Council.

DURING the greater part of the period dealt with in Chapter xi., when the attention of the general body of the profession was directed to the subject of medical reform, questions relating to changes and improvements in the internal administration and financial resources of the Scottish Universities were frequently under consideration. Various causes made it incumbent upon the University authorities to revise their position, and endeavour to obtain an enlargement of the powers which had been granted to them under the Universities Act of 1858. The steady increase in the number of students; a desire upon the part of the graduates to take a larger share in the conduct of University affairs; additions to the teaching staff; the growing demands of education and the rapid progress in science; and, in Edinburgh in particular, the expansion in the material resources of the University,

associated with the erection of the buildings of the New Medical School, made it necessary to appeal to legislation to alter the constitution of the governing bodies in the Universities, so as to surmount the difficulties which were arising.

It is true that the Commissioners, appointed under the Act of 1858, foresaw that, from time to time, changes would arise which would make modifications in the Ordinances necessary, and they had provided the machinery by which to carry this into effect, without submitting new Ordinances to Parliament before they could become law. Nevertheless, additional powers became necessary, and the Government were urged to pass an Act which would increase the administrative authority of the University Courts. Several Bills were prepared, but for many years no result was reached; finally, the Bill of 1889 was introduced by Mr J. P. B. Robertson (afterwards Lord Robertson), the Lord Advocate in the Salisbury administration, and was passed by both Houses of Parliament.

The important changes which had been effected in the constitution of the Scottish Universities in 1858, which made the Act of that year a landmark in their history, have already been referred to in our description of Turner's early days in Edinburgh, when he was not in a position to take any active part in contributing to their realisation. The transference of the government of the University from the hands of the Town Council to those of the Senatus Academicus, the formation of the General Council and the University Court, and the establishment of the Board of Curators of Patronage, were the outstanding features of her "Magna Charta" in that year, while two officials, the Chancellor and the Rector, were elected under the Act. When Disraeli's Government, however, in 1876, as a preliminary to prospective legislation, determined upon a fresh inquiry into the conditions of the Universities in Scotland, and appointed a Com-

mission for that purpose, Turner was able to give evidence, and to express his views not only upon matters concerning administration, but upon many questions concerning improvements in education. The Commission sat under the Chairmanship of the Right Honourable John Inglis, the Lord Justice-General and the Chancellor of the University. No man was more fitted to preside over such an inquiry. As Chairman of the Commissioners under the Scottish Universities Act of 1858, he had been largely responsible for the excellence of the work accomplished, and he was thoroughly conversant with the whole of the administrative and educational machinery of the Universities; "through his patience, foresight, and sagacity in framing the Ordinances, he had placed himself in the highest rank amongst the benefactors of education in Scotland."[1]

It is not without interest to observe that Huxley was made a member of the Commission of 1876. During the summer of that year he delivered his second course of lectures upon Natural History in the University of Edinburgh, in place of Wyville Thomson, who was still absent, engaged upon the scientific work of the expedition of H.M.S. *Challenger*. Huxley was, at the same time, Lord Rector of Aberdeen University, so that he was conversant with some, at any rate, of the aspects of Scottish University education. His ideal of a modern University was somewhat similar to that of J. S. Mill, and it differed very considerably from the standard type as recognised to-day, with its materialistic aim at making higher education mainly a practical and scientific training for the professional and commercial businesses of life. "My own ideal," he wrote in 1892,[2] "is for the present, at any rate, hopelessly impracticable. The university or universities should be teaching bodies devoted to Art (literary and other), history, philosophy, and science,

[1] Turner, Graduation Address, 1888.
[2] 'Life and Letters of T. H. Huxley,' vol. iii., 1913.

where any one who wanted to learn all that is known about these matters should find people who could teach him and put him in the way of learning for himself. It will be a place for men to get knowledge, and not for boys and adolescents to get degrees. That is what the world will want one day or other, as a supplement to all manner of high schools and technical institutions in which young people get decently educated and learn to earn their bread—such are our present universities." But he did not allow his own views to interfere with his duties as a Commissioner, and he applied himself to the work of improving the existing conditions.

Huxley and Turner, as we have seen, had been members of the Medical Acts Commission of 1881. Working as they did along similar lines of scientific inquiry, both men appeared to possess the mental qualities which fitted them for undertaking work of an administrative character, and consequently frequent demands were made upon their time and energies. Both were endowed with a practical bent of mind, and, with a readiness to perceive the point at issue, they were capable of formulating a working scheme in order to give it effect.

Though the Report which was published by the Inglis Commission in 1878 was not immediately acted upon by the Government, the information which it contained was largely utilised in the framing of the new Ordinances under the Universities (Scotland) Act of 1889. These Ordinances were drawn up by Lord Kinnear's Commission, which was responsible for many of the improvements which were carried through. Amongst his coadjutors were Lord Kyllachy and Mr Donald Crawford, while Professor S. H. Butcher and Sir Patrick Heron Watson devoted no small amount of their time to the interests of their University. Important alterations were effected in the constitution and function of the governing bodies within the University, and improvements were made

in its educational system. More than a passing reference to these changes is necessary if we are to understand properly the developments which have taken place during Turner's professional life, and the part which he himself took in promoting them.

The Edinburgh University Court, which had been established in 1858, received a very considerable extension of its powers in 1889. It became, indeed, the chief governing body in University affairs, though the Act constituted, at the same time, a Universities' Committee of the Privy Council, which was the supreme tribunal. The Court, in addition to the powers which had previously been conferred upon it, was now called upon to administer and manage the whole revenue and property of the University; to appoint professors, whose Chairs might come to be in the patronage of the University, lecturers, assistants, and examiners. The powers of the Senatus, which had hitherto administered the property and revenue, subject to the control of the Court, were now mainly confined to regulating and superintending the teaching and discipline of the University.

In view of the increased jurisdiction of the Court, the question of enlarging its constitution and the sources from which the additional members were to be obtained were made a subject of inquiry. Originally consisting of seven persons, it represented in its membership in Edinburgh four important bodies—the General Council or the graduates, the Senatus Academicus, the Town Council, and the general body of the students. If an increase in its membership were considered desirable—and opinion on the whole was in favour of this—it appeared reasonable that the General Council and the Senatus should provide the additional members. A strong desire had been expressed by members of the General Council not only for increased representation upon the Court, but for some executive power in the conduct of University business. The duties of the Council, in addition to

the election of the Chancellor, were to take into consideration all questions affecting the wellbeing and prosperity of the University, and to make representation to the Court on such matters. The general consensus of opinion in the Commission of 1876 was against the placing of increased powers in the hands of the Council. Its constitution was not such as to admit of its being advantageously, or even safely, entrusted with executive functions. Turner, in his evidence on this point, argued that as it was a body consisting of many thousands of individuals, living at great distances, some of them indeed abroad, and having little or no connection with the University, and without practical knowledge of University affairs, it could not be given executive authority. A comparatively small section of the Council residing in Edinburgh might thus exercise a control which the majority of the Council would disapprove of. Additional representation, on the other hand, would increase their interest in the University and would add to the influence of the Court. Under the new Act no executive function was given, but the Council was furnished with powers to elect four, instead of one, representative upon the Court. The representation of the Senatus upon the Court was also increased from one to four. The Civic element, which had been a feature of the Edinburgh Court, was not interfered with, and it remained as evidence of the historical association between the Town and its College. The Act of 1889, indeed, demonstrated the importance which was attached to a combination of town and gown, by placing, for the first time, upon the Courts of the Universities of St Andrews, Glasgow, and Aberdeen, two members of the Civic body in each of these cities, the Lord Provost and an assessor elected by the Town Council. The remodelled Court with its increased powers thus came to be a governing body consisting of fourteen members, and, in the event of the affiliation of Colleges with the University, addi-

tional members, not exceeding four, were to be added as representatives of these Colleges. Turner was elected by the Senatus, along with his colleagues Professor Crum Brown and the Rev. Professor Malcolm Taylor, when the Court was reconstituted in 1889,[1] and he continued to sit as a member of that body for twenty-seven years, as an ordinary member for fourteen years, and for the remaining period of the time as Principal. On the retirement of Mr John Christison, Sir Robert's third son, Taylor became secretary of the Court, and only resigned his post on account of his health, five months before Turner's death. The two friends worked loyally together throughout the whole of their official life, and though their views upon matters of policy were not always identical, they freely discussed the many points at issue and were mutually benefited by doing so.

While the Act of 1889 thus introduced important changes in the constitution and function of the University Courts, and increased the representation and influence of the General Council and Senatus upon them, no alteration was effected in the Curatorial Court of Patronage in Edinburgh, a body which had no analogy in the other Scottish Universities. The Court of Curators had come into existence in 1858, when the Town Council of Edinburgh had been deprived of its ancient right of University patronage. The power of nominating the Principal and Professors, which the Municipal Corporation had up to that time enjoyed, was transferred to seven Curators, three of whom were elected by the Court, and four by the Town Council, so that the latter continued, in a somewhat modified form, to exercise its old historical privilege. In the other Scottish Universities, in which no similar association had previously existed between City and University, and where the Professors had

[1] Professor Campbell Fraser, who was already a member of the Court, was the fourth representative.

hitherto been appointed by the Senatus, the Court was made the electing body in 1889. A certain amount of confusion appears to exist in the minds of many persons regarding the mode of election of Professors, the uncertainty being doubtless due to the fact that the several appointments are in the hands of more than one electing body. In Edinburgh the patronage of the various Chairs is administered by the Curators, the Crown, and the University Court.[1] In the Medical Faculty the majority of the Chairs, nine in number, rest in the hands of the Curators of Patronage, who are the present-day representatives of the Town Council, the original patrons of these Chairs. The history of the foundation of the Regius Professorship of Clinical Surgery, the Chair of Syme, Lister, and Annandale, illustrates how the Crown came to participate in the election of University Professors. In 1802, the Town Council was petitioned to add clinical instruction in Surgery to the teaching in the medical curriculum. Steps were accordingly taken to obtain from the Crown an endowment for a Chair, and in 1803, a Commission was received from George III. creating the Chair of Clinical Surgery, with an endowment of £50 per annum, and appointing Mr James Russel as the first Professor. In a similar way, the Regius Chair of Forensic Medicine was founded in 1807. The Chair of Botany is the third, and, indeed, the oldest of the Regius Chairs in the Faculty of Medicine; but, unlike the other two, it was originally in the patronage of the Town Council, the Professor being at first responsible for the teaching both of Botany and Materia Medica. In 1768, however, John Hope, who had been appointed "King's Botanist" for Scotland, obtained a Commission as Regius Professor of Botany, and resigned his Professorship of Materia

[1] In the Faculty of Law, the Society of Writers to the Signet, the Faculty of Advocates, and the Merchant Company exercise a certain limited amount of patronage; in the Faculty of Arts, the Lords of Session, the Faculty of Advocates, and the Society of Writers to the Signet exercise patronage when the Chair of Humanity is vacant.

Medica, the latter becoming a separate Chair in the patronage of the Town Council. The appointment of Professors by the University Court is of comparatively recent origin, and dates from the Act of 1889, because the power of receiving and administering the funds necessary for their endowment was then placed in the hands of that body. Four new Chairs in the Medical Faculty came into the patronage of the Court while Turner was one of its members.

The exercise of patronage with the single view of filling the vacancy by the election of the best qualified person that can be procured, is not an easy task, and the question as to the most suitable persons for appointing professors has been a subject of controversy at different times. The Commissioners, who carefully considered the subject, suggested that a detailed and reasoned report upon the qualifications of candidates should be drawn up and submitted to patrons, including Her Majesty—and they even went so far as to draft an ordinance along these lines, which was sent to each University body which exercised patronage, but all of them objected to such a method of selection. The Commissioners finally came to the conclusion that any provisions which might be framed would be either useless or embarrassing, or else would tend so far to diminish the responsibility of existing patrons, as to amount to a practical transference of the right of patronage to those whose duty it would be to frame the reasoned Report. John Inglis, in his inaugural address as Chancellor of the University in 1869, thus defined the three great qualifications which he regarded as necessary for such an office—honesty, firmness, and the capacity of making a discriminating choice. "It will be found that the men who possess these gifts, and who know best how indispensable is their use in the administration of such a trust, are, generally speaking, the most apt to shrink from undertaking its duties. It is no easy task, at least for most men, sternly to disregard the claims of kindred, the

appeals of friendship, the pressure of influence; to cast aside political and politico-religious prejudices and sympathies; to wade, it may be, through a morass of faithless and verbiose testimonials in the almost vain hope of gathering a few modest blossoms of truth; to extract all other available and trustworthy materials for forming a sound judgment, and then to address oneself to the task of selection. Yet such are the qualities, and such the amount of honest labour indispensable to the right administration of University patronage." Inglis held the opinion that there were cogent reasons against placing such powers in the hands of the Crown, or, in other words, the Government of the day. However carefully the Minister might consider his choice independently of political feelings, he probably had neither the time nor the opportunity to master his subject, and therefore he sought the advice of some one upon whom he could rely, thus delegating his judgment to another. Turner, like Christison before him, was frequently consulted in matters of this kind, and his opinion was valued and his advice repeatedly acted upon. The consideration of such matters always imposed upon him much earnest reflection, but when he had made up his mind as to the applicant who would best serve the interests of the University, he resolutely supported the candidate of his choice. "I have no doubt that you were right, absolutely right on the merits of the case," wrote one of his colleagues on the Board of Curators on the occasion of a professorial election. "What you said had that ring of conviction which it was impossible to resist. It was because you thought so, that I was convinced. It is not at every battle that you can trot out your big battalions, but you did it with effect this time, and nothing less would have won the vote of Mr——."

In connection with the constitution of the Court of Curators, Turner favoured the retention of the Civic element, because he felt that its historic interest

should be respected. But he suggested such a modification of the Court, that neither the civic nor the academic party should have a majority, and that a third element, preferably the Crown, might be introduced. The Crown would in this way cede its patronage to the Curatorial Court, on the condition, however, that it appointed a certain proportion of that body. There would thus be established one source of patronage, representing the Crown, the Town, and the University in such a relation that no party held a majority. In the event of an equal division of opinion in any election, a casting vote should be given to some one. An arrangement of this kind would undoubtedly bring the Crown element into closer touch with the local atmosphere, and would tend to eliminate those defects in the Crown patronage to which the Chancellor referred in his address.

In 1889, a radical change was introduced into the system by which the professors obtained their emoluments. Hitherto each professor had collected his class fees from his students, and he derived in this way the main portion of his salary, which naturally varied somewhat, from year to year, according to the size of his class. Under such a system the lecturer undoubtedly had a strong incentive to exertion, as his income was dependent, to some extent at any rate, upon his success as a teacher. Many objections, however, had been brought against the continuance of the method, and these were still further intensified by the alterations which the Commissioners proposed to introduce into the various curricula. So long as only certain defined subjects were compulsory for the pass degree in Arts, the old method of collecting the fees placed all the professors upon an equal basis of remuneration, though the salaries received varied very considerably in amount. But with the introduction of optional subjects in the Arts course, a competition for students, stimulated by an interest in fees, might

arise, which would not be salutary, as there would be a temptation to lower the standard of teaching in order to increase the numbers in the class; moreover, such a system was not applicable to Honours Classes, as the more advanced the subject, the smaller would be the class. Finally, the continuation of the fee system would militate against the proposed introduction of special lectureships, competing with the interests of the professors, in whose departments the special subjects would lie, and which would withdraw a certain number of students from the professorial classes.

The Commissioners, therefore, determined to abandon the old fee system, save in the Faculty of Theology, to regard all fees as earned by the University, and to pay the emoluments of the professors out of the General Fee Fund. The salaries under the new arrangement of payment were not so large as those previously obtained, but a minimum salary was assured to each professor by a charge upon the general revenue of the University. A proviso was introduced to the effect that the normal remuneration which had been assigned to each should, as a rule, suffer a proportional abatement in any year in which the aggregate amount of the fees was insufficient to meet the total claims upon the Fee Fund.

Turner regarded as somewhat unjust a system which remunerated one man from the work which was done by another, and he felt further that the depreciation in salaries which was a consequence of the new arrangement might prove detrimental to the best interests of the University by rendering her Chairs a less attractive goal of ambition than they had been in the past. He was conscious, too, that so long as human nature remained the same, there was always the risk of some relaxation of effort upon the part of the individual, when he was assured of a definite reward for his labours, and that no increase in it was possible.

The preservation of the autonomy of the Scottish

Universities, so that each might be left in a position to regulate its own educational system, and adjust its administrative machinery to suit the individual requirements, was a question upon which Turner held decided views. The subject involved not only the question of a closer federation of the Universities in Scotland, but the more far-reaching problem of State control. The Universities Acts of 1858 and 1889 foreshadowed legislative changes which, had they come into force, would undoubtedly have curtailed the freedom of action which he supported. In 1858, the Commissioners had been directed to inquire into the practicability of establishing a National University in Scotland, with which the four existing Universities would become federated as colleges, each of them having due representation upon its governing body. Such an arrangement would have meant the surrender of the powers of examining and granting degrees which each University had previously held, and it would have led to a uniformity in educational methods, with a loss of the healthy rivalry which stimulates individual progress. "Fortunately this proposal never became operative, but it was obviously in the mind of the Legislature that the time had come for the Universities in Scotland to lose their autonomy, and that their educational and degree-conferring functions should be framed on the same pattern."[1] The Act of 1889 suggested the formation of a General Court of the four Universities, which should review their common interests, especially in regard to degrees and examinations, and which should report to the Privy Council on all new Ordinances, or proposed changes in existing Ordinances. Although the Commissioners drafted an Ordinance in order to carry this into effect, it was subsequently withdrawn. "Such a Court," Turner wrote, "might with advantage become part of the University system in Scotland if it were to

[1] Graduation Address, 1903.

take the place of the reference to Parliament when new Ordinances were proposed; but to refer these to such a General Court as well as to Parliament, as now requires to be done, would only render more complicated the existing mode of procedure and entail even greater delay in effecting educational reform."

The tendency of modern legislation has, indeed, been directed in an entirely opposite direction, and in the autonomy which has been extended to the younger Universities in England we see an adoption of that policy of giving greater educational freedom such as he advocated. The Victoria University in Manchester, founded in 1880, had at first associated with it the Owens College, which had existed in that city for many years; but, in course of time, the Yorkshire College in Leeds and University College, Liverpool, became federated to it. The authority given to the Victoria University to manage its own affairs was so complete, that in no instance were new statutes and regulations to be submitted to Parliament. The influence of the Privy Council was exercised, however, by the Lord President having the power to appoint a proportion of the members of the University Court. But legislation in the twentieth century has gone even a step further in the cause of autonomy, and power has been granted for the breaking up of the federation of these colleges. The Owens College has become an independent Victoria University in Manchester, the College in Liverpool has obtained its own charter, and the Yorkshire College in Leeds has also become a University. The University of Birmingham has expanded out of the old Mason University College, and has been given full power within itself of constructing new Ordinances and of modifying them from time to time without reference to any outside authority. "I claim for the Universities in Scotland that the power of making, altering, and revoking Ordinances and regulations connected with the discharge of their degree-conferring functions

should be vested in the authorities of each University, after communication with the sister Universities and reference to the Universities Committee of the Privy Council, and that they should not be subjected to a prolonged and complicated procedure such as has been imposed by the Act of 1889. Educational freedom has been conferred on the younger Universities south of the Border, and it is difficult to understand why we in Scotland, with an educational history of which we have no cause to be ashamed, should be bound in swaddling clothes and impeded in our progress."

The possibility of the establishment of a close supervision of University education by a Government bureau did not appeal to him. "To place our Universities and colleges under the control of a Government office would be an administrative arrangement which I, for one, have no desire to see initiated in this country. I believe that State control has a tendency to crystallise the educational institutions which it administers, to cramp their expansion, and to deprive them of that elasticity which is necessary in order that they may adapt themselves to the progress of science and learning. I think that all educational bodies are better administered by those who are themselves practically engaged in educational work, together with such an admixture of persons possessing public spirit, administrative capacity, and business habits as may be required for managing their funds, providing more money, more buildings, and more appliances when they are needed. Such a body is, I believe, much to be preferred to one consisting of officials in a Government office having no special knowledge of the subjects or methods of education or acquaintance with local requirements." [1]

The Parliamentary control of Ordinances bearing upon expenditure, when grants are supplied by the State, stands upon a different footing, and it is reasonable and in accordance with general procedure

[1] Address on Medical Education, Birmingham, October 1st, 1890.

that such should be subjected to review. For many years the Legislature bestowed very little financial assistance upon the Universities in Scotland, though small sums of money were from time to time handed over to them. Additional grants were made in 1858, and again in 1889 and at a later period, thus rendering State control more stringent than formerly. Turner applied on more than one occasion for assistance from the Treasury, and though thus tightening the bonds of control, his solicitude for the urgent requirements of the University appeared to him to justify his appeal. He considered, however, that it would be a national misfortune if the State were to be looked upon as the only source from which funds for instituting and carrying on developments in the branches of knowledge should be obtained. "The strength of our national character hinges largely on the exercise of individual and local effort, and to be continually calling on the State for support, discourages the habit of self-reliance and leads to a system of centralisation which is not conducive to public prosperity. If the locality is satisfied that the University in its midst is employing the best endeavour to advance education, no further argument should be needed to elicit means which it may be necessary to provide in order to secure that end." To what extent private and public generosity have been the medium of advancing education and developing the scientific side of the Edinburgh school will become apparent, as we sketch the changes consequent upon the work of Lord Kinnear's Commission.

One further element in the constitution of the University, which may justly be looked upon as coming within the scope of its administrative arrangements, was the statutory recognition, by the Act of 1889, of the Students' Representative Council. The Act gave authority for a definite organisation of this kind in each of the Scottish Universities, and it empowered

the Commissioners to frame regulations for the constitution and functions of the Council. Although the privilege of electing a Lord Rector with a seat on the University Court had been in the hands of the undergraduates since 1858, the need of a more corporate existence, of a recognised medium of communication with the University authorities, and of an organisation which would promote the social life and academic unity of the students, had long been felt necessary.

The inception, in this direction, of the movement which had now received the sanction of the Legislature, had taken place in Edinburgh in 1884, in the year of the great Tercentenary Festival. Her example has been followed by the other Scottish Universities and by the majority of the Universities in Britain. The original scheme was evolved by Mr R. Fitzroy Bell, who afterwards practised at the Scottish Bar; associated with him in the first Presidential Triumvirate were David Orme Masson, now the occupant of the Chair of Chemistry in the University of Melbourne, and J. F. Sturrock, who practised for many years in Broughty Ferry. Through the labours of these men, of James Avon Clyde, Sims Woodhead, Charles W. Cathcart, and of many others who have followed in their footsteps, and through the never-failing assistance of Mr James Walker as the Lord Rector's Assessor upon the Court, in the later years of its history, the Representative Council, in spite of its difficulties, has stood the test of time. It has more than justified the expectations of its founders: to its inspiration the Students' Union owes its origin. Through its agency also, have arisen the Inter-Universities' Conferences, which have broken down the old exclusiveness of the individual Universities, and have developed a wider sympathy between their undergraduates, and by founding the International Academic Committee, the Council has encouraged friendly intercourse between the Universities of different countries, both in Europe and elsewhere.

CHAPTER XIV.

EDUCATIONAL PROGRESS FOLLOWING THE UNIVERSITIES (SCOTLAND) ACT, 1889.

A Retrospect—Conditions before the passing of the Act—The Preliminary Examination in Medicine—The Primary Scientific Subjects—Changes in the Medical Curriculum—The Faculty of Science—The Introduction of the Lectureship System.

It must be difficult for the University student of to-day to visualise all that his Alma Mater has accomplished in providing for the constantly growing needs of her sons and daughters, during the sixty years which have elapsed since the Scottish Universities received their Magna Charta in 1858. If he should be of an historical bent of mind and desirous to inform himself of the scope of the work that was required of his predecessors in the learned faculties, and of the provision that was made for educating them at that period, he will possibly seek his information from the shelves of the University library, and select the first number of the Calendar, which bears the date of the session 1858-59. It is a small volume of one hundred and twenty pages. He will look in vain for any similar record prior to that year, because no official Calendar was published before the passing of the Act just referred to. If the student turns for a moment to the last number of the series, a mere glance will show him that it has grown to more than eight times the magnitude of the first. The difference be-

tween the two books in size alone will furnish an object-lesson in itself, the significance of which will hardly be lost upon him, and he will begin to appreciate, even before he studies the pages, the enormous developments which have taken place in University education during little more than half a century.

The conditions of medical education as they existed in England prior to 1858, have been lightly sketched in the narrative of Turner's student days in Lancaster and London. North of the Tweed, the Scottish University system had exacted a higher standard of knowledge and a more thorough test by examination, than that to which he had been subjected when he sat for his diploma of the College of Surgeons of England. The old method of examining *vivâ voce*, at the end of the student's period of study, had been discontinued in Edinburgh in 1832. Prior to that date the ordeal had been more of the nature of a "heart to heart talk" between pupil and examiner. The undergraduate appeared in evening dress at the private residence of one of his Professors, and took his seat at the table along with the rest of the Faculty. He then underwent an oral examination, which was conducted for the most part in the Latin tongue. Ample opportunity was thus given for making a thorough and searching test of the candidate's knowledge, more so, indeed, than can be obtained by the briefer oral examination of to-day, though it lacked in the more practical methods of the modern clinical inquiry. Sir Robert Christison relates how he met his examiners at the house of Dr Gregory, who plied him with questions for an hour, and then handed him over to his colleagues. "The subsequent acts of examination," he writes, "consisted of a written commentary on an aphorism of Hippocrates, a consultation on a case drawn up by a Professor, and the defence of a thesis. But as these exercises were all written at home, they were actually often the composition of the candidate's grinder." In 1833, however, English was substituted for the Latin

tongue, and the examination, which became both written and oral, was conducted at the University in two stages, constituting a first and second professional. Doubtless, the comparatively short course of study, and the methods of examination, were quite sufficient to meet the demands which the state of scientific knowledge of the period required. Mediocrity and talent were produced then as now, and each carved their respective careers, and advanced our knowledge in both the small and the great things of science and learning. The student of to-day may possibly regret that it had not been his good fortune to live in those less exacting times, but he may seek comfort in the fact that his labours bring him compensation, by reason of his greater knowledge, and the increased power of doing good, which lies to his hand.

Perusal of the pages of the first number of the University Calendar will show that, in 1858, the old order of things had become considerably altered. A preliminary examination in Arts was established and made compulsory for medical degrees. Before the candidate could obtain his Doctorate of Medicine, he had first to take his Bachelor's degree; his course of study was to cover four years instead of three, and his examinations were to be still further divided into stages, in relation to the order in which the subjects of medical education were studied, thus instituting the three professional examinations.

The equipment of the different departments and the provision made for giving practical instruction in the scientific subjects of the curriculum, when viewed in the light of modern requirements, may well be described as most imperfect. "When I first became connected with this School in 1854," Turner has told us, "the only subjects in which practical instruction was imparted—in which the student was required himself to experiment or observe — were Botany, Chemistry, and Anatomy, with, of course, the practical training pursued in the Royal Infirmary.

The great bulk of the teaching was by means of formal lectures with occasional demonstrations of specimens by the teacher. Each subject, therefore, derived its interest, not so much from its own intrinsic merits, as from the descriptive power of the professor, and the force with which he threw his own personality into his teaching." The need of increasing laboratory work was becoming year by year more imperative. Lectures, however good and well illustrated, the reading of books, however extensively carried out, failed to give the student the reality and the fulness of knowledge which alone could come from experiment and actual observation.

The Commissioners, appointed under the Act of 1858, took certain steps in this direction, but two great obstacles barred the way to their efficient development—the lack of the necessary funds, and the want of suitable accommodation. What was shortly to be done in Edinburgh to overcome the latter difficulty will form the subject of another chapter. Progress, however, was slow, and the provision that was then made must appear meagre when viewed in the light of what now exists. Two assistants were appointed in Chemistry, and a joint assistant was placed at the disposal of the Professors of Materia Medica and Medical Jurisprudence. Even Anatomy had no assistant officially recognised by the University until 1863, Turner and his two colleagues being appointed and remunerated by Goodsir himself. We look in vain for any practical instruction in Physiology until 1862-63, when a new class-room was acquired for teaching histology, and for demonstrating experimental methods. Pathology continued to be taught entirely by lectures and demonstrations until 1870, and a practical class in Materia Medica was held for the first time in 1878, and only then, each of the Professors in the Medical Faculty became provided with an assistant. It must not be assumed from these facts that medical education in the Uni-

versity was defective. On the contrary, it occupied a very high position, and the influx of students was rapidly increasing—an increase which merely accentuated the handicap under which the work was being carried on, by emphasising the lack of accommodation. In the session of 1858-59, the number of students who matriculated in medicine was 526, while twenty years later they had more than doubled, 1323 being enrolled in the Faculty in 1878. The movement which was taking place towards a more practical method of teaching the theory of medicine was a comparatively new one. Chemistry, Physiology, and Anatomy were growing too fast for the resources of the Schools, but the opportunities for study in Edinburgh, in spite of the difficulties, were greater than those in the large London Schools of the period.

As the result of the labours of Lord Kinnear's Commission, appointed in 1889, far-reaching changes were introduced into the system of University education, many of which directly affected the training of the student in medicine. Very careful consideration was given by the Commissioners to the question of the Entrance Examination, and to the standard of efficiency in general education that was to be exacted from the student entering both the Arts and Medical Faculties. The conditions of Secondary Education throughout Scotland, at that time, were not such as to allow every boy and girl to receive at school the training necessary to bring them to the standard which was regarded as sufficient for commencing a University career. As it was important to maintain in the Arts Faculty the distinction between School and University education, it was deemed advisable to guard against lowering the standard of the degree in Arts by attempting to adapt the classes to students who might be insufficiently prepared. A Joint Board of Examiners was instituted for the purpose of conducting the Entrance Examination, but it was given

the power to accept, under certain conditions, the leaving certificate of the Scotch Education Department *in lieu* of the examination. It was clearly in the mind of the Commission that the examination was not to be regarded as final and permanent, but that its position in the future would depend upon the measure of improvement effected in the standard of school education in Scotland. This expectation will probably be realised shortly, as the Scottish Universities have recently agreed upon an Ordinance which will go far to revolutionise the previous methods of admission to the graduation courses in the University Faculties. The Ordinance provides for the establishment of an Entrance Board, consisting of members appointed by each of the University Courts, with powers to decide upon all questions connected with admission to the different faculties. The general scope of the Ordinance is sufficiently wide, as it will be part of the duty of the Entrance Board to determine the fitness of applicants who have resided elsewhere than in Scotland, while those who possess Arts' degrees in any British or Foreign University, or a certificate equivalent to a degree, may be regarded as exempted from the requirements of the Board. The test of the prospective student's knowledge will not necessarily depend upon the result of a single examination, but may be based upon the character and standard of his work during the whole period of his secondary education, as furnished by the report of his teachers. The principle has already been adopted in some of the Arts' classes in the University. We may perhaps, in the future, see the same idea adopted in the case of the professional examinations in medicine, and if the teachers in the University are prepared to accept the increased responsibility which the adoption of such a method would place upon them, the burden of the examination system, as at present conducted, will be considerably lightened.

The scope and the standard of the Entrance Examination for students of Medicine had received the close attention of the General Medical Council during the period immediately preceding the sessions of the Scottish Universities' Commissioners, and Turner, then a member of the Council, took a very active part in the discussions of its Committee on Education. It was rightly regarded as indispensable, that medical students should have as liberal an education as possible, before commencing their professional studies. While there was general agreement upon this point, diversity of opinion was expressed as to the subjects which should be included in the examination on general education. Turner insisted upon the attainment of a higher standard in English, and he favoured the inclusion of one ancient language, suggesting that the candidate might select either Greek or Latin, and one modern language, either French or German, while elementary Physics should either form part of the Preliminary Examination or be incorporated as a subject of the First Professional. The Commissioners of 1889 prescribed an examination under the Joint Board of Examiners similar to that which they had instituted in Arts, but modified it, so as to substitute French or German for Greek, and they placed Physics as a compulsory subject in the First Professional, along with Botany, Zoology, and Chemistry.

The position which the preliminary scientific subjects should occupy in the educational training of the student of medicine was a matter which, for a long time, had exercised the minds of those most interested in the arrangement of the medical curriculum. It still continues to do so. When the Commission of Inquiry into the state of the Scottish Universities conducted its investigations in 1876, Huxley gave considerable attention to the question, and sought Turner's advice on several points. In one of his letters to Turner, he indicates a difficulty which had to be overcome.

LONDON, *April* 23, 1877.

MY DEAR TURNER,—Many thanks for your commentary upon my proposals, which will be very valuable to me. I shall at present only just say a word on two or three points.

I fancy that there will be no difficulty in making Greek optional in place of French or German.

We shall never get physical science introduced into the schools until it is made an element in the University examinations, and the Arts students have to be considered as well as the medical students. I would give up a good deal rather than forego Natural Philosophy. It is really indispensable for the study of physiology. But I quite agree with you that there should be some limitation of the range.

The Physiology which I contemplate in the first examination for medicine is only so much as is incidental to Botany and Zoology. The difficulty is how to get a course of Biology such as I give at South Kensington, and which would be invaluable as a preliminary for medical students, to suit your arrangements with your three Professors of Botany, Zoology, and Physiology. It would be an immense gain if students could come to the study of Human Anatomy and Physiology with the edge taken off their ignorance by such preliminary instruction in Biology.

Our Report will be suggestion and not legislation, and I hope that great freedom of action will be left to the individual Universities. T. H. HUXLEY.

When in 1887, the Medical Council was discussing the question of the relation of the early scientific subjects to the schools on the one hand, and to the Universities and medical teaching bodies on the other, they found so great a divergence of views that they were obliged to let matters remain as they were for a time.

The teaching of science in the schools is once again the subject of close inquiry, as evidenced in the Report of the Committee appointed in 1916, to inquire into the position of natural science in the educational system of Great Britain. Greater facilities have now been provided for educating the boy and girl in natural science during the school period. It has

thus become possible for the University to consider whether it might accept the training given to them at school, as equivalent to the instruction hitherto received in the first year of medical study. If this were accepted as an alternative, it should be safeguarded in such a way that the science course should not interfere with the schoolboy's general education, which is as necessary for the prospective student of medicine as for any other professional career. If that were sufficiently provided for, the advantage which would accrue to the medical student would be considerable. On reaching the University, after a careful preliminary training in the basic sciences, he would be free to give more time to those subjects more intimately associated with medicine and surgery, and to that extent relieve the already congested curriculum. Some compromise might be reached by the schools undertaking to provide merely a groundwork in the natural sciences, while the Universities completed the education thus received by giving short courses, specially devoted to the medical application of the same subjects: Chemistry and Botany in their bearing on pharmacy and therapeutics; Physics as applied to physiology, and Biology in its more intimate relation to the spread of disease.

A striking innovation introduced by the Commissioners into the new Arts course was the large infusion of science. The admission of science into a course of graduation in Arts, though not intended to deprive that degree of its "humanistic culture," had nevertheless a special bearing upon the relation of the Faculty of Arts to that of Medicine. Of the subjects necessary for the medical degree, four, Physics, Chemistry, Botany, and Zoology, could now be taken as part of the Arts course. One of the years of medical study was thus included within the Arts curriculum, so that an inducement was thereby offered to the medical student to prepare for his

professional career by extending, at the same time, his training in the subjects of a "liberal education." It is interesting to inquire how far this good intention has been taken advantage of, and to what extent the student of medicine has taken an Arts degree under these new regulations.[1] If we take the five years which preceded the introduction of the science subjects into the Arts curriculum, we find that 1016 students graduated in medicine in Edinburgh during that period. Of these, 112 were Masters or Bachelors of Arts, 55 of whom held the Edinburgh degree and 57 that of other universities, thus giving 11 per cent of the total number with a qualification in Arts. In the inclusive period of 1891-1895, 1217 students graduated in medicine, of which number 136 graduated in Arts—70 in Edinburgh and 66 in other universities, furnishing as before, a total percentage of ·11. During the succeeding five years, 1895-1900, only 7 per cent of those graduating in medicine were also qualified in Arts.[2] In all probability, the increasing demands made upon the energies of the medical student, coupled with the addition of an extra year to his course of study, were responsible for defeating the excellent object which the Commissioners had in view.

Amongst other changes introduced into the course of graduation in medicine was the extension of the period of study from four years to five, and an alteration in the denomination of the degree-titles conferred: the degree of Bachelor of Surgery was substituted for that of Master in Surgery, the latter in future being regarded as a higher title of the same order as that of Doctor of Medicine. In addition to the presentation of a thesis, which was necessary when the higher degrees were sought, an examination

[1] I am indebted to Sir Ludovic Grant for supplying me with the figures quoted here.

[2] The actual figures for 1895-1900 were: graduates in medicine, 946—Arts degree, Edinburgh, 37; other Universities, 35: total, 72.

in certain special sujects was instituted before either of these qualifications could be obtained. Provision was also made for the University to confer diplomas in special branches of medical and surgical practice upon graduates in medicine and surgery.

An epoch-making change was inaugurated, at the same time, by the establishment of separate Faculties of Science in the Scottish Universities. Edinburgh had instituted degrees in pure science as far back as 1865, and, as we shall see, had conferred her first degree in Public Health ten years later. Degrees in Science had become necessary in order to meet the growing demands for scientific instruction. The Baxter Chair in Engineering had been founded in 1868, and the Murchison Chair of Geology in 1871, both of which had been added to the Faculty of Arts. The regulations for study and graduation in science had been entrusted, at first, to a Committee of the teachers of the subjects which qualified for the B.Sc., but the Commissioners realised that science teaching had come to assume an independence and dignity which called for the introduction of the more academic title of a Faculty. Moreover, its importance as a preparation for the industrial pursuits was becoming more and more emphasised, and the subjects would gradually acquire a still greater prominence if the different Chairs became incorporated in a distinct Faculty, instead of being confined to the Faculties of Arts and Medicine. In Edinburgh, in addition to the Bachelor's and Doctor's Degrees in Pure Science, similar degrees were granted in the Applied Sciences, in the subjects of Engineering and Public Health, while a B.Sc. was given in Agriculture.

The development of science, the expansion of practical instruction, and the great increase in the number of medical students, which we have seen had reached an unprecedented figure during the

eighties,[1] made it necessary for the Commissioners to consider carefully the best method of enlarging the existing teaching staff. In order to cope with the situation, three methods were open to them—the extension of the extra-mural system of teaching, the appointment of lecturers, and the establishment of new professorships. In dealing with the extension of the extra-mural system, it was obvious that, if permission were given to the student to take the whole of his curriculum outside the University, congestion in the professorial lecture-rooms would be lessened, and the practical classes would be relieved of some of that overcrowding which is inimical to the best standard of tutorial work. Such a course, however, presented certain disadvantages. The arrangement would be unsuitable by failing to make any provision for increasing the teaching power within the University herself; it might, too, render even more inadequate, from the loss of fees, her revenue, which was far from sufficient to meet all the claims that were made upon it, and it would tend to divorce teaching from examination to an extent which was not consistent with the idea then regarded as part of the University system of education. A greater latitude, however, was, at the same time, granted to medical students by the Commissioners in permitting half of the classes taken in the Extra-Mural School to qualify for graduation.

The foundation of new Chairs depended mainly upon the provision of adequate funds for their endowment. In the circumstances which then existed, it was felt that it would not be advantageous to establish additional Chairs, when great demands for other and very urgent purposes would be made upon the revenues of the University. Money had been ear-marked for founding a Chair of History in Edinburgh, and it was therefore deemed imprudent to appropriate any further portion of the Parlia-

[1] See Chapter V.

mentary Grant for the endowment of additional professorships in medicine. Moreover, a professorship implied an appointment of a more permanent character; it could not be so conveniently discontinued, if experience should prove that it had not been so successful as was at first anticipated. Every additional Chair also meant a numerical increase in the Senatus Academicus, and, in consequence, an increasing difficulty, from mere numbers, in the satisfactory transaction of business by that body. Turner foresaw that the Senatus might, at some future time, become too large an administrative body, and that it might be necessary to create an executive of its own members. The Principal, the Secretary, and the Deans of the various Faculties might be *ex officio* members, and, in addition to these, one or two representatives from each Faculty would complete the Executive Committee. He thought that if any change were considered advisable, it should be in this direction.

The solution of the difficulty which lay before the Commissioners was approached by increasing the number of lecturers and by improving the position of the assistants. A Lectureship could be attached to a subject, the specific importance of which was not such as to raise it to the dignity of a Chair. Lecturers, therefore, were appointed in subjects which had not been taught previously within the University, and also in special branches of subjects which were not usually or fully dealt with in the Professorial lectures. The intention was to open an academic career to graduates who might show some special capacity for such a calling. The position of the Lecturer deservedly acquired an academic status. As he took his share in the higher teaching of the University, he became responsible, along with the Professor, for a large part of the practical and laboratory instruction necessary for qualification, and, in many instances, his work carried with it the important function of examining for the degree. Some

share in the administrative machinery was also given to him by instituting Boards of Studies, upon which certain of the lecturers were represented. Provided with opportunities for carrying out original investigation, the lecturers, if possessing the necessary scientific bent, were in a position to acquire experience and prestige, such as would give them an undoubted standing upon the teaching staff.

The introduction of these lectureships, along with an improvement in the status of the University assistants, has greatly strengthened the teaching power of the University. The increase in the number of lecturers has been rapid during recent years, due mainly to the opening up of fresh subjects in connection with Honours classes in Arts and Science, and with the expansion of teaching in clinical medicine. Prior to 1889, six lectureships had been instituted, four of which belonged to the Faculty of Medicine, but by 1895, twenty additional appointments had been made. In 1916, the number slightly exceeded one hundred, while the assistants to Professors, some of whom also held lectureships, numbered close upon the same figure. History, Economics, Modern Languages, the application of science and arts to the industries, subdivisions of the subject of geology, and various branches of the Law, and even military instruction, all became part of the system of University education. In their gradual development Turner took a great deal of interest and exercised his influence in their promotion. He foresaw one possible danger which might arise from the institution of a number of appointments filled by comparatively young men, whose object was to gain experience in teaching and to acquire a more thorough knowledge of their subject. There was a risk that some might fail in due course to obtain promotion, and thus, with advancing years, tend to become disappointed with their want of success in life, a condition of things which would not conduce to the value of the lectureships in the scheme of University instruction.

CHAPTER XV.

THE FOUR NEW CHAIRS IN THE MEDICAL FACULTY.

Public Health and the Sir John Usher Institute—Bacteriology—Clinical Medicine—Tuberculosis.

ALTHOUGH the Commissioners were unable to see their way to institute new Chairs in the Faculty of Medicine, some progress has since been made in this direction. During a period covering nearly seventy years (1831-1898) no new Professorships in medicine had been established. In 1831, the Chairs of Pathology and of the Principles of Surgery were founded, Dr John Thomson and Mr John William Turner receiving their respective commissions from William IV. A strong protest was made both by the Town Council and by the Senatus against their foundation, on the ground that the Crown was interfering with the regulations of the University by giving these gentlemen power to examine candidates for graduation. Pathology was then being taught by the Professor of Medicine, while Monro *tertius* combined the teaching of Surgery with his duties as an anatomist. But with the establishment of these two Chairs the Faculty of Medicine was, for the time being, regarded as complete, and no additions were made to it until 1898, when the first of four new Chairs was created, two of which were also included in the Faculty of Science. The history of their origin is full of interest,

and illustrates what public-spirited generosity will do, when State aid is not so all-embracing as to stifle individual effort and render private endeavour unnecessary, while interwoven with the material aspect of the story of their creation runs a fine thread of romance.

The subjects dealt with in three of the four new Chairs are closely linked with the larger question of the development of the study of the prevention of disease, for which a new era opened in this country early in the reign of Queen Victoria. Sanitary science and sanitary reform were largely the products of the Victorian period. The arrest of the spread of infectious disease, the better housing of the labouring classes, improvement in the defective cleansing of towns, a healthy supply of water and milk, and many other questions bearing on the health of communities, had aroused but little intelligent public interest before that time. Much still remains to be done. As the outcome of the pioneer work of men like Chadwick, Southwold Smith, and Sir John Simon, the State took over the control of sanitary reform and legislated for many effective remedial measures. It is not surprising, therefore, that the prominent position which the science of preventive medicine had assumed should be reflected in the great teaching schools of the country, and that their material progress should advance along the same line. Edinburgh has no reason to be ashamed of the pioneer character of the part which she has played in this domain of medicine. She was the second city in the kingdom to appoint a Medical Officer of Health, and the first to insist on the compulsory notification of infectious diseases, while her University was the leader in establishing a degree in Public Health and in founding a Chair for the instruction of her students, before any similar steps had been taken elsewhere.

The Public Health Act of 1872 had brought about a new departure by requiring that all urban and rural

authorities should appoint Medical Officers of Health in their respective areas. Previous to the Act, health officers had been established only in the larger cities throughout the country. A new field of work was thus opened up to the medical profession, and the University realised the necessity of taking appropriate steps to make her graduates eligible to hold these important appointments. Sir Lyon Playfair, who had taken an active part in the House of Commons debate upon the second reading of the Public Health Bill, and always mindful of the interests of the University which he represented, wrote to the Dean of the Medical Faculty in 1873, as follows :—

> I am always jealous for the reputation of our University, and that it should keep abreast of public wants. Medical officers of health are now becoming a great requirement of the country, but with the exception of the diploma of Trinity College, Dublin, for State Medicine, there is no certificate of the qualifications of young medical men, as to their fitness to discharge such important duties as are involved in health officers. Hygiene involves knowledge of a very special kind, and is generally acquired as a supplement to a professional education. In the absence of examinations, the candidates for public office have to depend upon the miserable system of private testimonials. Would it not be worthy of consideration, whether the University of Edinburgh should put itself in advance of these rapidly growing requirements for the public service? A supplementary diploma for public hygiene would give a great advantage to your graduates who obtained it.

Acting upon this suggestion, the Faculty prepared a scheme, and the University laid down a curriculum and established a degree in Public Health, the first of which was conferred in 1875, upon James Russell, then acting as Turner's Senior Demonstrator in Anatomy. In after years, Sir James made a close study of Sanitation, and during his long period of service as a member of the Edinburgh Town Council, he held the office of Convener of the Public Health Committee.

The problem of teaching a new department of Science presented many difficulties in a School already seriously burdened by lack of accommodation. But having undertaken the task of conferring degrees, educational facilities had to be provided. A corner in the old chemical laboratory in the south-west corner of the Quadrangle was set apart for the purpose, and, in this modest way, a commencement was made in giving men practical training for the Public Health service. Steps were taken in planning the New Medical Buildings to give more suitable accommodation for a branch of science which was steadily developing, and, when the School in Teviot Place was completed in 1885, a chemical and bacteriological laboratory was provided for it in the department assigned to Medical Jurisprudence. Thus, in 1874, Edinburgh took the lead and introduced a new departure in scientific education. Through the foresight and energy of Henry Duncan Littlejohn, her Medical Officer of Health, she was again in the van in 1879, when he urged upon the Town Council the necessity of obtaining an Act of Parliament to make compulsory the notification of infectious disease.

During the sixties, Louis Pasteur in his laboratory in the Rue d'Ulm in Paris was conducting his experiments upon fermentation, and was laying the foundation of that scientific discovery upon which Lister built his antiseptic principles in surgery. Pasteur had destroyed the theory of spontaneous generation, and had proved that fermentation does not occur as an independent process, but is induced by the addition of minute cultivations of micro-organisms. He had studied, with that minute care which characterised all his work, the causes of disease in wines, and of the failure in the production of good beer. His scientific researches had shown that every marked alteration in the quality of beer coincided with the development of micro-organisms which were foreign

to the nature of true beer yeast. The alterations in its quality depended upon the introduction of the organisms as ferments of disease, which were conveyed by the air, by the ingredients, and by the apparatus used in the breweries.

Pasteur, being anxious to visit the great English breweries, had proceeded in 1871 to London, where he was most courteously received. Escorted by the managers of one of the most important breweries in the city, he examined minutely with his microscope sample after sample of the porter and ales submitted to him, and, to the astonishment of the party, he was at once able to inform them which were defective in quality and which the reverse. He demonstrated the presence of the noxious ferments, and explained to his audience how the quality of the beer was affected by the micro-organisms which were foreign to the beer yeast. "Pasteur was happy to offer to the English, who like to call themselves practical men, a proof of the usefulness of disinterested science, persuaded as he was, that the moral debt incurred to a French scientist would in some measure revert to France herself." [1]

In the spring of 1884, the University of Edinburgh celebrated her great Tercentenary Festival. Of the many distinguished men whom the University and the city delighted to honour on that unique occasion, no one received a more popular and enthusiastic welcome than the great French *savant*. As the guest of Mr H. J. Younger during his brief stay in the city, he visited the Abbey and Holyrood breweries, and, to his great delight, he found that the practical application of his views had been systematically carried out in the brewing process. He there made the acquaintance of Mr A. L. Bruce, an active partner in the firm, and a keen student and admirer of Pasteur's scientific work. Despite the many calls upon his time, Pasteur was able to accept the hospitality of

[1] 'Life of M. Louis Pasteur,' by René Valery-Radot.

Mr Bruce and his wife, the daughter of Livingstone, the African missionary and explorer.

In memory of this visit and as an acknowledgment of the Frenchman's great contribution to science, Bruce decided to found a Chair of Public Health in the University. It is recorded that when suddenly attacked by illness, which he realised was likely to prove immediately fatal, he sent for his friend and adviser, Mr G. L. Crole (recently made Sheriff of the Lothians and Peebles), and arranged for the preparation of a codicil to his will, so as to complete the terms of his bequest; this he was able to sign three hours before his death. Supplementary donations from his widow and family, from Mr John Usher of Norton (later Sir John Usher, Bart.), and from the firm of William Younger & Sons, raised the sum available for the endowment to £15,000. Thus, the Commissioners under the Act of 1889, were able to prepare an Ordinance instituting a separate Professorship in the subject, the first of that nature in the kingdom. With the resignation of Sir Douglas Maclagan in 1897, Medical Jurisprudence and Public Health, hitherto taught together, were divorced from each other. Sir Henry Littlejohn succeeded to the Regius Chair, and in 1898, Dr C. Hunter Stewart became the first occupant of the Bruce and Usher Chair of Public Health.

It was as essential for the progress of sanitary science as for any other branch of scientific study, that it should be assisted by experimental investigation and research. The accommodation reserved in the University for the department of Public Health was, as we have said, of a very limited character, and was hardly capable of further extension within the building in which it had been placed. Turner's attention had been directed, for some time, to the problem of raising funds for providing an Institute worthy of the city, of the University, and of the

importance of the science whose interests it would serve. Probably no one connected with the University during his lifetime exercised a greater influence upon the minds of public men than he did, when the question arose of making an appeal for raising funds for an important University object. The high position which he occupied in the estimation of the public, the earnestness with which he explained the necessity of obtaining the object in view—one might say, indeed, the evident righteousness of his appeal—and his persuasive power in the manner of making it, made it difficult for men to deny him their assistance.

Turner found in Mr Crole an active supporter of his views, and, with his help, he was enabled to see the accomplishment of the scheme which he had so much at heart. "I was told," said Mr Usher, "that a Chair without an Institute was not much good. There is an old saying, 'in for a penny, in for a pound,' and they asked me if I would build it, and I said I would." His generous response to the appeal was announced in the following letter which appeared in 'The Scotsman' newspaper :—

UNIVERSITY OF EDINBURGH,
July 27, 1898.

The Editor of 'The Scotsman.'

SIR,—At this time, when matters affecting the profession of medicine in its relations to the health of the community are filling so large a place in the public eye in this city, I wish to be allowed to state in your columns that, through the munificence of Mr John Usher of Norton, an Institute of Public Health is to be built and equipped for the teaching of the subject, and for the prosecution of research, worthy of the University and of the Medical School of this city.

Mr Usher has already shown his practical interest in sanitary science by completing the endowment of the Chair of Public Health, which was instituted by the late Mr A. L. Bruce, and added to by members of his family and firm, and to which an appointment was made by the University Court a few days ago.

Mr Usher is now about to provide the Professor with a building and equipment to enable him efficiently to carry on

his work, so as to meet the requirements of this rapidly developing and fundamentally important branch of medical science.—I am, etc., WILLIAM TURNER.

The Sir John Usher Institute of Public Health, which the donor desired should be utilised also for the purpose of carrying out such investigations as the city authorities desired in the interests of the health of the community, was completed and handed over to the University in 1902. Standing in the Warrender district of the city, it forms an integral part of the large scheme of University extension, which has gradually spread out its branches from the parent stem that encircles the old Quadrangle.

Coincident with the approaching completion of the Sir John Usher Institute, another Edinburgh citizen was laying the foundation of a second Chair of Science in his native town. Robert Irvine, a Fellow of the Royal Society of Edinburgh, had long devoted his leisure moments to the study of numerous scientific problems. Trained as a chemist in his younger days, he had been appointed chemical adviser to the well-known firm of A. B. Fleming & Co., the printing-ink manufacturers at Granton, in which he eventually became a partner. Intellectual, broad-minded, and deeply interested in the application of science to the promotion of industrial efficiency, he gathered about him a number of friends, whose presence he and his wife always welcomed warmly in their home at Caroline Park, overlooking the waters of the Forth. It became the centre of a small scientific coterie, which included such men as Sir John Murray, K.C.B., Professor Sims Woodhead, now of Cambridge, and Professors Noël Paton of Glasgow and David Orme Masson of Melbourne University. Irvine's natural leaning towards biological questions was fostered by

his constant intercourse with John Murray, whose residence at "Challenger Lodge" was so near his own; while a keen interest in the side issues, which the science of bacteriology evoked, was stimulated by his conversations with Woodhead.

Murray and Irvine leased the old sandstone quarry at Granton, into which the sea had burst many years before; and there, where the waters rose and fell with each flow and ebb of the tide, they moored their floating laboratory, "The Ark," and carried on their observations. The steam yacht *Medusa* dredged the waters of the Forth, and the study of marine zoology under these new conditions must have recalled to memory the earlier work of Edward Forbes and John Goodsir, who had laboured, forty years before, along the same shores. Those who attended the summer vacation courses in Biology in the eighties will not have forgotten the hours which they spent at Granton, when W. A. Herdman, J. Arthur Thomson, Patrick Geddes, and J. T. Cunningham disclosed the living wonders of the sea, and the Irvines dispensed their hospitality.

Robert Irvine, although never a University student of science—a circumstance which he often regretted—was desirous of leaving behind him a permanent memorial, by the aid of which the study of bacteriology might be further advanced. His interest in the secretion of carbonate of lime by marine animals—a subject on which he wrote a number of papers—and the process of solution which the salt underwent, by the action of minute bacteria setting free carbonic acid, appealed to his imagination and gave him the idea of founding a Chair of Bacteriology in the University. Upon his death on March 20, 1902, his trustees were empowered to invest the whole, rest, and remainder of his means and estate, as a separate Trust, for the purpose of accumulating a sum of twenty-five or thirty thousand pounds for founding a Professorship in the University of Edinburgh, and the

equipment of a class-room and laboratory for teaching and research.

In the Indian Ocean, lying to the south of Java and not far from the equatorial line, lies the small British possession named Christmas Island. Upon the fortunes of this small area of the Empire rested the future of the Edinburgh Chair. Sir John Murray's researches had led him into the study of the nature and distribution of the varied submarine deposits of the globe, and he investigated their relation to the rocks which formed the earth's crust. He accumulated material from all parts of the world, and compared what was sent to him with his own collection, which he had made while voyaging with the *Challenger* expedition. During the eighties, a sample of rock from Christmas Island was sent to him by Commander Aldrich of H.M.S. *Egeria*. Murray and Irvine investigated the specimen, and found that it was composed of a valuable phosphatic deposit. While Murray's interest in the rock was at first solely a scientific one, he soon realised its economic importance, and he became convinced that the island might be of value to the nation. The Government of the day was accordingly approached, and finally, Lord Salisbury agreed that the next British warship which passed that way should hoist the British flag upon it. Thus, this lonely uninhabited island of volcanic origin was annexed. Murray obtained a concession and visited the island, which, under his energetic directions, soon teemed with life. Roads were made, a railway was constructed, piers and waterworks built, and a flourishing colony worked the phosphatic deposits. While the British Treasury received its royalties and taxes, the commercial company in which Irvine had invested acquired its fortune, and the Chair of Bacteriology in Edinburgh became, year by year, a more certain event. Turner, who was well acquainted with Irvine's intentions, anxiously awaited the accumulation of the funds,

and when, in 1913, the Trustees were able to make over the sum necessary to ensure the endowment, he recognised that a very important point had been reached in connection with scientific teaching in the University. The Robert Irvine Chair came under the patronage of the University Court, and Dr James Ritchie, the Superintendent of the Laboratory of the Royal College of Physicians and Surgeons of Edinburgh, and formerly Professor of Pathology at Oxford, was appointed its first occupant. Thus, pure scientific investigation had led directly to the accumulation of wealth, which, in its turn, was destined to lead to still further scientific advancement.[1]

The Roll of Benefactors of the University contains the names of many who have bequeathed large sums of money allotted to certain specific objects. The foundation of Chairs, as we have seen, has been one of them, while fellowships, scholarships, and bursaries, and the erection of buildings also, owe their origin to benefactions of a similar kind, and the names of the donors have been associated with their gifts. On the other hand, legacies not set apart for any particular purpose, but left free for the University authorities to decide as to the best method of their application, have been far from numerous. Turner often expressed the wish that legacies, not ear-marked for a particular object, might be more frequently bestowed, so that the money could be applied, where it was most needed. In 1908, however, the University was fortunate in receiving a bequest of this nature from one of her graduates in medicine, a medical practitioner of distinction, the late James Moncrieff Arnott of Chapel, in the kingdom of Fife, and from his daughter. A

[1] I am indebted to Professors Sims Woodhead and W. A. Herdman for most of the information upon which this description is based.

portion of the residue of their estate was left for such uses and purposes as the University Court might see fit to apply them.

When clinical teaching in the Royal Infirmary was being reorganised in 1913, a draft Ordinance was prepared by the Court for the foundation of a Chair of Clinical Medicine. Dr W. S. Greenfield had resigned his position, as Professor of Pathology, on account of failing health, and the wards which had been under his charge as a "Professor of Medicine" had thus become vacant. With the appointment of Dr Lorrain Smith as his successor in the University Chair, the teaching of Pathology became dissociated from that of Clinical Medicine. It was, therefore, necessary that the managers of the Infirmary should make new arrangements for the charge of the wards which Dr Greenfield had vacated.

In 1778, the "Professors of Medicine" in the University, who had for a number of years given clinical lectures in the hospital, had been put in charge of wards in order to facilitate further their teaching. The managers, although recognising that the interests of medical education were closely interwoven with those of the University, nevertheless always acted on the understanding that the University had no prescriptive right or vested interest in the occupancy of wards by members of the professorial staff. The Board of Management of the hospital to-day, while recognising the same principle, shared with their predecessors the desire to give every facility for the advancement of the school, and accordingly, in their agreement with the University Court in 1913, they arranged that a Professor of Clinical Medicine should be appointed to the vacant wards. The agreement went even further than that, because, when a vacancy occurred in the Chair of Materia Medica, it was arranged that the wards, hitherto under the charge of Professor Sir Thomas Fraser, should be allocated to a professor or pro-

fessors of Edinburgh University. The long-standing association between the University and the Infirmary was thus to be perpetuated.

From the funds accruing from the legacy of the Moncrieff Arnotts, the Court was able to honour the memory of the donors by founding the first Chair of Clinical Medicine and by associating their name with it. Dr William Russell was appointed Professor on October 20th, 1913.

Throughout a period covering close upon thirty years, Edinburgh has fought her battle against tuberculosis. The Royal Victoria Hospital had been founded at Craigleith in 1887, and was maintained by public benefaction, with the object not only of treating consumption in the hospital and in the houses of the poor, but for the purpose of taking preventive measures against the disease, and for promoting the advancement of the science of tuberculosis in its various forms. From the experience derived from long-continued observation, a practical scheme for dealing with the disease had gradually been evolved. It consisted of three main elements, which had come to be regarded as essential factors in the treatment of tuberculous persons: these were, the dispensary, the hospital, and the farm colony. The dispensary in Lady Lawson Street stood as the general clearing-house through which the various activities of the scheme were operated; the diagnosis of the disease, the supervision of the families and houses of the afflicted, the training of nurses and medical practitioners, and the accumulation of scientific data, were the main objects of this department. The hospital at Craigleith accommodated the more advanced cases, and those whose condition justified the opinion that a course of careful treatment would lead to eventual recovery. The farm colony at Lasswade,

the most recent development of the system, provided more prolonged treatment for those who had been in hospital, and for whom the benefits of further care held out the prospect of a future useful existence.

The co-ordination of these three elements constituted the Edinburgh Scheme for dealing with tuberculosis. The success which had attended it, due mainly to the pioneer work and energy of the chief physician, Dr R. W. Philip (Sir Robert), brought the system prominently under professional and public notice. It was adopted by the Local Government Boards throughout Great Britain and Ireland, and, having thus received national endorsement, it became, in 1912, the accepted basis of that part of the National Insurance Act of 1911 which dealt with Tuberculosis benefits.

As the city of Edinburgh obviously benefited by the work of the Victoria Dispensary, the Municipal Corporation had contributed annually to its funds, but when the Insurance Act came into force, it was necessary that the Committee of the Hospital, and the Corporation, as the Local Authority under the Act, should make some change in the existing arrangements. The Committee recognised that a scheme, which was to be made available for the whole community, must necessitate an amalgamation of all the agencies and institutions which were engaged in the prevention and treatment of tuberculosis. They accordingly entered into an agreement with the Corporation, which was signed on March 13th, 1914, whereby the latter was to take over, administer, and carry on the work of the Royal Victoria Hospital and its component parts, as the nucleus of their administration under the Public Health (Scotland) Act and the Insurance Act. The Hospital Committee, however, retained the privilege of utilising the buildings for the furtherance of its own scientific objects. A Provisional Order confirming the agreement was obtained by the Corporation in 1916.

The Royal Victoria Hospital, thus relieved of a part of its original functions, formed itself into a Trust, and was able, with the funds at its disposal, to develop its energies and its usefulness along fresh lines. The promotion of scientific study by founding and equipping Chairs and Lectureships, the publication of useful information regarding the causes and prevention of tuberculosis and allied diseases, the care and treatment of those persons who had not come within the province of the local authorities under the Insurance Act, were objects well worthy of the benefaction of the Trust, and of the public who subscribed to its funds.

The gradual increase in the number of the little pavilions in the grounds of the hospital at Craigleith had attracted Turner's attention for a number of years in his walks in the northern outskirts of the city. He had at first taken up a critical attitude, somewhat adverse to the anti-tuberculosis propaganda, but, as he watched the extension of the scheme, and realised more fully its importance to the community at large, he became more sympathetic towards it. His old interest in public health matters was revived, and stimulated by his conversations with his friend Mr Lawrence Guthrie, one of the active secretaries of the Trust, he paid a visit to the new dispensary building in Lady Lawson Street. He was greatly impressed by what he saw there, and by the facilities which it provided for teaching and advancing the science of tuberculosis. In the class-room, the library, the museum, and the laboratory adjacent to the clinical department, he saw great possibilities, and he realised that they might be utilised in a larger field than that to which they had hitherto been applied. "What is to be the relationship of these various institutions with your Alma Mater?" was the question which he put to Sir Robert Philip. The possibility of the foundation of a Chair of Tuberculosis in the University began to assume a more practical shape in his mind, and, hav-

ing once turned his attention to the subject, he proceeded to work for the furtherance of the scheme. In the summer of 1914, he received, in his official capacity as Principal, a communication from the Honorary Secretaries of the Royal Victoria Hospital Tuberculosis Trust, which contained the following passage: "We enclose a copy of the Provisional Agreement with the Corporation, and a copy of the new Constitution and Rules of the Trust, from which you will observe, that one of the objects of the Trust is to promote the scientific study of tuberculosis by founding and equipping, or assisting to found and equip, a Chair or Lectureship, or Chairs or Lectureships, in one or more of the Universities of Scotland. We have been instructed to inform you that the Trustees, should the Provisional Agreement be confirmed by Provisional Order, propose to provide the necessary funds to found a Chair in the University of Edinburgh, which would concern itself with tuberculosis, should such a proposal meet with the approval of the Court of your University." This generous offer on the part of the Trustees was gratefully acknowledged by the University Court, and, in due course, a capital sum of £18,000 was handed over by the Trust, along with every facility which the dispensary, the hospital, and the farm colony could provide for teaching and research in connection with the Chair. Owing to the delay which arose in connection with obtaining the Provisional Order, Turner did not live to see the Chair established. It was not until December 1917, that Sir Robert Philip was elected by the Court as Professor of Tuberculosis, when Edinburgh again took the lead by founding the first Chair of the kind within the Empire.

CHAPTER XVI.

UNIVERSITY FINANCE—THE CARNEGIE TRUST.

THE extension of building and equipment, the upkeep of new laboratories and museums, the expansion in practical instruction necessitated by the constantly increasing demands of science, necessarily involved many additional calls upon the finances of the University. No one realised more than Turner the need of adequate resources to meet not only the existing obligations, but the prospective increase in expenditure which would certainly take place from year to year. Few persons, other than those more intimately associated with the administration of a great institution like the University, probably realise the sum that is annually required for its maintenance, nor do they appreciate how rapidly the expenditure may increase in a very short period of time.

The income which is annually available to meet current expenses is derived from three main sources: the interest from a comparatively small portion of the total capital of the University—the greater part of the capital being allocated for such particular purposes as endowments, bursaries, &c.—the matriculation and graduation fees of students, a surplus, if any, from the Fee Fund,[1] and lastly, the annual

[1] The Fee Fund has been explained in Chapter IX.

Parliamentary Grant. The money received from these sources constitutes the General University Fund, out of which all current expenses must be paid. An illustration of the expenditure which has to be met out of this Fund may be given from the statement submitted to the Chancellor of the Exchequer by the Edinburgh University Court, when, in 1908, a further request for assistance from the Treasury was being made by the Scottish Universities. The total income which accrued to the General University Fund in the previous year amounted to £39,691. The actual expenditure incurred was £40,862, showing a deficit of expenditure over income of £1171. The expenses of administration alone, for the year 1907, reached £4500, while the upkeep of the existing buildings, their lighting, heating, and cleaning for the same period, cost between twelve and thirteen thousand pounds; the laboratory and museum expenses between four and five thousand, the library about two thousand five hundred, while the lecturers and assistants were paid nearly fourteen thousand, and the examiners close upon three thousand pounds. The annual income which formed the General University Fund naturally fluctuated with the rise and fall in the number of matriculated students, while the expenses invariably tended to augment. Thus, in 1909, two years later, the sum necessary for the maintenance of the buildings had increased by three thousand pounds, while an additional thousand pounds had been expended upon the salaries of the lecturers. These figures clearly show the financial strain imposed upon the University Court in their attempt to keep abreast of the growing demands of education.

The necessity of appealing to the State for assistance was sufficiently obvious. In a bill introduced into Parliament in 1883, an attempt was made by the Treasury to come to an arrangement with the Universities of Scotland, whereby an annual sum of

£40,000 was to be paid to them, which was to cover all their claims, past, present, and future. In other words, it sought to deprive these institutions of any further opportunity of obtaining additional State financial assistance, and thus to leave them handicapped in the matter of adding to their resources, or adapting themselves in the future to the ever-changing conditions and the needs of higher education. Such a proposal could not have been accepted either by the Universities or by the people of Scotland. "I can recall," writes Turner, "the answer given by one of the shrewdest of Edinburgh citizens, the late Sir George Harrison, to the then Financial Secretary to the Treasury — that the proposal to dispose for the future of the claims of the Universities to public moneys would require to be coupled with the condition that the people of Scotland would also have to be freed from all future increase of taxation." Fortunately for the Universities, the bill did not become law.

The Parliamentary Grant, which the Act of 1889 provided for the needs of the Scottish Universities, amounted to an annual payment of £42,000, a sum which was considered quite inadequate to meet both the existing obligations and future requirements. Turner led a protest against the inadequacy of this provision, the terms of which were not, however, altered. But within a month of the passing of the Act, Mr Goschen, the Chancellor of the Exchequer, awoke to the fact that the sum was not sufficient. The claims of the Scottish Universities were reconsidered, and an additional £30,000 were allocated to them under the Education and Local Taxation Account (Scotland) Act, which was passed in 1892, thus providing the Universities with an annual grant of £72,000. After the deduction of what was necessary to meet the various calls upon the pensions funds for Principals and Professors, the University of Edinburgh received as its yearly share of the

balance close upon £21,000, the other Universities being credited with lesser amounts.

A new financial era, however, in the history of the Universities of Scotland was slowly taking shape. Obstacles in the way of effecting improvements, which had hitherto seemed almost insurmountable, were soon to a great extent to become smoothed over. Some lessening of the financial strain was about to be provided for the men who kept so close a watch upon the "University chest," to whom the provision of ways and means to keep the educational machinery running smoothly was ever a source of anxiety. It came somewhat unexpectedly, except to the few who were in intimate contact with the man who was carefully preparing his scheme. Once more private generosity was coming to the assistance of the Scottish Universities, and, on this occasion, upon a scale which far exceeded any previous benefactions.

Andrew Carnegie, Scotsman, millionaire, and philanthropist, already a generous benefactor, both in this country and in the land of his adoption, had conceived the idea of assisting every child of Scottish birth, who had sufficient merit to pass the Entrance Examinations, to receive the benefits of a University education. In 1901, he announced his intention of setting apart a sum of two millions sterling for the purpose of relieving Scottish parents of the necessity of paying their children's fees at the Universities of Scotland. Such was the original scheme which evolved in Mr Carnegie's mind, the general purport of which, he expounded to a number of the leading statesmen and politicians of Scotland at a private meeting held in Dover House in May of that year.

It was not unnatural that the sense of appreciation aroused by the donor's splendid generosity should be mingled with expressions of doubt as to the wisdom of the scheme—as to whether the object which he had in view would be altogether beneficial to the

recipients, to the Universities concerned, or, indeed, to educational interests in Scotland. Carnegie's original idea was to make the non-payment of fees a compulsory measure for all Scottish students—an arrangement which could only have become effective by means of an Act of Parliament. Such a bill would undoubtedly have raised very considerable controversy, and, in its attempted passage through the Legislature, might even have led to the abandonment of the whole scheme. The "compulsory freeing of education," restricted, as the intention was, to one group of students, in Universities with an eminently cosmopolitan position, did not appeal to the majority of those who carefully considered the terms of the gift. The project, if carried in its initial form, might also have endangered the interests of the Secondary Schools and the various Technical Colleges in the country. The question arose, and indeed became a subject of discussion, as to whether it would be possible to exact the payment of fees in these intermediate schools and institutions, when education in the lower schools, on the one hand, and higher education in the Universities, on the other, were to be made free. If secondary education were also to be freed, a large sum of money would require to be raised annually, and a considerable additional tax would thus be imposed upon the ratepayer. In this event, the object of the Carnegie scheme would be partially defeated, because that which was given with the one hand would be taken away with the other.

Turner was invited to attend one of the early conferences at Dover House, where, along with Lord Elgin, Lord Balfour of Burleigh, the then Secretary for Scotland, Mr Arthur J. Balfour, Mr John Morley (Lord Morley), Sir Henry Craik, and Mr Thomas Shaw (Lord Shaw), the advantages and disadvantages of the proposal were freely discussed with Mr Carnegie. By piecing together some manuscript

notes which Turner has left, it is possible to learn the direction of his thoughts, and the views which he expressed at the meeting.

"The granting of opportunities to persons of limited means to obtain a University education for their children is most praiseworthy. Even with the bursary system in Scotland, there is room for an extension of effort in this direction, which would be welcomed. But this should not be complicated by forcing into a scheme persons with means, who are able and willing to pay for the education of their children. If a compulsory system of free education were adopted—and this would necessitate legislation—money would be spent on freeing parents from the payment of fees, and the State has no right to compel parents to accept free University education when they may not desire to be liberated. It would be just as improper as to compel all children, whatever might be the financial position of their parents, to attend the Board Schools, and in so far to pauperise them. Under a permissive system, on the other hand, a balance of money would be left for the extension of the Universities in the direction of buildings, appliances, and teaching staff."

"If this reasonable and limited plan were adopted, there would not, I think, be any need for legislation. The University Court by the Act of 1858, sect. 12 (4), has the power to fix the fees in the several classes. If the Carnegie Trust were to undertake to pay the fees of those who required assistance, it would be doing on a large scale what benevolent persons not infrequently do at present for individual students. The object which Mr Carnegie has in view, of bringing University education into the power of all who are fit to receive it, but unable to pay for it, would be accomplished without leading to difficulties and opposition in the legislature. The fact that two classes of students would attend the University—namely, those who pay fees, and those who do not themselves pay—would not be of moment, as at Eton and many other

public schools there are foundation and non-foundation scholars."

"A natural question to consider is the effect of such a change upon the finances in the University system. The scheme in itself would not add to her revenue, unless the number of students underwent a proportionate increase. It would mean no more than that fees now paid by parents would be paid by the Trust. Can we look for a large increase of students under its operation? In considering this matter, it must be remembered that the number of students each year is practically determined by the standard of the entrance examination, and in the education of the schools being sufficient to prepare for that standard. Hence the subject has an important bearing upon secondary education in Scotland. Were this so improved as to permit of a large increase in the number of students, the Universities would then be called upon to make payment on capital account for larger class-rooms, and in the scientific departments for larger laboratories, more apparatus, and other teaching appliances; and additional teachers would be needed. It is possible that the increase in the number of fees might be sufficient to provide salaries for the increase of the teaching staff in existing subjects, but it would be altogether inadequate to meet the charges to be incurred on new buildings and teaching appliances. Hence the scheme, even in the restricted sense to which I have referred, would call for an increase in the capital of the Universities to provide for all those improvements in educational methods, and for adding to the branches of knowledge which will require to be taught in the future."

Mr Carnegie, essentially a practical man and anxious to consider the best interests of the Scottish Universities, and from the widest standpoint, was considerably influenced by the opinions which were placed before him by his friends. A working scheme was therefore prepared, from which far-reaching benefits

have been obtained, and the financial position of the Universities to-day has been materially improved. One-half of the net annual income arising from the gift was to be applied towards "the improvement and expansion of the Universities in the Faculties of Science and Medicine; for extending the opportunities for scientific study and research, and for increasing the facilities for acquiring a knowledge of History, Economics, English Literature, and Modern Languages, and such other subjects cognate to a technical or commercial education as can be brought within the scope of the University curriculum." This was to be achieved by the erection of buildings, the equipment of laboratories, and the endowment of Professorships and Lectureships, and especially by scholarships for the purpose of encouraging research.

The other half of the income, or such part of it as might be found requisite, was to be devoted on a permissive basis "to the payment of the whole or part of the ordinary class fees exigible by the Universities from students of Scottish birth or extraction, and of sixteen years of age and upwards, or scholars who have given two years' attendance after the age of fourteen at such schools or institutions in Scotland as come under inspection by the Scotch Education Department." The Carnegie Scheme, however, was not confined in either of its two main spheres of usefulness to the Universities alone. It went further than that, and it gave assistance to schools and institutions in Scotland which provided technical or commercial education which, though outside the present range of the University curriculum, might be accepted as doing work of a University level. One condition, however, was attached to Mr Carnegie's gift. The Trust was entitled, in making a grant, to require from other persons or Trust such additional sums as they might conceive reasonable or necessary to attain the desired object.

An Executive Committee, under the Chairmanship

of Lord Elgin, was selected from amongst the Trustees appointed to carry out the administration of the Trust. Turner was chosen to represent the University of Edinburgh upon the Executive Committee. "I am rejoiced," wrote Lord Robertson to him, "that the University Court has taken advantage of the singular good fortune which places your services at their disposal for a work of such enormous and lasting importance." Turner continued to serve until his death, being re-elected for each of the biennial periods during which the University obtained representation. His knowledge of affairs and his sound grasp of financial matters gave him great influence during the early difficulties with which the Executive was faced. The Trust was most fortunate too in its choice of a secretary. In Mr W. S. M'Cormick (Sir William M'Cormick) they found a man eminently qualified for a position which exacted not only a thorough knowledge of educational matters, such as his previous training had given him, but an acquaintance with finance, so necessary for dealing with such large sums of money as the Trust required to handle. While carefully considering every claim upon its own merits, the Executive has justly held that none of the Universities had vested interests in the Trust money, nor were they entitled to receive specific sums. But it has always acted in a most liberal spirit, and has invariably adopted a sympathetic attitude towards the numerous calls which have been made upon it, while the Secretary has generously given his advice and assistance at all times.

The operations of the Trust in the payment of fees led to an expenditure of £445,373 in the four Universities during the first decennial period of its labours. The increasing demands which had been made upon this part of the benefaction had brought about in 1911, an expenditure somewhat in excess of the income available under the Clause. Consequently, it became necessary for the Trust to apportion certain annual allowances or grants for the new beneficiaries, in place

of the payment of the whole of the fees, as had been done in the past. A careful study of figures prepared by the University, with the view of determining whether this form of free education had resulted in any actual increase in the number of Scottish students or scholars attending the University of Edinburgh, has led to the conclusion that no such result had been brought about under its influence.

The work of the Trust, under the clause dealing with the improvement and expansion of the University, has added greatly to her resources, and has lightened the burthen which has so continuously overweighted her. But the operations of the Trust must naturally have their limitations, and the sum of £50,000 allotted annually for distribution amongst the four Universities was not one which could be expected to remain, for all time, the same. The American Steel Bonds, which furnished the capital, were not likely to yield consistently the same interest, and they were, moreover, redeemable in fifty years, when an actual loss might naturally be looked for. While the Trust fully appreciated the desire of the Universities for immediate assistance, it felt that it was impossible to give them any large portion of its annual interest as income. After careful deliberation, it determined upon a quinquennial scheme whereby capital grants were made to provide buildings and endowments of lectureships in yearly instalments covering a period of five years, and in order to meet the more urgent and immediate claims of the Universities, provisional assistance was likewise given, as income, during the same limited period. Thus the University of Edinburgh being desirous, for example, to found a lectureship in French, the Carnegie Trust provided the annual salary, say, of £300 to the lecturer for five years. During the same period the University was credited with £1000 annually towards the endowment fund of the lectureship, so that at the end of five years

half of the capital endowment of the lectureship had been obtained, and, under the condition attached to Mr Carnegie's gift, it only remained for the rest of the endowment to be furnished from another source. The provisional aid thus permitted of an immediate start being made with a lectureship, while the capital assistance freed the Trust at the end of five years from the necessity of providing any further help for that particular object, and gave it greater freedom of action in connection with the many other calls which were made upon it. The Carnegie Trust has, therefore, come in this way to be—along with other private benefactions—a very valuable source of capital endowment, and the Universities have been enabled to keep themselves abreast with modern progress.

The assistance which the Carnegie Trust has received in the furtherance of its objects through the application of other benefactions was strikingly illustrated by the munificence of Sir Donald Currie, G.C.M.G. In response to a personal appeal for assistance, Turner received from Sir Donald Currie, in 1905, the generous donation of £25,000. It was the expressed desire of the donor that the metropolitan University of his native land should be placed upon a sound financial basis, and that the revenue, derived from his gift, should be applied by the Court for the remuneration of a staff of lecturers such as the University might find it advisable from time to time to appoint. A sum of £20,000 was set aside for this purpose, and designated as "The Sir Donald Currie Lectureship Endowment Fund."

In order that the revenue derived from the gift might become immediately available, Sir Donald expressed the hope, that the Executive Committee of the Carnegie Trust would assist him by at once handing over the funds which they had allocated to Edinburgh for teaching purposes. It is needless to say that the Committee willingly agreed to further

Sir Donald's wishes, and they offered to place the income of the capital sum of £10,000, ear-marked for Edinburgh University, at the disposal of the Court, to be used in conjunction with that derived from Sir Donald Currie's gift. Lectureships in Forestry, Geography, Economic History, Chemical Physiology, and Tropical Medicine were established as the result of the arrangement.

Out of the event which we have just recorded there grew up a close and sympathetic friendship between Turner and Sir Donald Currie. The annual summer cruise in the Western Highlands in the steam-yacht *Iolaire*, and the occasional visit to Garth, Sir Donald's Perthshire home, became some of the pleasantest memories of Turner's later years. Though the sphere in which each had laboured was so widely different, a similar object characterised the lifework of both men. Their work was essentially constructive—the one devoting himself to assisting in the imperial task of Empire-building, the other giving his time and his energy to improving and expanding an educational structure which also played its part in cementing the bonds of Empire.

One further aspect of the Carnegie benefaction remains to be noticed. The assistance which the Trust has given to the encouragement of scientific and literary research has likewise proved most gratifying. It has had, indeed, a stimulating effect throughout the length and breadth of Scotland. Many, who otherwise would have found themselves financially unable to turn their attention to laboratory work, have through its agency been able to devote themselves to original inquiry, and what has been accomplished in some of the departments has been recognised as work of a high order of merit.

It is not always by individual effort alone that the best results can be most effectively attained. The development of co-operation between individual workers,

not only in the same, but in different departments of science, requires to be encouraged, and in this respect also the Trust has had its influence. The growth of "Schools of Research" in the various departments undoubtedly has been encouraged, and a further extension of the same system and a closer alliance between workers and groups of workers in different departments, would do much to develop further progress.

The reputation of a large school cannot rest alone upon the teaching ability of those who minister to the immediate wants of their pupils, however capable the teachers may be individually, or however well organised the system of education. The school must produce men who can extend her reputation beyond the narrow confines of the lecture-rooms and wards in which their daily work is carried on, and this can only be achieved by labouring at the elucidation of scientific problems. When men are thus engaged they are better able to infuse a similar spirit into the minds of others.

Edinburgh, in the past, built up her reputation as the leading medical school not only by the ability of her alumni as teachers, but by the contributions which many of them made to the great discoveries of the past century. Public and private benefaction may bequeath large sums of money to provide the necessary means. The men in whose hands is placed the duty of arranging the scheme for conducting the affairs of the School may labour, as Turner did, in the best interests of the University; but the great body of teachers, equally with those to whom we have alluded, have their individual part to play in carrying on the work and enhancing the reputation of their Alma Mater. Governments may legislate and supply the sinews of war; generals may plan their dispositions for battle, and their subordinates in rank may see to their effective arrangement; but without the spirit and the untiring labour of the mass of the rank and file, the will to conquer and the path to victory cannot be attained.

CHAPTER XVII.

THE EXTRA-MURAL SCHOOL OF MEDICINE AND ITS ASSOCIATION WITH THE UNIVERSITY.

College of Surgeons and the Teaching of Anatomy—College of Physicians and the Physic Garden—Surgery and Medicine in the Surgeons' Theatre—Foundation of Medical Faculty—The Extra-Mural School—Qualifies for University Degree—School of Medicine of the Royal Colleges—The Royal Infirmary, 1729—Clinical Teaching—Professors of Medicine and Surgery—Movement to amalgamate University and Extra-Mural Teachers—Reorganisation of the Infirmary Staff.

FREQUENT reference has been made in these pages to the Extra-Mural School of Medicine, a factor in the scheme of medical education in Edinburgh which has no precisely similar counterpart in the other Scottish University towns. It is appropriate, at this stage in our narrative, to sketch briefly the origin and progress of the School, and to show how its fortunes were intimately linked with those of the University, outside whose walls it became a valuable educational element in the medical history of the city. During Turner's life in Edinburgh two important milestones marked the onward course of the School; one might justly say, indeed, that his advent was coincident with its greater expansion and usefulness as a teaching body, while his passing followed closely upon a change which materially affected many of its teachers,

and for the final adjustment of which he was largely responsible.

The first seeds of medical education in Edinburgh were planted and germinated, in soil which was not cultivated with the object of raising the academic Medical Faculty as we see it in the University to-day, but in order to create a school of medicine which flourished for many years before that Faculty was founded. In 1505, the Incorporation of Surgeons and Barbers received its civic Charter from the Town Council, which granted the right to carry out dissections upon the human body and to instruct and examine in anatomy. For more than a century and a half the surgeons were the sole teachers of the healing art in the city. At the beginning of the eighteenth century, increased activity manifested itself in the surgeons' school, and having built an anatomical theatre, they proceeded to carry out "public dissections," for which purpose they appointed regular teachers from amongst their Fellows. Robert Eliot was elected in 1705, and he in turn was succeeded by Adam Drummond, John M'Gill, and Alexander Monro, the last-named receiving the anatomical appointment in 1720.

In 1675, the leading physicians in the city, prominent amongst whom were Sir Robert Sibbald and Dr Andrew Balfour, had begun to recognise the importance of botany in its application to medicine. Both these men were distinguished naturalists, and had made valuable collections illustrating the natural history of Scotland. Sibbald, who had been educated at the University of Leyden, where he graduated in 1661, made a special study of the Cetacea, and his work in this connection has already been referred to.[1] These men took steps to acquire a small piece of ground close to Holyrood House, where they establishen a Physic Garden, the humble beginning of the Botanical Gardens of to-day. The care of the garden

[1] Chapter VII.

was entrusted to James Sutherland, a youth who possessed an intimate knowledge of plants; and history records that in 1695, the Town Council appointed him Professor of Botany in their College, while the Surgeons retained his services for the instruction of their apprentices. There is no evidence, however, that Sutherland lectured in the Town's College.

Sir Robert Sibbald's energies were further directed to founding the College of Physicians, which received its Royal Charter on November 29, 1681. Although restricted by the same from establishing a school of medicine—a restriction which was finally removed under the new Royal Charter of 1861—the Fellows of the College, as individuals, were at liberty to teach their profession as they saw fit. Sibbald, James Halket, and Archibald Pitcairne taught the principles of medicine, and in 1685, the Town Council appointed them Professors of Medicine in the University, without salary and without assigning to them any professorial duties. Pitcairne, indeed, one of the most celebrated physicians of his day, actually occupied the Chair of Physic in Leyden during a part of the period when he was supposed to be fulfilling similar duties at home. The position of these men in the University was therefore merely nominal, and their appointment cannot be regarded as establishing the foundation of the Medical Faculty.

In 1720, two physicians of the Royal College, Andrew St Clair and John Rutherford, came to the assistance of their surgical brethren, and joining Alexander Monro, they taught the practice of physic and the institutes of medicine in the anatomical theatre of the Surgeons' College, while Drs Plummer and Innes lectured upon chemistry in the same building. A School of Medicine had thus gradually developed in Edinburgh, through the energies of the Fellows of the two Medical Corporations, and in it were contained the seeds of the Extra-Mural School. With the translation of Alexander Monro from the

Surgeons' theatre in 1726, as the first Professor of Anatomy in the University, the Medical Faculty came into being, nearly a century and a half after the foundation of the University. Monro's colleagues accompanied him, and became professors in their respective subjects, and Joseph Gibson, a Fellow of the College of Surgeons, was elected, at the same time, the first Professor of Midwifery. It is not without interest to note that what happened in Edinburgh in this connection afterwards repeated itself in Amsterdam. The Medical School of that city was not originally a school of the University. It developed first, as it had done here, outside, and was then brought into the University, and the great anatomist Ruysch, like Monro *primus*, was in his early career a teacher in the Surgeons' school.

The physicians and surgeons continued to teach in what had now become the Extra-Mural School, and prepared their candidates for the examinations qualifying them for their respective licences to practise. The lecturers required no authority from the governing body of their College to enable them to do so, nor was any examination test as to their fitness to teach, exacted from them. The School grew up without any corporate cohesion, and it developed a healthy competition and a spirit of friendly rivalry, which strengthened the reputation of medical education in Edinburgh. When the University began to send out her young graduates, some of whom afterwards joined one or other of the Royal Colleges, and aspired to follow a more academic career, the Extra-Mural School became a useful training-ground for them. In it they obtained experience in teaching, they worked at scientific problems, and, in many cases, gained reputations which afterwards justified their election to professorial Chairs, both in Edinburgh and elsewhere. It was often an uphill fight for the young lecturer; but in spite of initial difficulties, the absence of endowment, the necessity of personally

defraying all expenses, and the cramped accommodation both for teaching and museum purposes, the School continued to flourish and to more than justify its existence.

The old houses acquired by the lecturers of former times have now disappeared from the city map, and instruction is given, for the most part, in the buildings attached to Surgeons' Hall, for the construction and arrangement of which Sir John Struthers was largely responsible. But Surgeons' Square, the scene of the early work of the first Monro, of the Bells, Barclay, and Knox, of Liston, John Reid, Wharton Jones, Sharpey, and Allen Thomson; Brown Square, where Syme and Lizars first taught anatomy and surgery, and Argyle Square, in which Handyside and John Struthers conducted a conjoint course in anatomy, have been demolished in the onward march of town improvements. Minto House, once the surgical hospital of Syme, and later containing the class-rooms of many of the teachers in the Extra-Mural School, still stands, under a new guise, on the north side of Chambers Street, but is now in the hands of a commercial house.

For more than a century after the foundation of the Faculty of Medicine, the classes of the Extra-Mural teachers, while qualifying for the diploma and licence of the two medical Corporations, were, with one exception, not recognised by the University as qualifying for her degree in medicine, though they were open to any of her students who might be desirous of gaining knowledge through that channel. Practical anatomy was the only qualifying class which the student could then attend outside the University. During the Professorship of the third Monro, the fame of Barclay and Knox, coupled with the inability of Monro to arouse enthusiasm in his subject, attracted large numbers of University students to the anatomical theatre of the College of Surgeons. Nevertheless, they were obliged to enrol in the Professor's Lecture class, and obtain from him the attendance

necessary for a qualifying certificate. In 1840, James Syme, always a strong supporter of the recognition of extra-mural teaching, and himself a former lecturer in the School, addressed a letter to the Town Council, in which he suggested an inquiry into the causes of the steady diminution in the number of medical students in the University. He hinted in his letter that an explanation might be found in the rigid rule upon which the University acted, in refusing to recognise any instruction as qualifying for the degree, save what was given within its own walls, or by another University. Such a monopoly was injurious alike to teacher and taught. The former, secure in his position and free from competitive rivalry, ran the risk of becoming satisfied with a routine discharge of his duties, and of narrowing the field of his activities. The latter had no alternative against professorial inefficiency, nor could he seek an outlet elsewhere, if excessive numbers tended to the uncomfortable overcrowding of class-rooms.

The Town Council, after prolonged consideration, drafted certain alterations in the regulations which governed medical teaching in the University, and directed that four of the extra-mural classes should qualify for the degree in medicine, and that this should become effective in 1847. Opposition on the part of the Senatus Academicus led to protracted litigation. The Scottish Law Courts decided against the plea put forward by the professorial body that they, and not the Municipal Patrons, had the right to regulate University degrees. An appeal was finally taken to the House of Lords, and in August 1854, the Scottish decision was there confirmed. The Senatus had merely delayed for eight years the operation of the Town Council's regulations of 1847.

Such was the position of affairs when, two months later, Turner joined Goodsir's staff. The decision of the House of Lords gave a fresh impetus to extra-mural teaching by recognising the classes of the

lecturers as qualifying for the University degree. An Ordinance of the Commissioners appointed under the Universities (Scotland) Act of 1858, only served to confirm the arrangements already made, and the School was still further recognised by the Commissioners of 1889, who, as we have seen, allowed one half of the classes in the curriculum to be taken under its lecturers. Turner held the opinion that the recognition of extra-mural teaching had been productive of the greatest good to the University, but, for reasons already related,[1] he was unable to support the proposal made in more than one quarter, that all the classes in the curriculum might be attended outside.

With the change in the status of their lecturers, it behoved the two Royal Colleges to take a more personal interest in them and to give some guarantee that they possessed the necessary qualifications to teach. Each prospective lecturer had, therefore, to undergo an examination test by his College, and if he also sought University recognition, an inspection of his premises and his fitness for his post became a subject of inquiry on the part of the University authorities. Notwithstanding the greater activity in the School and the increase in the number of lecturers consequent upon the new regulations, and in spite of the fact that the two Corporations had become responsible to the General Medical Council appointed by the Medical Act of 1858, as the central authority in all matters relative to teaching and examination, the two Colleges took no active share in regulating the conduct of the School. The teachers formed an independent association and made all their own arrangements. In 1884, they made an attempt to become incorporated as a teaching College under a Royal Charter, but in view of the approaching legislation in connection with the Scottish Universities, the Privy Council decided to delay consideration of

[1] Chapter XIII.

their request, and no further procedure was taken. It was not until 1895, that the two Medical Corporations definitely associated themselves with the body of lecturers, and formed a Governing Board consisting of fifteen members, with five representatives from each College, and five elected by the Association of Lecturers, with powers to supervise the whole management of the School and to maintain its efficiency and discipline. Thus, nearly four hundred years after the Surgeons and Barbers had received their civic Charter and commenced giving instruction in anatomy, a corporate body was founded under the title of the School of Medicine of the Royal Colleges.

The history of the development of the Extra-Mural School would be incomplete, and the significance of the more recent arrangements which have been effected between it and the University would not be duly appreciated, unless we follow the gradual growth of the two subdivisions of the Medical School in Edinburgh, as they took shape within the walls of the hospital.

When the Medical Faculty in the University was created in 1726, Edinburgh possessed no public hospital suitable for clinical or bedside instruction necessary for the training of the medical student. The care of the sick poor had not been entirely neglected previous to that time, as the Physicians had been giving gratuitous advice and dispensing medicines for a number of years in a small building adjoining the Hall of the College. In this system, we see the origin of the Dispensaries which have grown up in the city, and which, in course of time, have become utilised for the purpose of giving medical instruction to students. Coincident, however, with the foundation of the Faculty, the interest of the citizens in the welfare of the poor was stimulated to action by the enthusiasm of George Drummond, the Lord Provost,

a man of outstanding ability and endowed with a great capacity for organisation. With the assistance of his friend Alexander Monro *primus*, he obtained subscriptions from the general public, while contributions to his hospital scheme were made by the College of Physicians and the Incorporation of Surgeons. It thus became possible in 1729 to open a small Infirmary in the vicinity of the University.

We read in the "Rules of Management" adopted by the Contributors, that the Professor of Anatomy was given a seat upon the Board, a privilege doubtless granted to Monro on account of the active share which he had taken in the promotion of the hospital. The Professor of Anatomy retained this right until 1870, when the Edinburgh Royal Infirmary Act was passed, amending the original Royal Charter of 1736. There is no evidence that Turner made use of the privilege which his Professorship gave him during the three years immediately following upon his election to the Chair. Since the Charter was amended in 1870, the Senatus Academicus has elected two representatives upon the Board of Management of the Infirmary, but, throughout the whole of his University career, Turner never accepted nomination for a seat on the Board from his colleagues in the Senatus.

In the early history of the Infirmary, the treatment of the patients was entrusted to the members of the College of Physicians. The offer of the assistance of the Surgeons had at first been refused by the Managers, in consequence of which a surgical hospital was opened by the Incorporation ; but it was soon found expedient to merge the two hospitals into one, so that in 1738, the Infirmary became both a medical and a surgical hospital. No individual selection of visiting officers was at first made by the Board, but it was permissible for each member of the Physicians' College to serve in rotation for a brief period, if he cared to do so. The Surgeons, in their turn, were appointed on the same understanding. But in 1800, the Board adopted the

principle which is now in existence. They found that it was inconvenient to have so many men visiting the institution for short periods, so they proceeded to elect a limited number of Ordinary Physicians and Surgeons from amongst the Fellows of the two Colleges, men whom they regarded as properly qualified to discharge the duties of the hospital. The duration of these appointments was originally for a much shorter period than now exists, but, by a gradual process of evolution, longer terms of service were granted. These changes were not effected, however, without considerable protest from the bodies concerned, but the Managers were masters in their own house, and had made up their minds to exercise a more absolute patronage.

University representation upon the Infirmary staff was originally an indirect one. The Professors of Medicine gave their services to the hospital, not by reason of their professorial status, but as Fellows of the College of Physicians, attending in rotation with their brother Fellows. The Board of Management was bound, both by its original Charter and by subsequent resolutions of the Managers, to select their physicians and surgeons from the two Royal Colleges. The regulation upon this point is the same to-day, and no one can hold an official position upon the Honorary Staff, whatever University degree he may possess, unless he is also a Fellow of one or other of the two Colleges in Edinburgh.

Clinical instruction in the Royal Infirmary is mentioned, for the first time, in the minutes of the Board in 1748. In that year, Dr John Rutherford, occupying the Chair of Practice of Physic in the University, was discharging his duties at the hospital as a Fellow of the College of Physicians, and he was authorised by the Managers to commence a course of Clinical Lectures. In the following year, this privilege was extended to the Professors of Medicine during their attendance as physicians. Apparently all the patients

in the hospital were put at their disposal for this purpose, and the duty of teaching was not limited to those members of the Faculty who taught the Principles and Practice of Physic, but it was bestowed upon each member of the Faculty who, as a physician, might be desirous of taking a share in clinical instruction. Hence the term "Professors of Medicine" had a wider significance than, at first sight, it appears to have. The Managers were anxious to spare no pains to advance the prestige of the School of Medicine, so far as the hospital could serve that purpose, and, "foreseeing that its interests were closely interwoven with that of the University, they resolved to adopt every measure that could tend to facilitate medical education, and to render it compleat." The Professors were finally allotted wards in 1778. In 1769, the Surgeons had been granted the privilege of giving clinical Lectures, but it was not until 1829, that similar permission was given to the Ordinary Physicians. Thus, while the selection of the Honorary Staff of the Infirmary was made from the Fellows of the two medical Corporations, clinical teaching was, at first, solely in the hands of the University Professors of Medicine. When a similar permission was given to the Ordinary Physicians and Surgeons, a subdivision of the teaching staff into intra- and extra-mural elements took shape, a separation which became still further emphasised, when the Chair of Clinical Surgery was founded in 1803.

James Russell, at the time of his election to the Chair, was one of the Ordinary Surgeons of the hospital, and the Board gave him every facility to carry on his teaching, in so far as that did not interfere with the lectures delivered by the other members of the staff. When Syme was elected to the same Chair in 1833, his position was very different from that of his predecessor at the time of his election. Syme was not even a member of the hospital staff, and when the Senatus requested that wards might be given to him,

the Board had to consider how his appointment might affect their arrangements. But being desirous to continue the intimate connection between the Infirmary and the University, they appointed Mr Syme the Junior Assistant Surgeon, and they gave him three of the smaller wards to enable him to deliver his Clinical Lectures. They were careful, however, to point out that they regarded it as not only *ultra vires*, but improper, to form any permanent arrangement for the Professors of Clinical Surgery, or to put any part of the establishment committed to their superintendence beyond their own control. It is interesting to read that when the greatest surgeon of his day was appointed to a Chair of such importance, he entered upon his duties in the humble capacity of a Junior Assistant Surgeon. In 1852, James Miller, the Professor of the Principles of Surgery, urged upon the Managers the necessity of providing him with beds, not for the purpose of giving Clinical Lectures, but in order to illustrate his systematic instruction. Acquiescence in this request was followed by a strong protest on the part of the College of Surgeons, on the grounds, that in order to provide Mr Miller with wards, both the Professor of Clinical Surgery and the Senior Ordinary Surgeon would be deprived of beds hitherto available for purposes of clinical instruction. The College of Surgeons appealed to the Court of Session, but judgment was given against them, the Court deciding that the Managers were entitled to make such regulations as they saw fit for the benefit of the patients. Thus, University Surgical wards became established in the Infirmary.

In more recent times, the position of the Ordinary Physicians and Surgeons of the Infirmary, *quâ* teachers, differed from that of their University colleagues upon the staff in two important particulars. Like the rest of the lecturers in the Extra-Mural School, they were

subject to the regulations of the Commissioners of 1889, which authorised that only two of the five years of medical study, or half of the subjects of the curriculum, could be taken outside the University as qualifying for the degree. Thus, their opportunities for teaching University students in their wards were restricted by the terms of these regulations. Again, though they taught and examined the candidates studying for the licence of the Royal Colleges, they were not examiners in medicine and surgery for the University degree. It is true that, from time to time, one of their number was chosen as an additional examiner, to assist the professor either in the systematic or clinical branch of his subject, but the appointment was only temporary. The wards, staffed by the extra-mural teachers, could not be used for purposes of University examinations, save when one of the staff was in the temporary position of a co-examiner. Hence, much valuable clinical material remained unutilised, and the scope of the final examination in clinical medicine and surgery was correspondingly curtailed. Further, a teacher who was not an examiner possessed an obvious disadvantage. The student, with his examinations in view, naturally desired to obtain some of his knowledge, at any rate, at the hands of those who were to test his fitness. In consequence of the arrangements that existed, the distribution of students throughout the various hospital wards was frequently unequal; in some, the clinics were crowded, in others, but sparsely attended, with the result that the instruction lost much of its value. In large practical classes the personal contact between teacher and taught was almost impossible, and some of the wards were overcrowded, to the detriment of the comfort of the patients.

It was becoming increasingly evident that the full resources of the hospital were not being efficiently employed to the best advantage of the Medical School as a whole. Edinburgh could not afford to risk her

position by neglecting to use what lay to her hand. With the advent of the present century, modern progress was enlarging the sphere of medical education, and competition was increasing in no uncertain manner. Although Edinburgh still had the largest medical school in the Empire, it could no longer be regarded as the only attraction, and it could not expect to continue to enjoy the unique position which it had held for so long, unless it put its house in order. The Overseas Dominions were being given every encouragement to strengthen their young schools. The old Universities of Oxford, Cambridge, and Durham, which, for so many years, had looked somewhat askance at the scientific side of education, were rapidly developing important schools of medicine. During the first decade of the new century, the young provincial Universities in England had come into existence with well-equipped medical faculties, and with a wealth of clinical material which only large cities were capable of providing, while even nearer home, the University of Glasgow was strengthening her position by incorporating into her medical school the teaching staff of a second infirmary, with all the clinical equipment which such a union provided. It was necessary, therefore, that Edinburgh should close up her ranks, and remove the restrictions which prevented the best use being made of the means at her disposal. It was not so much a question involving lack of teachers or paucity of material, as a want of organisation and complete utilisation of all her resources.

In Professor Sims Woodhead's Memorandum, attached to the report of Lord Elgin's Committee of Inquiry into the financial condition of the Scottish Universities in 1908, a scheme was outlined for reorganising clinical instruction. Turner recognised, that in the successful competition of other schools, there lurked a greater danger to Edinburgh than could possibiy arise from the weakening of healthy

rivalry in competitive teaching in Edinburgh itself. He realised that what restricted expansion within the School was the element of dual control which governed the existing system, in the form of extra- and intra-mural authority. The University was the principal body; it could not be otherwise, and no one denied that the success of the whole School must depend primarily upon her. It was essential, therefore, that if a satisfactory solution was to be reached, the University must have undivided control, with the power to arrange and utilise all the hospital equipment so that there should be no waste. It had been more than once suggested that the extra-mural teachers in the Infirmary should become an integral part of the University system, so that the whole of the teaching and examining arrangements should be brought under one authority, and greater efficiency in this way obtained. To some, it appeared as if a fatal blow was about to be struck at the old tradition of the School—the strength which it derived from competitive teaching—but tradition too often spells an obstacle to reform, assuming a magnitude out of all proportion to its value.

Turner took up the question of amalgamation, and pressed it through to a successful conclusion. It was one of the last reforms to which he directed his attention, and it was a source of great satisfaction to him to see the machinery in working order before his death. The scheme had to be carefully considered. The patronage of appointments must be respected; financial arrangements, as affecting the teachers, required readjustment, and a fresh expenditure upon equipment would necessarily come under consideration. Its preparation, however, received the cordial co-operation of the two bodies more immediately concerned—the University and the Board of Management of the Royal Infirmary. As the members of both institutions had the best interests of medical education at heart, the ground was already prepared, and diffi-

culties in regard to the settlement of details, such as might have been found insuperable in the earlier history of the School, did not stand in the way of a satisfactory settlement in 1913. The Managers of the Infirmary, true to the traditions of their predecessors, willingly co-operated to maintain and strengthen the connection between the University and the Institution under their care, and a spirit of reciprocal conciliation characterised the direction of the meetings.

A modified scheme of amalgamation between the two sides of the Surgical division of the hospital had been adopted in 1908, when two of the Ordinary Surgeons accepted appointments as University Lecturers, and became responsible for a part of the examination for the Degree. As this arrangement removed some of the difficulties which existed in clinical teaching, it naturally foreshadowed a more extended application of the principle to the entire hospital. In the autumn of 1912, Turner was appointed Chairman of a Committee of the University Court, with instructions to open up negotiations with the Infirmary authorities. The interests of the Infirmary were also entrusted to a Committee, presided over by Sir James Affleck, with Mr G. L. Crole as one of its active members. As Chairman of the Joint-Committees much of the work fell upon Turner's shoulders.

The scheme of reorganisation included a rearrangement of the Pathological Department of the Infirmary, by which the Professor of Pathology became Pathologist to the hospital. His advice and assistance was thus placed at the disposal of the whole teaching staff. The instruction in Pathology in the University had been crippled and rendered less effective by the previous separation of the two Departments, but it was now brought into line with that of most of the great medical schools abroad, and of other universities in this country. Turner had looked forward for many years to an arrangement of this kind. When giving evidence before the Commission of Inquiry in 1876, he

pleaded for an association between these two important departments. "The difficulty that has to be overcome," he said, "lies in the two divisions of the Medical School into intra- and extra-mural. While the Professor of Pathology derives his material for illustration from the pathological theatre of the Royal Infirmary, by arrangement with the Managers, it would materially strengthen his Chair if he were also Pathologist to the Infirmary. But we could not ask that he should be made Pathologist to the whole of the hospital, because it has not only professors but extra-mural teachers associated with it, and we could hardly request that he should be Pathologist both to University and non-University wards. We might fairly ask that an arrangement should be made, by which the Professor should become Pathologist to the University wards, although I do not know that it would be acceptable to the Managers of the Infirmary, but I throw out the proposal as a matter for consideration." Thirty-six years later, the complete scheme, which he had in his mind at that time, was carried satisfactorily through.

The changes in the departments of Medicine and Surgery included the appointment of a Professor of Clinical Medicine, to take charge of the wards previously under the care of the Professor of Pathology. Thus the Moncrieff-Arnott Chair was founded, the origin of which we have already described.[1] The Ordinary Physicians and Surgeons were appointed Senior University Lecturers and clinical examiners, while the Assistant Physicians and Surgeons became University Lecturers, and were to take a larger part in the clinical teaching than they had hitherto done. Tutors were appointed as University Clinical Assistants, to assist in training the students in the more elementary work, and in the work of the Out-patient Departments. Similar arrangements were made in connection with the special department reserved for

[1] Chapter XV.

the treatment of the diseases of women. Special rooms in the Infirmary were provided with the equipment necessary for clinical teaching, and were set apart for this purpose, the cost to be finally defrayed by the University, which was also to provide honoraria for the Assistant Physicians and Surgeons, and for the Tutors. The new status of the University Lecturers did not interfere with their position in the Extra-Mural School, as they continued to teach the candidates preparing for the qualifying licences of the Royal Colleges, and were still at liberty to conduct classes on medicine and surgery outside the University. The question of conferring the title of Extraordinary Professor upon the senior ordinary Physicians and Surgeons was a matter which came under discussion, but the Court took Counsel's opinion as to the legality of adopting such a title. The opinion expressed by Counsel was to the effect that the University Court had no power to extend the class of University professor to the prejudice of the existing professoriate, by creating a new and anomalous class of professors, whose title was to be qualified with the prefix "Extraordinary." There was no such official known in the constitution of the Scottish Universities, and there was no provision make for appointing or defining the duties or status of such officials.

A new arrangement was also made in connection with the patronage of appointments to the staff of the Royal Infirmary. Hitherto the applications for the honorary post of assistant physician and assistant surgeon had been made directly to the whole Board of Management, in whose hands lay the selection of the most suitable candidate for the vacancy. A Selection Committee of seven members was now formed, consisting of the two University representatives upon the Board, of one of the representatives of each of the Medical Corporations, and of three other members nominated by the whole Board. The function of this Committee was to nominate two of the

several candidates seeking election, and to submit their names to the Board for the selection of one of them for the appointment. The University thus came to have a more direct influence in the appointment of men who were to become members of the teaching staff of the School.

The Agreement between the University Court and the Managers of the Royal Infirmary was signed by Turner, on behalf of the Court, on July 14, 1913. It marked the second of the two milestones in the history of medical education contemporaneous with his life in Edinburgh. The stone which bore the figures 1 . 8 . 5 . 4 indicated the commencement of a path leading to increased activity and usefulness in extra-mural teaching. That which displayed the ciphers 1 . 9 . 1 . 3 recorded the commencement of the broad highway, destined to lead to greater efficiency, and to the promotion of the larger interests of the whole School of Medicine in Edinburgh—interests which must be maintained in the future, as in the past, by all who are its well-wishers. One of the members of the Infirmary Committee,[1] who was largely responsible for the efficient presentation of the hospital position, and for guiding it through the negotiations, has thus expressed the impression left upon his mind by his association with Turner. "He was a man with whom it was a pleasure and an education to work. To the very end he retained a young mind, which was always receptive of whatever was deemed best for the University. He was ready to grasp new ideas and to take fresh views; if at first, he was antagonistic, he did not cling to his opposition, because his original ideas were contrary to the suggestions which were put before him. But after listening to a reasoned statement of the advantages which they would bring, he thought them out and willingly accepted them, when he saw that they led to improvements in the existing conditions."

[1] Sheriff G. L. Crole.

By thus placing all the members of the staff upon an equality as University teachers, and by increasing the number of examiners, the necessary steps were taken to effect a practical solution of the weak points in hospital education. One factor in the situation, which was somewhat more difficult to bring under the control of regulations, was left unchanged. The free choice of teacher by the student was a question frequently in Turner's mind during the negotiations, and his sympathies were undoubtedly in favour of maintaining the principle. The personality of the individual and his gift of exposition must always have their influence in directing the student towards his selection of an instructor. In a large medical school it is difficult to obtain a uniformly high level throughout the whole staff. It is an ideal which is hardly attainable: hence, the human equation remains as an important factor in any scheme that may be devised. A strict limitation of the size of the clinics could be made a matter of regulation, and such an arrangement, if considered necessary, might at any future time be determined upon. The fear so often expressed that the new scheme would strike a blow at healthy competition, scarcely seemed to be justified. The large number of teachers engaged in clinical instruction, and the greater facilities which it gave to the junior members of the staff, provided ample scope for friendly and co-operative effort within the University herself, so that there should be nothing to debar each individual from obtaining experience in teaching, and from giving of his best in the common interests of the whole School of Medicine.

CHAPTER XVIII.

THE STORY OF UNIVERSITY EXTENSION.

1868-1914.

Origin of the New Medical School—The site—Public response to the appeal—Opening of the Anatomical Department—Tercentenary Festival, 1884—The Anatomical Museum—The M'Ewan Hall—Opening ceremony—New Departments of Engineering and Natural Philosophy—Mr Andrew Carnegie opens the Departments—A Degree and Department of Forestry—New Chemistry Department.

THE increase in the number of students from all parts of the world, the expansion of the educational system within the walls of the University, as seen in the augmentation of the teaching staff and in the addition of new subjects in the various curricula, especially in connection with the introduction of practical instruction in science, caused the sap to flow more generously through the veins of the parent stem, stimulating it to fresh growth, and to the development of young and vigorous offshoots.

We must, therefore, carry the reader back to Turner's early professorial days, and show how intimately he was connected with the work of University extension, and how much his influence and his energies were directed to furthering its progress. Once again we see the milestones which marked his entrance to, and exit from, academic life, recording

a definite stage in the material expansion of the life-history of the Medical School. The inception of the great scheme of the University Buildings' extension synchronised with his appointment to the Anatomical Chair, while its completion, if such a term, indeed, can be applied to the onward march of progress, reached a definite goal, hitherto unattained, when he laid down his office as Principal.

When Sir Alexander Grant succeeded Brewster as Vice-Chancellor in 1868, he found that a movement was being initiated by his colleagues in the Senatus, with a view to providing a much-needed extension of the accommodation, which was rapidly proving quite insufficient to cope with the demands being made upon it. The history of the University was, indeed, repeating itself. Exactly a century earlier the condition of the buildings was far from satisfactory, and a similar movement had been started in Edinburgh with the object of removing what was considered to be a disgrace to the capital. In a memorial issued by Principal Robertson in 1769, we read: "A stranger, when conducted to view the University of Edinburgh, might on seeing the courts and buildings naturally enough imagine them to be almshouses for the reception of the poor, but would never imagine that he was entering within the precincts of a noted and flourishing seat of learning. With the exception of one large upper gallery, which has lately been repaired and made the public library, and of an anatomical theatre, there is no room or building belonging to the University that has any degree of academical decency. The teaching rooms of the Professors are, in general, mean, straitened, and inconvenient." Under the Provostship of George Drummond, city improvements had been made and were still being pushed on; "large buildings arising suddenly on all hands, a magnificent bridge, and new streets and squares begun." But the University fabric remained in a neglected state, and was gener-

ally accounted a dishonour to Edinburgh. A subscription list was opened, and although only £6500 was asked for from the public at first, the response to the appeal was not encouraging. A private Act passed by Parliament in 1785, giving powers for the construction of the South Bridge over the Cowgate, included the appointment of Trustees for the purpose of designing and creating new University buildings, but the foundation-stone of the Adam-Playfair edifice was not laid on the South Bridge until 1789, the event being celebrated amidst great pomp and ceremony.

In 1868, the desire for improvement and extension was the natural outcome of the pressing demands that were being made upon the limited accommodation, and upon the necessity of placing the University on an equality with the other great centres both at home and abroad. During the century which had elapsed, Scotland had made great material progress. The development of railways and the growth of commerce; the increase of wealth, the spread of education, and the improved position which the people had attained by reason of their educational advantages, along with the growing importance of Science as the New Knowledge which was beginning to make its influence felt, rendered imperative the taking of some decisive step.

Grant at once threw all his energies into the movement, and under his guiding hand steps were taken to place the scheme upon a practical basis. It was felt that if the different departments in the Medical Faculty, which had the strongest claims for assistance, were provided for in new buildings, their requirements could be sufficiently met, and the Faculties of Arts, Law, and Divinity would find room for expansion in the premises thus vacated. The need for a Hall of Assembly was also a very pressing one, and this was included as a part of the original extension scheme, along with a Campanile to crown the edifice. A Provisional Committee was formed in 1869, with Sir Alexander Grant as its Convener, and Turner as one

of its active members, while his friend, Robert Bruce Johnston, a well-known Writer to the Signet in the city, became the chief Acting Secretary. The original estimate for the above plans amounted to a sum of £261,500.

Unfortunately, the moment was not favourable for making an appeal for subscriptions from the community, and at a meeting of citizens held in 1869, it was decided that, for a time at least, the public project should be abandoned. A considerable drain had just been made upon the resources of the people in raising the funds for the new Royal Infirmary, therefore it was deemed wiser to wait for a more auspicious moment before floating another subscription list. In the meantime, however, a great deal of useful work was overtaken, and a sufficient sum of money was raised by private endeavour to enable the University to purchase the Park Place and Teviot Row sites in close proximity to the new hospital.

The problem of extending the original University buildings was one which presented considerable difficulties, situated as they were in the centre of the city, and surrounded by property of no little value. At one time in their history, an extensive area of unoccupied land lay to the west of the old buildings and was the property of the University, and the Commissioners under the Universities (Scotland) Act of 1828 had endeavoured to add to it by acquiring a further extension of the ground westward. If this object had been attained, the whole of the south side of the Chambers Street of to-day, from South Bridge Street to Lindsay Place, might have been occupied by a compact mass of University buildings. But, in 1854, the College had been deprived of the piece of ground which originally belonged to it, through an arrangement made between the Government and the Town Council, by which the vacant site was appropriated for the erection of the National Museum of Science and Art, the building of which was commenced in

1860. In 1869, the Senatus first made an offer for the ground, which had just been vacated by the transference of the old Infirmary to its new position in Lauriston. The offer, however, was declined, and probably no one has regretted it, as the situation finally selected in Teviot Row and Park Place for the Medical School enjoys, both in its proximity to the Infirmary and in its more open surroundings, advantages such as it could not have had in the Drummond Street area.

With the demolition of the Park Place houses, another relic of one of the old-time fashionable parts of the city of a century ago disappeared. George Square alone remained in that neighbourhood as picturesque evidence of an old residential quarter, with its memories of Sir Walter Scott, of Henry Erskine, whose brilliant talents had placed him at the head of the Scottish bar, of Robert Dundas, the Lord Chief Baron, and of others, who figured prominently in the life of the city at the beginning of the nineteenth century. What had the future in store for the secluded amenity of the old Square! With a prosperous Medical School growing up in such close proximity to it, could it hope to escape the transforming hand of the builder? As we write, just half a century later, the inevitable has occurred, and the parent tree has already pushed out a fresh offshoot, and is gradually establishing new roots in other corners of George Square.[1] Although the buildings in Park Place, at the time of their removal, had been for many years tenement houses, one, at least, had been the domicile of the Campbells of Succoth, and once the residence of Sir Ilay Campbell, Lord President of the Court of Session, while in close proximity to it was the home of the Taits of Harvieston, where Archibald Campbell Tait, Archbishop of Canterbury, was born, a fact which remains memorialised for all

[1] The Forestry Department occupies part of the north side of the Square, and the University has acquired several houses on the south side.

time by the mural tablet which has been placed in the eastern wall of the New Medical School.

In addressing the graduates in the summer of 1873, Turner said: "If time had permitted, I would have taken this opportunity of directing attention to the wants of the University, more especially the urgent need that exists for more and larger class-rooms, for a new museum, for laboratories, and for rooms in which an efficient system of practical instruction in all the departments of medical science may be carried on. To put this school of medicine on a level, not only with other universities but with newer institutions springing up in several large cities, to enable us to keep our place in the great education race, it is essential that these should be provided without delay. That our University should not lose its position as the largest school of medicine in the British Empire, as the institution in which a thorough medical education can be imparted, is a matter which interests not only us who are immediately concerned in teaching, but the citizens of Edinburgh generally. For not to speak of the advantages which accrue to the city from being a great educational centre, attracting young men and families from all parts of the world for purposes of study, it is surely of the utmost importance to the inhabitants themselves to have at their own doors an institution capable of providing their sons with a complete scientific and practical professional training." In many of the cities in Germany large sums of money were being expended upon the building and equipment of laboratories. Oxford had just completed her Museum, largely through the untiring efforts of Henry Acland and George Rolleston, and Cambridge was following in her footsteps. In Manchester, Leeds, and Newcastle, Colleges of Science were approaching completion, and the citizens of Glasgow were adding materially to the resources of their University.

In Edinburgh, the conditions under which much of

the teaching was being carried out in the early seventies was far from satisfactory. The Professor of Pathology had to lecture in a room which was used one hour before by the Professor of Moral Philosophy, and one hour after he had left by the Professor of Geology. Turner was in a constant state of despair as to how he was to accommodate his class of more than four hundred men. Lyon Playfair has described his chemical laboratory in the sixties as a dingy hopeless place, little more than a private room, in which the professor and his assistant could prepare the class experiments, while Tait's physical laboratory was a kind of superior attic, in which even a few students were inconveniently crowded. One marvels that so much good work was done under such poor conditions, but we have already described how, in the history of scientific research in Edinburgh, the men in the past were not deterred by the shabby state of their surroundings.[1]

At a largely attended public meeting held in the Queen Street Hall on April 6th, 1874, the extension scheme was launched, and an appeal was made to raise £100,000, a very different sum from the modest amount asked for in 1768. Of this, £58,000 had already been obtained by private subscription, which included the legacy of £20,000 from Sir David Baxter of Kilmaron, whose generosity to the University had not been confined to this act alone. The movement was strongly supported by the Duke of Buccleuch, who was the principal speaker at the meeting, and whose practical assistance and great influence must always be associated with the origin of the New Medical School. The University through her past reputation had deservedly earned the sympathy of the people of Scotland. If she were not rich enough to make her own way without asking for assistance, it was scarcely her fault. What she had accomplished so successfully in the past had

[1] Chapter VII.

been done in spite of her poverty, and she had no reason to feel ashamed in asking for means in order to extend her sphere of usefulness. Her founder, King James VI., had failed to endow her, so that the youngest of Scotland's Universities was also the poorest. "Had the King followed the example of his own Court jeweller, George Heriot, things might have been very different to-day. Had King and commoner, the royal borrower and the shrewd lender, changed places, or indeed have exchanged ideas, we might have seen the two institutions, the University and George Heriot's Hospital, the one for the higher, the other for the lower education, co-operating with results which it will take years of begging, if not legislation, to bring about. Heriot's Hospital School, from its original endowment alone, possesses an income almost equal to the whole revenue of the University, which is now educating more than two thousand students, and benefiting the city proportionately."[1]

The response to the appeal was not made by the wealthy alone, but, coming as it did from the University of the people to the people themselves, rich and poor, nobleman and commoner alike responded. All creeds and professions, businesses and trades, played their part in answering to the call. The Press exerted its powerful influence on its behalf. While the city, supported by the action of successive Lord Provosts, first awakened to its duty, the movement spread throughout Scotland, thence to England, and to the furthest possessions of the Empire and beyond it, wherever, indeed, Scotsmen were found who were keenly interested in the success of their Alma Mater. No sum was considered too small for acceptance, and steadily, if slowly, the subscription list grew until £80,000 had been received.

Sir Alexander Grant, in addressing the students at the commencement of the winter session of 1875, thus picturesquely described the efforts of his Committee:

[1] Writer in the 'Daily Review,' 1874.

"The collection of a large subscription is like ascending an alpine height. We commence with the rich meadows and easy slopes, but we soon leave these behind, and find ourselves continually in a more and more rarefied atmosphere, in a more bleak and barren region. Greater exertions are required as we go on, and the results are less. At the same time, our views become more moderate and our appreciation of any assistance more lively." The Acting Committee was constantly at work, and Turner was fond of relating some of his experiences, not only in raising money, but also in arousing enthusiasm in the interests of the University. Sometimes, during his visits to London to attend the meetings of the General Medical Council, he would, in company with his friend Sir George Harrison, Lord Provost, personally interview some wealthy magnate, before whom it was thought advisable to place the needs of the University. No little tact had frequently to be displayed, and, in some cases, an exercise of the sense of humour, which both men possessed, led to a successful result, when perhaps little or nothing had been expected. On one occasion an interview took place in the City with a wealthy Aberdonian, which seemed at first likely to end in failure, the gentleman expressing the opinion that he did not see that Edinburgh's interests had any particular claim upon him. But to this Sir George replied, that the alliance between the two cities was much closer than he appeared to realise, as he could assure him that some of the finest physical types in Edinburgh's police force were the men recruited from the northern city. This appeal found its way to the heart, if not to the head, and they left the house with a substantial addition to the funds of the extension scheme in their pockets.

In the summer of 1876, when a sum of £82,000 had been raised, a decision was reached that an appeal should be made to the Treasury for further assistance. Grant, Turner, and Bruce Johnston

joined a deputation which interviewed Mr Disraeli, who was then Prime Minister. A sympathetic hearing was given to their claims, and, in due course, a memorial was addressed to the Chancellor of the Exchequer, asking for a grant of £80,000, to be paid in four annual instalments. While the Lords of the Treasury were prepared to ask Parliament to give this sum, certain restrictions were imposed in connection with its bestowal. They suggested a reduction in the contemplated expenditure, so long as it was consistent with the provision of the necessary accommodation and equipment for teaching; they asked that a further sum of £10,000 should be raised by public subscription, before they placed the first instalment of £20,000 in the estimates for the year, and that, before the second instalment was provided, the whole of the remainder of the funds required for the completion of the buildings should have been subscribed or promised.

The somewhat stringent conditions which were thus imposed were accepted by the University, but not without much heart-burning. The original plans had to be readjusted, and with great regret and reluctance that portion of the scheme which included the erection of the Hall and the Campanile, and certain improvements contemplated upon the existing University buildings, were deleted. The long-desired and much-needed Academic Hall faded still further into the distant future. The change in the estimates now adopted left a proposed expenditure of £187,500. But by no means daunted, the Committee redoubled its efforts; another public meeting was arranged, and within a few days all apprehensions were allayed: £10,500 were at once raised, and the first instalment of the Government Grant was assured, and before the second became due, the remainder of the sum had been obtained.[1]

[1] Proposed expenditure, £187,500; subscriptions obtained, over £82,000; Parliamentary Grant, £80,000; balance obtained, £25,500.

Towards the close of the year 1877, the University authorities felt that they were justified in commencing building operations. The work was pushed rapidly on. The plans for each department had already been prepared by the Professors in charge, and had been submitted to the leading architects in the city, with a request for a design that would most suitably meet the requirements which had been suggested. After careful consideration, Mr Anderson's (afterwards Sir Rowand Anderson) plans were accepted, as they appeared to fulfil most satisfactorily all the conditions. He left no stone unturned to procure the best and latest information in connection with educational buildings, personally visiting the most important schools of medicine in this country and on the Continent, so as to acquaint himself by direct observation with their special needs.

By the autumn of 1880, the Anatomical Department was ready, and Turner had the satisfaction of being able to commence the winter session in his new premises. In his opening address, on that occasion, he said: "In celebrating the accomplishment of the first stage of the great task of providing new buildings for the accommodation of the Faculty of Medicine, we may congratulate ourselves upon entering into the occupation of apartments which, in their spaciousness and in the convenience of the arrangements which they provide, for the purposes for which they are designed, are unsurpassed in the British Empire. How well the architect has accomplished his task an inspection of the rooms devoted to anatomical teaching and study will show you, and you will not fail to see that he has set this and the other departments in a casket of stone, of which the University may feel proud to be the possessors, which is an ornament to the city and a witness to the truth of the saying that 'A thing of beauty is a joy for ever.'"

It was becoming increasingly evident, however, during the further progress of completing the

buildings, that this would not be accomplished unless another call for funds was made. The conditions in the school had changed considerably during the nine years which had elapsed since the extension movement had been launched. The internal requirements of the various medical departments had been planned and estimated for upon a basis which was deemed sufficient to meet a normal rate of expansion. But, during this period, the increase in the number of students coming to the University exceeded all expectations, and was indeed unparalleled in the history of any modern seat of learning. Between 1874 and 1883, the students in the Faculty of Medicine had nearly doubled—the numbers having risen from 900 to over 1700. The matriculated students in all the Faculties had increased during the same period from 2000 to 3340. Under these new conditions some of the medical departments were found to have outgrown the demands which were expected to be made upon them before they had been occupied. Increased accommodation had in consequence to be provided, and the rooms enlarged in every conceivable way. Some parts of the building were pulled down and rebuilt; while in some of the lecture-rooms, the galleries, which form so conspicuous and not altogether a pleasing feature, had to be introduced in order to give a requisite number of seats.

In March 1883, a "Tercentenary Appeal" for an additional sum of £30,000 was accordingly issued, so as to complete the necessary alterations, and to equip the large Anatomical Museum, in order that the Medical School might be in working order before the Festival of 1884. The appeal met with a ready response: the people of Scotland were not to be denied the success of their efforts, and, by the beginning of June, the necessary sum had been raised. After many years of untiring endeavour on the part of those who had worked unceasingly for

the accomplishment of this end, the University and the public were rewarded by the completion of the New Medical School.

The Tercentenary celebrations, in April 1884, offered a suitable opportunity for its inauguration, and a luncheon in the Anatomical Museum, to which the University invited 450 of her guests, was not the least interesting event in a week crowded with so many historic ceremonies. It must have been with feelings of justifiable pride in the successful completion of his labours that Principal Sir Alexander Grant, who presided on that occasion, rose to propose "The Donors of the New Building."

> It was by no foresight or calculation that the two events which we celebrate to-day have coincided. But it has fortunately so happened, by a lucky chance, that we are able to see this house-warming so brilliantly attended and graced by the presence of some of the greatest medical authorities in the world. I hope that they may find leisure to inspect our New Medical School. And I hope also, that our non-medical guests may take a look at these bright and airy theatres and laboratories, where all that is repulsive in the study of medicine is mitigated and refined—where the dissecting-room shows like a conservatory, and where morbid pathology is pursued as a fine art. When they see all the charms of this palace of medicine, perhaps they too may wish that they had been students of medicine.

No careful planning could have arranged a more fitting ceremony for the inauguration of the School than what this "lucky chance" had provided. If the presence of so many illustrious men famous in science and in law, in literature and in art, were to be taken as an earnest of its future success, then indeed a prosperous career lay before it. Science in its various branches had many notable representatives seated round the tables. Pasteur and Virchow, the founders of the modern doctrine of bacteriology and pathology; von Pettenkofer and Schmiedeberg,

chemists and physiologists; Lord Rayleigh, William Thomson (Lord Kelvin), and von Helmholtz in the realm of physics; Sir William Gull, Sir William Jenner, and Sir Henry Acland, the physicians; Lister and Paget, Ollier and Thomas Keith, the leading exponents of surgery. Law was graced by the presence of Count Saffi of Bologna and of Sir James Stephen, jurist and legislator. Literature by Browning, James Russel Lowell, James Bryce (Lord Bryce), Benjamin Jowett, and Max Müller; art by Sir Frederick Leighton; while in the person of Comte Ferdinand de Lesseps, whose genius had linked the East with the West, international commerce had its leading representative.

It was Turner's privilege on that occasion, alike on account of the active part which he had taken in the work of preparation, and as befitting the ceremony held in his own Department, to propose the "Sister Medical Schools."

To them we owe a deep indebtedness. It was in London and in some of the great schools on the Continent that the founders of our medical school in the early part of last century received their training. It is, however, to the great University of Leyden, to which at that time so many young Scotsmen were attracted by the fame of Boerhaave, both as a physician and as a teacher, that we must especially look as a nursing-mother. So great, indeed, was her influence that the regulations which prevailed in that University as to the examinations and the mode of conferring degrees were adopted in Edinburgh with but slight modifications, and the 'Aphorisms' and 'Institutiones Medicæ' of Boerhaave were the text-books which controlled the teaching of medicine for nearly forty years in this University, until the spell was broken by the genius of William Cullen. But our indebtedness to our medical sisters is not limited to these early passages in our history. Our senior students and young graduates have always been encouraged to broaden their education, to increase their knowledge of men and things by a residence at other great centres of professional training. And let us hope that that practice may long continue. If I were to paint a picture of a "Scot abroad," I should

not depict him, as has often been done, as a soldier of fortune, or a wandering philosopher ready to enter into disputation with any comer on some abstruse metaphysical and ethical problem, but as a young doctor hard at work in the wards of a hospital in London or Dublin, or a great city on the Continent, or advancing his knowledge of medical science by working in the laboratory of a University.

But if we owe much in our origin and development to the influence of our medical sisters, we, as time has rolled on, have in some measure been able to repay them in kind. The great reputation which this school acquired in the latter half of the last century, through the genius and labours of the second Monro, of Whytt, Cullen, Gregory, and Black, attracted to this northern city students from all quarters, so that the medical school assumed a cosmopolitan character. And as our young graduates returned to their homes and native countries, many of them became connected with existing medical schools or founded new ones. Thus, the cosmopolitan character which was stamped on the school by the genius of our predecessors has never been lost.

Amidst this wealth of intellect and medical fame, it may seem difficult to select from these our guests one more than another to respond to this toast; but we, the professorial descendants of the first Monro and his colleagues, may be pardoned, perhaps, for looking to the country of Boerhaave and Albinus, our mother in medicine, and to select one of the distinguished men now holding a Chair in a University of Holland. The reputation which the Universities of Holland attained during the last century has been sustained during the present. I need only mention, amongst those who in recent years "have gone over to the majority," the names of Vrolik the anatomist, van der Hoeven the naturalist, and van der Kolk the physician. But Holland has still in her Universities men of European fame. Donders, one of the great scientific personages of Europe, whose unavoidable absence from our festival we greatly deplore, now adorns the University of Utrecht. We are happy to have with us to-day representatives of the Universities of Leyden, Utrecht, Gröningen, and Amsterdam, and of these I will ask Professor Stokvis to reply.

How changed is now the scene of that historic banquet! It remains but as an indistinct memory in the minds of those who were fortunate enough

to be present. Gone are the brilliant decorations, the trappings of white and blue which adorned the walls; gone are the plants and flowers which lent so much colour to the picture; gone too, with few exceptions, are the men of eminence who graced the ceremony with their presence.

The furnishing and fitting of the Museum for its own particular purpose, and the arrangement and cataloguing of its many thousand contents, was a labour of love, to the completion of which Turner devoted many years of his life, and endless thought and attention. Accompanied by one of his sons, he again visited Germany and inspected the new buildings of the University of Strasburg, which were in process of completion, and he spent more than one day in the anatomical department at Leipzig, studying the arrangements which had recently been introduced there by the distinguished anatomist, Professor His. In conjunction with Sir Rowand Anderson and Mr Allan Clark, the Clerk of Works, he considered, to the minutest detail, the best method of displaying to full advantage all the hidden treasures which had accumulated, from year to year, as the outcome of the work of the Monros, Goodsir, and himself, and which, through lack of proper accommodation, it had hitherto been found impossible to exhibit.

The Museum, an essential factor in the teaching of anatomy, pathology, and surgery, occupies the central block between the two courts or quadrangles contained within the main walls of the new buildings, and it forms a spacious hall, well adapted to the purpose for which it was intended. The nucleus of its contents had been created by the first Monro, who had transferred his valuable preparations to the University, when the Edinburgh mob had threatened to burn down the College of Surgeons. In the hands of Monro *secundus*, the collection grew in accordance with his work, and was enriched by many specimens of great value, illustrative of his manipulative dex-

terity. The contributions which were made by Monro *tertius*, were more of a pathological character, but with the advent of John Goodsir, and his enthusiasm for the study of comparative anatomy, an extensive series of dissections, both of the invertebrate and vertebrate kingdoms, was added. Goodsir sought to establish in Edinburgh what John Hunter had succeeded in founding in London, a great museum. In Turner's hands, there gradually grew that striking collection of human crania and the varied assortment of skeletons of whales and dolphins and other amphibious mammals, illustrative of most of the varieties obtained in Scottish waters. The museum will remain for future generations as a splendid record of the scientific labours of the illustrious anatomists whose work it displays. *Si monumentum requiris, circumspice.*

In the autumn of 1884, Sir Alexander Grant died after a brief illness, and the Acting Committee of the Buildings' Extension Scheme was deprived of the wise counsel and valuable services of its energetic convener. He had devoted himself with untiring effort to the accomplishment of the great undertaking, the funds for which were raised largely through his personal exertions and influence. In the words of Sir William Muir, his successor as Principal, "the University had to mourn the loss of one who, by his pre-eminent culture and his genial temperament, not less than by his wise administration, attracted the regard of all around him. His singular amenity and gracious courtesy threw their charm about the Tercentenary Festival, which owed so much of its success to him."

Although the Medical School, finally completed, was handed over to the Senatus Academicus in 1885, the work of the Acting Committee was not yet at an end. The Academic Hall, the dream of the University for so many years, had yet to be built.

The need for it was as great, if not greater, than at any previous time in her history. Turner was appointed Convener in succession to Grant, and became the dominating influence upon the Committee. Mr William M'Ewan, M.P., was added to its membership, and on the death of Mr Bruce Johnston the secretarial work was entrusted to Mr George Somerville. Financially, the outlook was far from favourable, and it seemed wellnigh hopeless to expect that the public would contribute a sum sufficient for the erection of the hall. During a period covering nearly twenty years, considerable calls had been made upon its generosity in connection with the School of Medicine, because the new Infirmary, though erected primarily for the treatment of the sick poor, nevertheless formed an integral part of the School.

But the cloud of depression which weighed heavily upon the minds of those who were seeking a solution of the pecuniary difficulty had its silver lining, and the shadow which it cast was soon to be dispelled. One member of the Committee, Mr M'Ewan, already a liberal contributor to the building fund, could not reconcile himself to a situation which left unfinished a piece of work which had been so successfully commenced. He regarded it as unseemly that the University should require to borrow, or to hire, halls in different parts of the city for the purpose of conducting its academic ceremonies. It fell to Turner to announce to the public in December 1885, that a friend of the University, desirous for a time to remain anonymous, had signified his intention of defraying the cost of the erection of a hall. In acknowledging Mr M'Ewan's generosity, he wrote: "I duly received your favour of yesterday, communicating your intention in connection with the completion of the New Buildings of the University. I need scarcely say that this additional and most munificent expression of your goodwill to our University will be warmly appreciated by all who are interested in its welfare

and progress. I understand, however, that at the present stage you do not wish the matter to be made public, and accordingly I must content myself by thanking you in my own name for the generous gift."

When Mr M'Ewan's intentions had been made known, steps were immediately taken to acquire the property and houses in Park Street, situated immediately to the east of the Medical Buildings, and an Act of Parliament was obtained giving Sir William Muir, Sir William Turner, Mr William M'Ewan, and Mr John Christison, the four Trustees, power to effect the purchase and to hold the lands and property until the building was completed. The original estimate of the hall was calculated at forty to fifty thousand pounds, while the cost of the site was £12,000. An appeal was made to the Treasury to provide the latter sum, and to include it in the estimates for the current year. The negotiations which ensued for this purpose were both difficult and protracted. The Government appeared to be in a particularly economical frame of mind, and it required all the influence and assistance of the friends of the University to urge upon the Chancellor of the Exchequer the importance of responding to the appeal. It was not until the spring of 1887, that the matter was finally adjusted, the Government agreeing to give £8000 towards the cost of the property, the remaining £4000 being contributed by Mr M'Ewan. Turner was warmly congratulated by his friends upon the successful result of his efforts to carry through the negotiations. "Dear Sir William, excellent indeed!" wrote Professor S. H. Butcher. "You deserve boundless thanks; most heartily I congratulate you—as well as ourselves—on the long and delicate negotiations you have brought to so happy an end. Any one but yourself would have given in long before reaching this stage."

During the ten years which were occupied with

the construction of the M'Ewan Hall, Turner watched over its growth with almost parental solicitude. The period was perhaps the busiest of his busy life. It was no light task that he had taken upon his shoulders, in guiding the often stumbling footsteps of the child, and in assisting it out of many difficulties until full manhood was attained. But in this, as in other matters to which he applied himself, he mastered many of the details of the business. He made himself acquainted with the problems of architectural design, he faced the difficulties connected with ventilation and lighting, and the knowledge of such matters which he revealed, when they became the subjects of discussion, excited the wonder, as well as the admiration, of those who had made the study of such affairs their life's avocation. The various claims of architect, builder, and artist were sometimes opposed to each other, and patience and a power of conciliation were required to adjust difficulties. Throughout the whole of this period, Turner was closely in touch with Mr M'Ewan, who gave unwearying attention to every detail, who spared no pains, and who refused nothing that would add to the usefulness or to the beauty of the building, which gradually took shape in accordance with Sir Rowand Anderson's design. The hall which Mr M'Ewan originally had offered to provide exclusively for University purposes, at a cost approaching £50,000, slowly assumed in his mind a wider significance. He did not forget that the city, with which the University had been associated for three centuries, and whose interests were identical, had no hall of sufficient size available for public functions in which the citizens generally were interested. With this further object in his mind, he improved and enlarged his scheme, and finally completed it at a cost of £115,000. Both in the dignity of its architecture and in the completeness and elegance of its internal decoration, the M'Ewan Hall stands as an edifice which the University and the

city may justly regard with pride. One part of the original design of the Medical School remains unfinished. The Campanile has yet to rise and crown the building.

Friday, December 3rd, 1897, was a red-letter day in the history of the University. The donor of the hall, in the name of the Trustees, handed it over to the Chancellor, Mr A. J. Balfour, as the head of the University, and he himself received the Honorary Degree of Doctor of Laws, the highest dignity which was in the power of the University to bestow upon him. "How better may the academic polity carry home to *her* citizens the lesson of the larger citizenship which awaits them beyond her walls, than by holding before them the example of one who, while he unstintingly devotes his manifold gifts to the service of his own generation, has by a noble use of the fruits of his industry and wisdom bequeathed to future generations a splendid and perpetual possession."[1]

"I believe," said Mr Balfour, in accepting the deed of conveyance, "that the educational value of a worthy setting to a great University is not to be despised. Tradition clings round our buildings. The immaterial is indissolubly united with the material. Together, they contribute to form part of that most valuable result of academic training, the love with which those who have been academically trained look back to the freshest, to the brightest, and the most plastic period of their lives. You have earned the gratitude, Mr M'Ewan, of the present generation of students and of all those interested in or connected with the University; but I think I can promise you that the gratitude of the University will not end with the lives of those I am now addressing. If history teaches us anything about the conditions of University life, it is that a University once founded is possessed of a wonderfully persistent vitality. Political revolu-

[1] Sir Ludovic Grant in presenting Mr M'Ewan for the LL.D. Degree.

tions, military revolutions, theological revolutions pass over it and leave it still what it was before—a great centre of enlightenment, a great source of knowledge and of education. Nay, the Universities have not survived these revolutions only, but they have even, though sometimes with difficulty, shown themselves capable of modifying themselves to suit the advance of knowledge. This danger, and all other dangers, have been survived by almost every one of the old Universities of Europe, and I think we may therefore, without undue confidence, anticipate that the University of Edinburgh will, for many ages to come, be all that it has been, to Edinburgh, to Scotland, and to the world; and though the time may come, nay, though the time must come, when our present methods may seem to our distant successors to be wholly antiquated, though our knowledge may read like the stammering of infants, though our most confident generalisations may only appear to be the groping in the dark, still I believe that even then, even in those remote periods, this hall will still continue to serve the needs of our University, and will be associated in the minds of all those who love it with the name of our generous benefactor."

It is unnecessary to recapitulate the steps which had led to the erection of the Public Health Institute and the presentation to the University of Sir John Usher's gift in 1902,[1] another offshoot in the scheme of University extension. But the Faculty of Science was still further asserting its claim for due recognition of its needs. The Departments of Engineering and Natural Philosophy had laboured for a long time under the disadvantages of restricted accommodation, and the increasing importance of the first, as a training-school for the young engineer, necessitated

[1] Chapter XV.

the introduction of more commodious premises. In October 1900, Professor Hudson Beare had been installed in the Chair previously occupied by Fleeming Jenkin and Armstrong, and he was anxious to see his Department developed, while in the following year Professor M'Gregor succeeded Peter Guthrie Tait, who had given forty-one years of continuous service in the Chair of Natural Philosophy.

Early in 1903, coincident indeed with Turner's appointment as Principal, an influential Committee was formed, consisting of members of the University Court and a number of the leading citizens of Edinburgh, interested in the welfare of the University, with the object of enlisting public sympathy in aid of her further improvement and expansion. Turner was elected Convener, and the work of the Committee proved so satisfactory, largely as the result of his influence, that it was found quite unnecessary to make any appeal to the general public for funds. The sum that was raised by private endeavour amounted to nearly £50,000. The most pressing claims for assistance were, undoubtedly, those of the two Science Departments, and in the construction and equipment of the new Physics Laboratory, the friends of Tait were enabled, at the same time, to perpetuate the memory of his scientific work in the most fitting manner.

The question of a suitable site for the new Departments did not prove to be a difficulty, as Turner had become cognisant of the fact that the Town Council were willing to dispose of the Old Infirmary buildings in Drummond Street, along with the adjoining area, consisting of three or four acres of ground. When the New Infirmary was built in 1870, the old buildings had been used by the Town for the treatment of cases of infectious disease in Edinburgh, but they had been recently vacated on the completion of the new City Hospital at Colinton Mains. The negotiations for the purchase of the Old Infirmary

were practically left in Turner's hands, and there is no doubt that he was mainly responsible for the successful issue of the transaction. By the confidence and respect which he inspired, he won the cordial support of the members of the Town Council. His power of dealing tactfully and patiently with men of very diverse temperaments and training, combined with his exceptional gift of business capacity, were shown to advantage in a matter of this kind, and contributed to the satisfactory agreement between both parties. It was as much an advantage to the City to dispose of the property in this way as it was to the University to acquire it. In all probability the buildings would in course of time have been demolished, as they could not have been suitably adapted to municipal purposes, while their proximity to the University certainly increased their usefulness as part of the teaching school. A sum of £15,000 was paid for the property, the amount being furnished from the private subscriptions received by the Committee, while the adaptation of the buildings to their special purposes was met, for the most part, by the grants made by the Carnegie Trustees and by the donors of the Tait Memorial Fund.

In a speech delivered by Turner at the semi-jubilee dinner of the Students' Representative Council in 1905, he thus referred to the action of the Town Council in connection with the site: "Through the public spirit and the historical feeling which filled the minds of the Town Council of this city, they allowed the University to become the purchasers of a very important piece of ground, and I should like to express to you, my Lord Provost, and your colleagues, our great indebtedness for the opportunity which you gave us of becoming the purchasers of the ground. It showed, if I may say so, on your part an historical feeling. It showed that you felt how intimately the town had been associated with the University, in its growth from the small Town's College to the great

institution that it has become. I have pleasure in saying that only yesterday we passed the plans for the erection of the Department of Engineering, and before many weeks are over, I believe that we shall be able to approve the plans for the construction of the Department of Natural Philosophy."

The acquisition of this old site by the University thus reconsecrated the ground for educational purposes. It was there that the first High School had been built in 1578, and for two centuries had provided the youth of the city with their early intellectual training. The original building had been pulled down and rebuilt in 1779, and had continued to be used as the School until the classic temple was erected in the Regent Road in 1829. Sir Rowand Anderson's scheme of reconstruction has left untouched the external walls of the old High School building, and the pillars of its ancient porch still bear the names of many of the boys of that bygone period cut in the old sandstone. The walls which once echoed to the youthful voices and footsteps of Walter Scott and Henry Brougham, the future Lord Chancellor of England and the first Chancellor of the University, of William Cullen and Sir Charles Bell, and of many others who carved their way to fame, now re-echo to the hum of the electric motor and the thud of the hydraulic pump, as it tests the iron and steel. The hydraulic laboratory which has been fitted up in the old building is one of the largest in the United Kingdom, and the whole Engineering Department, in its completeness and utility, bears most favourable comparison with any other in the teaching schools of the country.

The new Physical Institute was installed in what was formerly the Surgical Hospital of the Old Infirmary, situated upon the north side of Drummond Street, and, as in the case of the sister department, the original walls have been left almost untouched. A part of the old city wall and the massive iron gate, once the entrance to the Infirmary, have been preserved as

interesting historic monuments, while the stone steps worn by the footprints of many generations of students, and sacred to the memory of Lizars and Liston, Sir William Fergusson and Syme, remain as relics of the half-forgotten past.

The new laboratories were opened in October 1906, and the ceremony was not the least interesting of the many which had marked the onward march of progress in the life of Scotland's youngest University. Graced by the presence of the Chancellor, Mr A. J. Balfour, the event was further identified by the admission to the Honorary Degree of Doctor of Laws of the Earl of Elgin, the first Chairman of the Carnegie Trustees, and of Mr Andrew Carnegie, the creator of the Trust. To the latter was entrusted the duty of declaring the buildings open. It was not unnatural that Mr Carnegie, imbued with the spirit of materialism, and devoting much of his wealth to bringing knowledge within the reach of all classes, should take the opportunity of emphasising the new position, and lauding the power attained by the applied sciences. Criticising in somewhat characteristic vein the bygone educational methods and contrasting them with more modern developments, Mr Carnegie said—

> For centuries the University wasted her powers upon speculative subjects, incapable of settlement, which, even if settled, could have had no beneficial influence upon human life. The leaders argued in a circle. Many of you are familiar with the curious questions which the learned of old debated; faint traces of somewhat similar subjects sometimes obtrude themselves to-day. Two, at least, of our foremost men find recreation from high affairs of State, searching for foundations which are never found, or for the pathway to reality, proving to the entire satisfaction of readers that there is about that pathway "No Reality" whatever. Fortunately these excursionists are in constant demand by their country, in office or in opposition, which prevents fears of serious consequences.
>
> The Catholic Church then captured most of the Universities, and Clericalism reigned for many long years, during which

nothing was known of Milton's bold words, "Let truth and error grapple." Conclusions were determined before investigations began. Clericalism in turn was finally dethroned, but only to be succeeded by another tyrant, ancient classics, which usurped the throne. The millions are now being devoted to science and practical studies. This betokens a steady march forwards from the policy of the past, not that it is desirable to exclude any of the former University courses, but that there should be added others, needed to guide and advance the new knowledge which is creating new conditions. This mighty force of our day has hitherto been the Cinderella of the Sisterhood of Knowledge, and you know how Cinderella was treated by her haughty sisters. The Prince has appeared at last and taken her by the hand. It is now the turn of the elder sisters to greet the once neglected Princess. She will more than justify the millions which are now being showered upon her in the most progressive lands.

Thus has the University developed to the present all-embracing type, through the successive reigns of scholasticism, theology, and ancient classics, always behind the age, conservative in the highest degree. Science has arisen and established her claims to equality. We have long had the Republic of Letters; we now have the Republic of Knowledge. The ceremony of to-day bears testimony to the growing power of Edinburgh University. She is to remain famous for her Medical School, and is also destined to increase her reputation as a scientific instructor, through the possession of the increased facilities now provided. The Physical Laboratory and the Engineering School, which, with the cordial co-operation of the municipal authorities have been so ably procured by the Principal and the University Court, are the necessary tools which will enable her to extend her work. They mark an epoch in her long career, and are to testify to future generations that the officials in charge of her work at the beginning of the twentieth century were alive to the duty of keeping her abreast of the new knowledge.

That the study of science is indispensable to the efficiency of the nations no one will deny, but few, if any, will be found to admit that science, and it alone, is to absorb all the energies of University education and to deny to the elder sisters their rightful place. The world would be the poorer, and life, indeed, would be robbed of much that makes it worth living, if the

Republic of Letters ceased to exist. "It was evident," said Mr Balfour in his reply, "that Mr Carnegie, as a Scotsman, could not escape the taint of philosophy. He had talked about the soul of matter, and that matter without soul was unworthy of investigation. Metaphysics! He talked about service to the infinite. Metaphysics! It was in vain that they struggled to free themselves from their early misfortune, and distinguished as their new graduate was in the higher and more successful branch of practice, he remained a Scotsman even in those characteristics and qualities in which he evidently thought the Scots were a little behind and mediæval. It showed in his love of looking at the phenomena of this world under some great universal generalisation, and in looking at all the forces around them, whether in the material or moral sphere, as part of one great whole, and that was philosophy."

Yet another offshoot from the parent stem developed under Turner's fostering care. The question of systematising the education in Forestry in Edinburgh began to take more concrete shape in 1907, when the Governors of the Edinburgh and East of Scotland College of Agriculture approached the University Court, in the summer of that year, with the object of considering what steps might be taken to provide instruction in the subject. The College of Agriculture had been promised a grant of money from the Scotch Education Department, both for the purpose of providing the necessary instruction, and with the object of acquiring land in the neighbourhood of Edinburgh for the development of a Forest Garden, and for a large area in the Highlands of Scotland, suitable for the practical study of Sylviculture. The object which the College had in view in co-operating with the University was to prevent any unnecessary

duplication of classes in the two institutions, and, at the same time, to give the University facilities for educating her students, both in the garden and in the forest.

The instruction in Forestry in the University had not been carried out, hitherto, on a very extended scale, and it compared unfavourably with what was being given in Oxford. The University authorities had determined, therefore, to effect improvements in their scheme of education, and had resolved to institute a Degree in Forestry. The College, at the same time, had under consideration the question of granting a Diploma, but the Governors felt that to do so, when the University was giving a Degree, would only involve an unnecessary overlapping of classes. They decided, therefore, to forgo, for a time at least, the question of giving a qualification in Forestry, but they expressed their desire to give instruction to University students in those branches of the subject which could be dealt with in the Forest Garden and Forest Area. The projected scheme, however, fell through in 1909.

In 1910, interest in the question was revived, in view of the fact that the Secretary of State for India was prepared to approve of the University curriculum for the training of the India forest students. Turner had given evidence before the Committee of Inquiry appointed by the Secretary of State, and as the outcome of the Committee's investigations, the above decision had been reached. But the University curriculum contained no practical instruction owing to the want of a Forest Garden and a Forest Area, so that her students would be compelled to go to France or Germany for their practical work. Such a state of affairs could hardly be regarded as satisfactory. Turner, therefore, applied to the Development Commissioners for a grant from the Development Fund (Act of 1909) towards the extension and improvement

of University Forestry instruction, and he pressed for a Forest Garden and Nursery, an extension of the Museum, and the construction of a Laboratory.

In 1911, negotiations were again opened up with the College of Agriculture, with the view of providing the Garden area, to be used jointly by the University and the College, and to arrange a course of instruction and the suitable allocation of classes between the two institutions. A satisfactory working arrangement was reached whereby a subdivision of the teaching was made: an Elementary Course was assigned to the College to meet both the needs of the University students reading for their Degree, and of the College students studying for the Diploma which that body had again determined upon. The final or Advanced Course was to be taught in the University. At the same time, application was made to the Development Commissioners for a sum of £12,000 for the erection of the Forestry Buildings, and the property, already acquired by the University on the north side of George Square, was utilised for the purpose. Through the generosity of the Commissioners, most suitable provision has thus been made for the teaching of a subject which is growing in importance, and which every year is receiving an increasing number of students. The provision of the Forest Garden has yet to materialise. A suitable site had been selected in 1913, upon the Dreghorn estate, in the immediate neighbourhood of the city, but owing to the extended use of the grounds at Dreghorn by the military authorities, consequent upon the Great War, this locality had to be abandoned, and any further development of the question must perforce remain in abeyance until peace is restored.

Turner displayed a great personal interest and enthusiasm throughout the whole of the negotiations, and was largely instrumental in obtaining the grants

that were required in aid of the extension of the teaching facilities. We can recall a brilliant day early in August 1912—one of few such days in what proved to be a cold and wet month—when the town of Nancy, the former capital of Lorraine, was bathed in summer sunshine. It was a day when a stroll in the public gardens, or a seat under the awning of a pleasant café, would have proved an enjoyable method of spending such a summer morning. But the University of Nancy was the fortunate possessor of an excellent School of Forestry, and the museum, with its garden attached to the School, was the best of the kind in France. Such an opportunity could not be lost when Forestry matters at home were absorbing so much attention; consequently, Turner passed the forenoon carefully inspecting all that was to be seen, and doubtless the Department in George Square benefited as the result of his well-spent hours.

Thirty-three years have elapsed since the New Medical School in Teviot Place was completed, and already a demand for its further extension has arisen. With the introduction of the study of Chemistry into the Arts Course, and in view of the necessity of providing instruction, not only for students of Medicine but for those engaged in the various Applied Sciences, the accommodation provided in the Chemistry Department in the early days of the New Medical School has far outgrown the calls that are now being made upon it. In a Memorandum prepared by Professor James Walker, and laid before the Senatus and the Court in 1912, it was proposed that the Department should be transferred to a new site in High School Yards, and thus give provision not only for its extension, but permit of the much-needed improvements in some of the other Departments. The plans were prepared, and placed in the hands of Mr Balfour Paul. But the

War again intervened, and temporarily checked the commencement of building operations.

Thus the tree continues to grow and to spread its branches over the city. "In Education there is no finality. We cannot stand still in such matters. Every step which we take in the improvement of University education gives us a new platform from which to start, in order to make other and better arrangements."[1]

[1] Sir William Turner: speech at Educational Meeting.

CHAPTER XIX.

PRINCIPAL AND VICE-CHANCELLOR.

1903-1916.

Robert Rollock, first Principal—Robert Leighton—William Carstares—William Robertson—Brewster, Grant, and Muir—Turner—The Secondary Schools—Degree in Education—Degree in Veterinary Science.

WHEN the Magistrates of the City of Edinburgh sealed their contract with Master Robert Rollock on the 14th September 1583, creating him Regent of the College, they laid the foundation of the long line of Principals of the University. Robert Rollock, son of the laird of Powis, near Stirling, was then in his thirty-third year, and had succeeded, during the short period of his life, in establishing his reputation as a teacher of philosophy, and had become well known for the piety which he instilled in the minds of his pupils. In the new position to which he had been called, he was to "exercise the office of Regent in instruction, government, and correction of the youth and persons committed to his charge . . . so long as the said Mr Robert uses himself faithfully therein, according to the rules and injunctions which shall be given to him by the Provost, Baillies, and Council of the said burgh." The Council further bound itself to advance him, upon his good merit,

to the most honourable place that should become vacant.

The appointment of Rollock, as Regent or Tutor, marked the opening of the first session of the "Town's College," and in association with Mr Duncan Nairn, as second master or tutor, he commenced to instruct the pupils, some eighty or ninety in number, preparing them for their graduation as Masters in Arts. Every evening he conducted family worship: on Sunday, the pupils assembled for morning lessons, and were then taken to attend divine service. The general life of the College, at this early period in its history, was essentially collegiate and domestic, not having as yet assumed the character of a University.

In 1586, Rollock received the title of Principal or First Master, in fulfilment of the Town Council's pledge that he should be advanced to the highest post in the College. Thus dignified, he became relieved of his obligations as a teacher, and was soon appointed by the Council, with the sanction of the Presbytery of Edinburgh, Professor of Theology in the College. He thus combined, in his own person, the offices of Principal and Professor. The combination of the two appointments was not continued beyond the period of his immediate successor, Henry Charteris, though we find that, when John Lee was Principal, he was appointed a Professor of Divinity in the year following the Disruption.

From 1586 to 1858, only members of the Church of Scotland, who were engaged in the Ministry, were eligible for election to the Principalship in the Universities of Glasgow, Aberdeen, and Edinburgh. Looking back upon the men, nineteen in number, who held the office in Edinburgh during this long period, we can select three who have left their mark upon contemporary history in Scotland, and who, by their personality, exercised a beneficial influence upon the University. Robert Leighton, the divine, taken from the ministry of Newbattle, Mid-Lothian, was

appointed in 1653. A man of rare sweetness and humility, he was acceptable to all the Churches, and as Principal he proved "a great blessing to his office; for he talked so to all the youth of any capacity or distinction, that it had great effect on many of them." He revived the practice introduced by Rollock of giving lectures to the students, and he discoursed upon Human Happiness, the Immortality of the Soul, and the Scheme of Salvation. He took steps to improve classical teaching, and as he attributed the defect in the progress of the College pupils to the deficiency of grammar-schools, he worked for the establishment of such in each of the Presbyteries. Upon the restoration of Episcopacy in Scotland, he accepted the Bishopric of Dunblane, and in 1670 he became Archbishop of Glasgow.

The commencement of the eighteenth century saw the advent of William Carstares, the statesman, the man of action, of boldness and promptitude in an emergency, who recognised what ought to be done and got it done. When a student of theology in Utrecht, he became the friend and confidant of William of Orange, and later in life he proved himself a tower of strength to his countrymen. He persuaded William III. to trust the Presbyterians of Scotland, and in this way he helped to bring about the Revolutionary Settlement, and influenced the General Assembly to accept the Act of Union with England. In 1703, Carstares was appointed Principal, and did much to improve the position of the College. He obtained a bounty from Queen Anne, and with it he was enabled to increase the salaries of the Regents, who now became designated Professors. The Faculties were remodelled after the Dutch type, and during his tenure of office, concurrent with the greater prosperity which followed the Union, the College began to develop and take its place as a great University.

In the person of William Robertson, minister of Lady Yester's Church, appointed Principal in 1762,

the University placed at her head a man of letters, a writer of history, and one who did much to revive intellectual life in Scotland. The contemporary of David Hume and Adam Smith, he was, next to them, "the most eminent Scottish prose writer of his time. High as was the character of the men of letters who were then the glory of Edinburgh, there was not one of them who surpassed Robertson in amiability of temper and sweetness of disposition. His direction of ecclesiastical affairs was wise and statesmanlike, and the eloquence which enabled him to maintain his predominance in the General Assembly was eminently persuasive."[1] During his long Principalship of thirty-one years, the reputation of the University increased, and she attracted many students from south of the Border. The Faculties of Arts and Medicine were stronger than at any previous time. Robertson became an active force in all that made for her increased prosperity. He promoted the scheme for providing the new buildings; he established the Library Fund and did much to extend its usefulness.

One of the several changes which followed upon the introduction of the Universities (Scotland) Act of 1858, was the enlargement in the field of selection of the Principal. Hitherto, the office had been denied to the layman, or to the member of any Church other than the Church of Scotland. Under the influence of the Disruption of 1843, public opinion led to a movement which resulted in the passing of an important amendment upon one of the clauses of the Bill while under discussion in the House of Commons. In consequence of this, it was enacted "that the Principals in the Universities of Glasgow, Aberdeen, and Edinburgh, appointed in time to come, shall not as such, be, or be deemed Professors of Divinity, nor shall it be a valid objection to any person appointed to the office of Principal in any of the said Universities that he is

[1] Professor J. H. Millar. 'A Literary History of Scotland,' 1903.

a layman, and no such office of Principal therein shall fall under or be included in the terms 'Chair of Theology.'" The title of Vice-Chancellor, which has become associated with that of Principal, dated in Edinburgh from the same period, as the appointment of Chancellor was made, for the first time, in the University under the Act of 1858.[1] It was in the power of the Chancellor to appoint a Vice-Chancellor, who, in his absence, discharged his office so far as regarded the conferring of degrees.

Under the changed conditions of election, five Principals have now been appointed to the office, three of whom have been men of science,[2] while two had held educational and administrative positions in India. In 1859, science, for the first time, became represented in the person of its illustrious exponent, Sir David Brewster. The son of the Rector of Jedburgh Grammar School, he was, at the time of his election, already the recipient of all the honours that his scientific colleagues had in their power to bestow. To him, the world owes almost all the most important of the experimental results arrived at in the field of optics during the eighteenth century. He had discovered the superiority of the converging lights or mirrors in the illumination of lighthouses; he had invented the kaleidoscope and had solved the principle upon which the improved stereoscope was subsequently made. After twenty-one years as Principal of the United Colleges at St Andrews, he was transferred, at the age of seventy-seven, to the same office in the University of Edinburgh. "This remarkable man, after living at feud all his life with those who came in close contact with him in matters of business, proved during the eight years of his Principalship in Edinburgh a determined lover of peace, a wise

[1] The office of Chancellor existed in the other Scottish Universities prior to this Act.

[2] Principal Sir J. Alfred Ewing, K.C.B., who succeeded Sir William Turner, had made his reputation in Physics and Engineering.

ruler, respected by all his subjects, and a delightful companion."

On the death of Brewster in 1868, opinion in Edinburgh was divided as to the selection of his successor. Sir Robert Christison and Sir James Y. Simpson were both mentioned for the vacant office, but ultimately the choice of the Curators fell upon Sir Alexander Grant, Bart. His work, and the success which attended it, has already been dealt with.[1] A dux of Harrow, a Balliol scholar and Fellow of Oriel, Grant had obtained an extensive experience in educational administration in India, where he had been Vice-Chancellor of the University of Bombay, and Director of Public Instruction in the same Presidency. When in 1884, the University placed at her head Sir William Muir, she appointed one who had attained distinction in high office in the Government of India. A man of culture and of wide sympathies, ever anxious for the welfare of the undergraduates and solicitous on their behalf, he forged a bond of affection between them and himself. In him we see a reflection of the same spirit which influenced the minds of his predecessors, Rollock and Leighton, in his desire to improve the conditions of University life.

The changes introduced, in 1858, into the constitution of the University had added considerably to the duties devolving upon the office. With the whole administrative system placed for the first time in the hands of the Senatus and the Court, and with the Principal as Chairman of both bodies, the position was no sinecure or one of dignified ease, as some would suppose it to be. Turner gave the fullest consideration to the question of accepting nomination to the vacant post. He recognised that he was no longer young, that he had passed, indeed, the allotted span of threescore years and ten. He might have felt himself justified in declining to assume fresh responsibili-

[1] Chapter XVIII.

ties at an age when he might conscientiously have withdrawn from the scene of his former activities. "Too old at forty," had become a popular saying which he never regarded as a serious proposition. "Most of us think we can do good work after sixty," he said, and some of us at any rate, he might have added, can do good work after seventy. Turner had no doubt in his own mind that he was both physically and mentally capable of discharging the duties which devolved upon the position, otherwise he would have given the matter no further consideration. His upright carriage, his firm step, his keen eye and purposeful bearing at this period, denoted not only abundant vitality, but an intellect which the years had not yet impaired. A story is told of how he was anxious to submit himself to the experimental test of a new instrument that had been devised for measuring the fraction of a second involved in transmitting a "reflex action" through the body; in other words, the time required by the brain in responding to some peripheral stimulus. When the test was carried out upon him and upon some of his active students, it was found that his responses were quite as brisk as theirs, a result which greatly delighted him. He had no intention of accepting office in order to act as a mere figurehead. It was not his conception of what the position signified. He could not have tolerated that view of it in others, and he would not have accepted it himself in a similar spirit.

The health of his wife, at this time, was a matter which he felt called upon to consider in coming to a decision. His promotion would, of necessity, bring with it certain social duties in which she would require to take her part, and he was averse to placing any undue strain upon her. The acceptance of the Principalship meant also the discontinuance of his career as a teacher, the putting behind him of the profession to which he was devoted, although, in the natural course of events, such a step could not be long

delayed. The severance of old associations of place and work, and the cutting of the ties that had bound him for nearly fifty years to the Anatomical Department, were not lightly contemplated. His occupation of the Chair for another year would have witnessed his jubilee as a teacher of Anatomy in the University. Notwithstanding these considerations, a feeling of duty called him to the office, and in that sense alone he accepted the nomination, conscious of his ability to undertake, for a time, the new responsibility. His appointment was made unanimously by the Curators of Patronage on January 22nd, 1903. "Had I been gifted with the most vivid imagination," he said when delivering his first graduation address as Principal, "I could not have pictured that, as time went by, I should have had, as Principal and Vice-Chancellor of the University, to address the young graduates; the question of personal promotion to these offices would have seemed the wildest of dreams."

Lord Lister did not forget his old friend when he learnt of his promotion. Writing from Bath, where he was undergoing treatment, he said:—

> I have seen in to-day's 'Times' the important announcement of your election. I sincerely hope that this is as much a subject of congratulation for you as it is for the University and the Medical Profession. The University secures your invaluable services, and the Profession is honoured in having this dignified position occupied by one of its members.
>
> For yourself, this mark of the confidence of the University cannot but be very gratifying, and I know that the work of the office will be thoroughly congenial to you. I wish you many years enjoyment of it.

In the opinion of the citizens of Edinburgh, and of the larger public, he was the right man in the right place, and the University had honoured herself by thus honouring him. It was a source of great gratification to the medical profession, who saw, for the first time, one of their active members called to a post of such

distinction. Strictly speaking, he was not the first Principal possessing a degree in Medicine. Gilbert Rule, elected in 1690, though a Presbyterian minister who had suffered persecution in his early ministerial days, and was driven to leave Scotland, graduated as a doctor of medicine in Holland during his enforced absence. On his return to his own country he actually practised at Berwick-upon-Tweed, carrying on, at the same time, in a private way certain ministerial duties. When appointed Principal, however, he had become minister of Greyfriars. John Lee, the predecessor of Brewster, graduated M.D. in Edinburgh, but chose divinity as his profession. In one respect, at any rate, Turner could claim undoubted priority: though domiciled in Scotland, he was the first Englishman to become Principal. "I wonder the Scots allow an Englishman to rule them," wrote one of his friends at the time of his election; "but I take it they think they have naturalised you!" Amongst his colleagues his appointment was warmly endorsed. They recognised that in him they possessed one of themselves, whose claims for the position were immeasurably greater than any that could be advanced in favour of an outside candidate, and he was assured of their complete confidence and loyal assistance in carrying on the administration of the University.

As Turner had, for many years, been engaged in helping to administer her affairs, his promotion entailed no break in the continuity of the policy which was being carried on. His appointment, indeed, was an assurance that there would be no interruption in the scheme of developing the scientific side of University activity. He was in the fullest sympathy with that aspect of progress, and much of what was accomplished during his Principalship has already been recorded in these pages. A wider horizon now opened out before him, as the interests of all the Faculties came more immediately under his supervision. As the head of the University he had to consider her educational

interests from a broader standpoint, not only as they concerned her within her own walls, but in their more extended relation with the educational institutions around her. His citizenship acquired a wider outlook.

Turner's new position brought him certain *ex officio* appointments upon some of the Educational Boards and Trusts in the city, but, in addition to these, his well-established reputation as a business man led to his election to other similar offices. All of them benefited from his experience and his knowledge of educational matters. He became a Governor of the Fettes Trust, and his interest in the affairs of the school was proportionately increased by the fact that his three sons had been educated at the College. He was made Chairman of the Trust for Education in the Highlands and Islands of Scotland, an administrative body which dealt with various aspects of school teaching in Orkney and Shetland and the northern counties. One of the principal aims of the Trust was to spread the teaching of Gaelic, and to arrange for the distribution of grants for that purpose. As President of the Committee of Management of the St George's Training College for Women Teachers, he was much interested in the work of the College, and, from his wide experience, he was able to assist the Committee in their deliberations. Turner regarded his acceptance of these and other similar appointments in the same light as, in his earlier days, he had viewed his election as an honorary office-bearer in the various scientific societies to which he belonged. He did not look upon them as merely honorary positions, but, recognising that certain duties were attached to them, he threw himself into the actual work of the Councils. Nor did he confine his energies, in this direction, to the Council-room only, but he took more than one

opportunity of visiting the schools, and of putting himself in touch with the actual work of the teachers and pupils.

As one of the Board of Governors of Morison's Academy, Crieff,[1] he twice attended the Annual Exhibition of the School, taking part in the proceedings, and, on a like occasion, as a Trustee of the John Newland's Trust, he addressed the pupils of the Bathgate Academy, one of the endowed Secondary Schools upon the estate of the Edinburgh Merchant Company. In his address at Morison's Academy, in 1911, he pleaded for an extension of the school, mainly along the lines of science teaching. Owing to the position which the subject had attained, he considered that the Secondary Schools were bound to provide the necessary accommodation and instruction in the shape of properly equipped laboratories and thoroughly qualified teachers. "There is one great thing which we must all keep in mind, and that is, that we must never allow an institution to drift into an educational backwater. The prow of the boat must always be advancing. We have to pass on to what is good and to what is improvement, and that can only be done by meeting the needs of the country and of the pupils." He regarded a certain intermixture of science with the other subjects taught in the schools as of great educational value, apart from the knowledge of science that was thus acquired. It was of value alike to those who gave the instruction and to those who received it, because it taught accuracy. "Accuracy in observation, in experiment, and in thought are vital for the purposes of the scientific man and woman, but it is equally important that youth should also learn how to be accurate in speaking the truth as a moral being." He was not in favour of early specialisation in the schools, as there was a danger in making the

[1] In 1918, the Academy placed his portrait upon their walls, the engraving having been presented to the school by Mr Patrick Murray, W.S., the secretary to the Board of Governors.

boy think that his path in life was to be followed out on a narrow specialised line.

When presenting the prizes at the Lancaster Grammar School in 1902, Turner said: "In the school education of the present day we have reached the meeting-ground of the old with the modern. The schools must blend as far as practicable what is good in the old, with that which is good in modern education. That which at one time was considered to be paramount cannot entirely be put aside. We must keep what is best in it and apply it to the needs of the present day. We must preserve in our schools and in our Universities both the classical and the mathematical education, so as to fit the youth to enter the various professions, because these subjects are essential as a training for all professions. But boys must be trained for commercial life and to become men of business, and therefore, the school system must have such arrangements and appliances as will prepare them for entering business and becoming engaged in commerce. This side of school education is comparatively new, and it has not as yet had many traditions to fall back upon."

Turner's interest in the progress of School Education was not confined to the pupils alone, but was extended to the question of improving the training of the teachers. When welcoming, on behalf of the University, the Congress of the Educational Institute of Scotland in 1912, held under the Presidency of Dr Morgan, he pointed out that the University owed its position as a great educational body, in no small respect, to the training which its students had received in the schools of Scotland. "We have a strong and direct interest," he continued, "in the preservation of the standard of education in those schools, so that the youth of both sexes who come to us may be in a position to profit by the higher University instruction. Anything that affects the schools must also have a reaction upon the Uni-

versity. There would appear to be a certain disturbing element in the minds of teachers as to what the relations of the University to the schools is to be. One of the resolutions upon the programme of the Congress is framed as follows: 'The Congress views with grave apprehension the serious decrease in the number of students in training attending University classes in recent years, and reaffirms the strong conviction of the Institute that, in the best interests of Scottish education, the traditional association of Universities with the training of teachers should be not only maintained but strengthened.' I regard that fear, supposing it should be as stated, as a national calamity. It is vital that the association should be maintained." Whatever influence Turner had in this direction he used to the utmost, and those who were identified with the movement, always found him a helpful adviser.

Turner was very desirous of seeing satisfactory arrangements made by which prospective teachers would be enabled to obtain a practical training in their profession. "The University can train the youth of the country in the theory of education," he said, "but instruction in its practice must be given in the schools. Could some arrangement not be made in the schools of the Merchant Company to enable the Professor of Education to have—of course always under the supervision of the school authorities—an opportunity of practical education for his students. I have a very good reason for my request. Under the English Education Act all teachers must be registered, and a condition of the registration is that the applicant must show a certificate of having gone through a course of theoretical and practical education. It is therefore of the utmost importance that the school-masters and mistresses who are trained in Edinburgh should have such certificates. I appeal, therefore, to the Merchant Company to help the University in this matter. I should like

to ask even more than this, to enlist the sympathy of the Company in the development of such teaching as is more especially applicable to commercial life. I refer to the teaching of modern languages, looking upon them not merely as media of expression of wants, but of expression of thoughts, as a means for enabling those who travel abroad to get at the thoughts of the people with whom they are speaking. For commercial purposes this is obviously of enormous importance. There is still another aspect of the question that ought not to be lost sight of—a knowledge of the language is an introduction to the literature, and the pleasure to be derived from reading with intelligence the literature of a country adds greatly to the enjoyment and the interest of life."

During the later years of his Principalship, the University had under consideration the question of establishing either a Degree in Education, or, as an alternative proposal, an M.A. Degree with Honours in Education. The general consensus of opinion, however, favoured the establishment of a separate Degree. The basis of the Ordinance as finally drafted and approved in May 1916, was founded upon the Memorandum which had been drawn up by Professor Darroch, and the Degree was conferred, for the first time, at the Graduation Ceremonial in July 1918.

Under the regulations, two courses of instruction have been drawn up, the first, terminating with an examination, success in which is awarded with the University Diploma, while completion of the second course carries the Bachelor's Degree in the History, Theory, and Practice of Education. In each case, candidates require to be graduates in Arts or Science of any Scottish University, or the holders of a similar degree of any University duly approved of by the Court. Women placed in the Class Lists of any of the Final Honours Examinations in the Universities of Oxford and Cambridge may be regarded as graduates for the

purpose of the Degree. The course of study extends over a period of not less than two academical years, and embraces instruction both in theory and practice. It is necessary to produce evidence of professional training at a recognised Training Centre or College, and the attainment of a satisfactory standard of proficiency as a teacher, or, as an alternative, evidence must be forthcoming that the candidate has taught with success for not less than three years in one or more approved schools or educational institutions. In this way, due care has been taken to ensure a practical acquaintance with the art of teaching.

The University found herself, at this period, enlarging the sphere of her usefulness by having her attention turned to the question of Veterinary Education. The story is not without interest. For many years the training of the veterinary student in Edinburgh had been conducted in two Colleges—in the Royal College of Veterinary Surgeons and in the Royal (Dick) College in Clyde Street. The Dick College had been founded by William Dick, a Professor of veterinary medicine, who, in conjunction with his assistants, had carried on the work of the school for a number of years. By his trust-disposition, dated 1866, he appointed the Town Council of the city to maintain the management and the usefulness of the College as a training centre.

In 1876, Turner was appointed a Trustee by Miss Mary Dick, the sister of William Dick, and associated with him as co-trustees were his colleagues, Professor John Chiene, Professor J. G. M'Kendrick of Glasgow University, and the late Mr Middleton Rettie, Q.C. Upon the death of Miss Dick in 1883, the trustees were empowered to accumulate the funds, and when they proved sufficient they had instructions to apply one-half of the residue of her estate to the assistance

of the College, in which her brother had taught, while the other half was to be devoted to founding a Professorship, either of Comparative or of Surgical Anatomy in the University, in memory of John Barclay and John Goodsir. Owing to the depreciation in the value of the securities in which the money was invested, many years elapsed before a satisfactory sum had accumulated to make it possible to transfer the money to the two beneficiaries, for the purposes to which it had been assigned. Turner's position as a trustee undoubtedly stimulated his interest in the question of veterinary education, and this had a bearing upon future developments.

For a number of years after the death of William Dick the Town Council continued to administer the affairs of the College in the terms of the trust-deed. But the working expenses gradually exceeded the income of the estate, and they found that it was becoming increasingly difficult to keep the College in a state of efficiency, while it was quite impossible to extend it, or to add to the equipment which the more modern demands of the science were making. Due consideration, therefore, had to be given to the question of maintenance, and unless some *modus operandi* could be devised, the College was in danger of extinction, and the means of educating the veterinary student in Edinburgh might soon cease to exist. While matters were in this unfortunate position, Mr A. J. MacAllum, a successful veterinary surgeon in the city and an old pupil of the Dick College, was seriously considering the situation, and, as a result of his reflections, he came forward with an offer of £15,000 in order to place the school in a better position, expressing the hope that the University would establish a curriculum and give a degree in veterinary medicine and surgery. In consequence of this generous offer, a number of conversations took place between Mr MacAllum, Turner, and Professor Rankine as representing the University, and Mr Hunter (Sir Thomas Hunter) the represen-

tative of the Town Council. As a result of their deliberations, the Municipal Council decided to incorporate the Dick College as a Trust under an Act of Parliament, and Turner undertook to lay the matter before the University Court with the object of preparing an Ordinance for granting degrees in Veterinary Science.

Having thus determined upon a satisfactory method of improving veterinary education and of saving the position of the College, the Town Council, in 1906, promoted a Provisional Order for the purpose of incorporating the College; this received the Royal Assent in the same year. A representative Board of Administration was formed with powers to administer the funds and to carry on the business of the School. Representatives from the Town Council and the University, from the Royal College of Veterinary Surgeons and the Agricultural Colleges in Scotland, and from the Trustees of Miss Mary Dick, constituted a comprehensive Board of Management, and Turner was elected its first Chairman.

In the meantime, the University Court prepared an Ordinance for a degree in veterinary science, but on its presentation to the Universities' Committee of the Privy Council it met with the opposition of the University of Glasgow. As a result of her representation, the Privy Council found itself unable to report favourably to His Majesty upon the Ordinance. It was therefore sent back to the University Court for amendment, on the ground that the proposed course of instruction appeared to afford no adequate basis of general and scientific culture, while the proposals which had been made seemed to be subject to any kind of alteration at the hands of the University herself. But an amended Ordinance was prepared and finally adjusted, receiving the sanction of His Majesty in Council in December 1911. The University thus became able to confer both a Bachelor's and Doctor's Degree in Veterinary Science. The arrange-

ments of the curriculum and the allocation of the classes in the University and the Dick College were placed in the hands of a Joint Advisory Committee of both institutions. A Barclay and Goodsir Lectureship in Comparative Anatomy in the University was filled by the appointment of Dr O. C. Bradley, the Principal of the Dick College and its Professor of Anatomy, the foundation of a Professorship upon the subject being in the meantime postponed.

Turner, in his capacity as Chairman of the Administrative Board of the College, devoted considerable attention to its affairs. He was desirous of raising the character of the teaching imparted, and he took a great deal of trouble in seeing that efficient teachers were appointed upon its staff. When the movement was initiated for the erection of the College new buildings in Hope Park Crescent, he used his influence in obtaining money for that purpose. As the head of a deputation to the Highland and Agricultural Society of Scotland—of which Society he had been a member since 1868—he explained the financial position of the College as follows: "We are undertaking to remodel the Veterinary College, to put it into a position which is worthy of the subject in Scotland, and for that purpose we require money. We have approached the Scotch Education Department, which has met us on what I concede to be extremely generous terms. It has agreed to give us one half of the money that we are about to expend in connection with the new buildings, and that is a very large subscription. Owing to the College having been established in the city for nearly a hundred years, and from the intimate association of the Town Council with it for a long period, we approached that body, and they have very generously agreed to give us £3000 to carry on the work that we are about to undertake. And now we come to you and ask you to give a substantial contribution towards the important work in which we are engaged. We do not

ask you to give us money for maintenance, but a capital sum to assist in buying the site and putting up the requisite buildings. We believe that we can obtain what is necessary for maintenance year by year from the Scotch Education Department. The sum we have now to raise is from £25,000 to £30,000, and then the Government on its part gives us an equivalent sum." As a result of the efforts of the deputation the Society contributed £1000.

The new Royal (Dick) Veterinary College has now been completed. A fresh lease of life has been given to it. The status of veterinary science in Scotland has been elevated by receiving the hall-mark of a University degree, and the future of the profession presents a brighter outlook. Much of this it owes to Turner's personality and his zeal on its behalf.

CHAPTER XX.

PRINCIPAL AND VICE-CHANCELLOR—*continued.*

Freedom of the City—Honorary Member of the Merchant Company—Eightieth Birthday and Sir James Guthrie portrait—Graduation and other Ceremonials—Colleagues in the Court and Senatus—Students' Union—The End.

Amongst the fresh honours which came to Turner at this period of his life, none gave him more satisfaction, or appealed more directly to him, than his admission to the Freedom of the City of Edinburgh. It marked the esteem in which he was held by his fellow-citizens. It had a deeper significance than the highest honour which his colleagues in the world of science had conferred upon him, when they elected him President of the British Association, because it rewarded the man as well as his work. It was a recognition of the respect and admiration in which he was held by those amongst whom his daily life was spent, and an acknowledgment of his many services to the University and to the city. To the Magistracy and the Town Council, in whose hands lay the bestowal of the honour, it signified something more: it was an outward expression of their appreciation of his constant endeavour to cultivate friendly relations between "Town and Gown." Turner never forgot the old historic connection between the two bodies, and in the later years of his life he was, with the exception

of his former colleague, Emeritus Professor Campbell Fraser,[1] the only academic survivor of the period when the Town Council controlled University affairs. There had been a time when even under modern conditions University and Town Council had tended to drift apart and become somewhat indifferent to each other, but under his régime a closer connection had again become established.

Two other men were selected at the same time by the Municipal authorities to be recipients of the distinction—Mr H. H. Asquith, the Prime Minister of the day, and the Rev. Dr Alexander Whyte, Principal of the United Free Church College, Edinburgh. As circumstances had arisen which made necessary the postponement of the honour in the case of the Prime Minister, and as the state of Dr Whyte's health prevented his attendance, with the consequent conferring of the Freedom upon him *in absentiâ*, Turner found himself the central figure in the ceremony in the Synod Hall in December 1909, where an audience numbering close upon two thousand persons was presided over by Mr W. S. Brown (afterwards Sir William Brown), the Lord Provost. Turner's thoughts as he looked upon the gathering around him must have carried him back to another and very different scene, when, sixty-two years before, as a lad of fifteen, he had signed the burgess roll of his native town in the presence of two spectators, his uncle and the Mayor. At the commencement of his life he had claimed the freedom by right of birth—now, towards its close, a new citizenship was about to be conferred upon him by reason of "his brilliant and distinguished career." In the words of the Lord Provost, who presented him, "the Town Council recognised in Sir William Turner, one of their oldest and most eminent citizens, one who had done long and distinguished service in connection

[1] Alexander Campbell Fraser was appointed to the Chair of Logic and Metaphysics in 1856: he resigned in 1891, and died in Dec. 1914, aged 96.

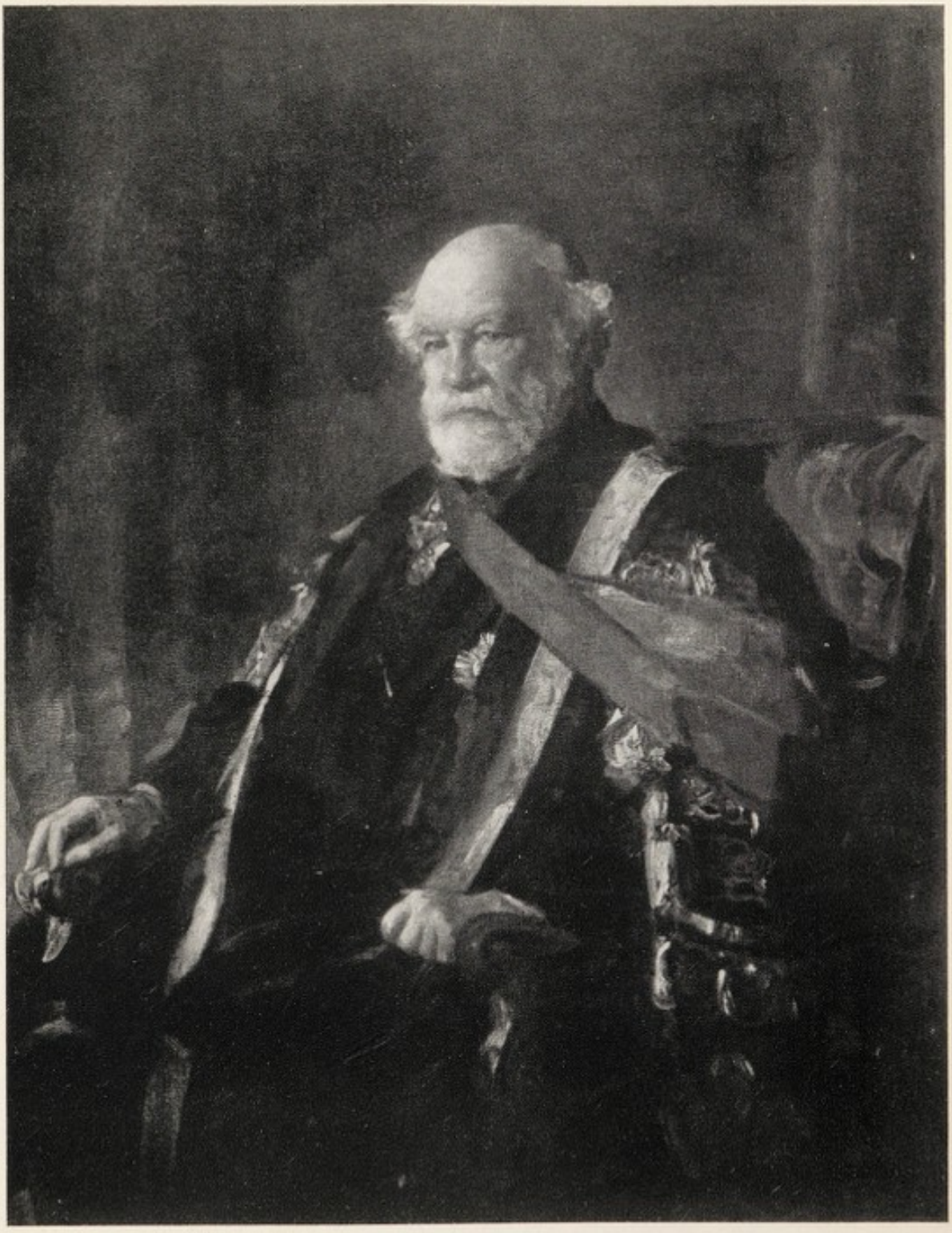
with their University, who was not merely its official head, but represented as no other man could do its life and work since it was taken over from the Municipality fifty years ago, and one who had earned the esteem and honour of his fellow-citizens."

Coincident with his admission to the freedom of citizenship, constituting, indeed, an event of the same day, Turner was elected an Honorary Member of the Edinburgh Merchant Company, along with the Earl of Mar and Kellie, and Lord Pentland, then His Majesty's Secretary for Scotland. In the Company of Merchants, Edinburgh possesses an ancient and influential Corporation, which in 1681 received its Royal Charter from Charles II. Amongst its manifold interests and various important endowments, a high place has been taken by the Company's Secondary Schools, which have done so much to enhance the reputation of the city as a centre of education. Its educational influence was not inappropriately described by Turner on one occasion, when, as a guest at the annual dinner of the Merchants, he proposed the "Stock of Broom," the plant emblematic of the Company—"though the origin of the term goes so far back in the mysterious past as to be unknown even to your historian, Mr Heron, we can see in it the suitability of its application to the Merchant Company. For what was the broom? A sturdy plant, with a vigorous life, congenial alike to the soil and to the climate of Scotland. Its vigour and its sturdiness were emblematic of the Scottish character, and in all respects, in activity of life and in vigour, the broom might be regarded as significant of the Company. But the broom might be looked at in yet another way. It gave off numerous shoots: it produced beautiful flowers and a crop of fruit. The Merchant Company, fortunate in having attracted to itself for many generations some of the ablest men of business —clear-headed, far-seeing men—had given offshoots

in the form of its magnificent schools distributed over the city, and their six thousand pupils were the fruit."

It was fitting, therefore, that the Company, with its large interests in education, should wish to enrol upon its list of honorary members the three men whom it had on that occasion selected for the honour. In 1695, an ancestress of the House of Erskine had, in conjunction with the Merchant Company, founded the Merchant Maiden Hospital, and for two centuries at least, the representative of the House of Mar had been a Governor of the Hospital. To the labours of Lord Pentland, Scotland owed the Education Act of 1908, which placed Secondary Education in a more advantageous position, while in the words of the Master, Mr J. L. Ewing, "We think it fitting that Sir William should accept the honorary membership of an ancient incorporation, which has striven for many years to the best of its ability to uphold and increase the reputation of the city as an educational centre. Its relationship with the University in the administration of its schools has necessarily been a close one, and our personal relations with Sir William have been of the most friendly nature; while his wide experience and talents have been of great service to us and others in the cause of higher education."

Turner's eightieth birthday, January 7, 1912, brought him many congratulatory addresses from the various bodies with which he was connected, and many letters from his numerous friends. The anniversary was not forgotten by some of the men who had been his pupils in the days when he was a Demonstrator under Goodsir. "I hope," wrote Sir Dyce Duckworth, a student in 1860, "that you will not regard it as an intrusion on the sanctity of your age to receive the warm congratulations of a faithful old pupil, on your attainment of an eightieth birthday. It is not given to many to be so hale and vigorous, with a Lancastrian tenacity, as you are; and this



PRINCIPAL SIR WILLIAM TURNER.

[From the painting by Sir JAMES GUTHRIE, P.R.S.A., presented by subscribers in 1913, and placed in the Senate Hall of the University.

occasion furnishes a happy opportunity for rallying around you the collected veneration and regard of many of your old pupils, whose lives and careers you have so splendidly helped to form and direct." From North Devon he received the following letter :—

> As an old and grateful pupil of yours, I am writing to wish you many happy returns of the day. Yes, fifty years ago I attended your lectures, given with explicit and painstaking lucidity. Your "handwriting on the wall" diagrams were proofs of your interest. Then I recall you and Stirling injecting the kidney through the lumbar vessels; I hear again your kindly voice, I once more see your genial personality. These memories are worth saving, for you are verily, "Good Sir," a namesake of your distinguished predecessor.—With loving respect, RICHARD DAVY.

His eightieth birthday received further commemoration from his past and present colleagues in the Senatus Academicus, and from his many admirers throughout the country, who were desirous of presenting the University with the portrait of one who had done so much on her behalf. The picture from the brush of Sir James Guthrie, *P.*R.S.A., depicts Turner in his official capacity, sitting in his Vice-Chancellor's robes of black silk, relieved by its silver decorations, while the crimson hood of the D.C.L. degree of the University of Oxford lends additional colouring to it. Painted nearly twenty years later than the Reid portrait, it shows that while advancing years had not failed to leave their mark upon his features, time had not succeeded in depriving them of their force of character. As Sir George Reid had taken occasion to familiarise himself with his subject by attending more than one of the anatomy lectures, so Sir James effected a similar purpose in a somewhat different way. Learning that Turner was travelling to London on a certain day, he arranged to make the journey himself, and he succeeded in obtaining a seat in the same compartment, his purpose being to spend the

hours *vis-à-vis* with his subject. Turner remained ignorant of the true purport of Sir James Guthrie's journey to London on that occasion.

The presentation of the portrait was made in the Upper Library on February 13, 1913, on behalf of the subscribers by Sir R. B. Finlay, the Parliamentary representative of the University, and, as he reminded the audience, an old pupil and a private in No. 4 Company under Turner's command. "Rest assured," he said, "that you have reaped the true reward of a teacher, when every one who studied under you regarded that period as the most valued of his student life, and held your memory in admiration and affection." The picture was accepted on behalf of the University by the Chancellor. In tendering his grateful thanks to the donors, Turner, while recalling his early associations with the city, drew attention to what he regarded as the secret of the success of the Edinburgh Medical School when he joined it. The reputation which the men in the School at that time had gained, and which gave them a permanent place in the history of Medicine, was due to the combination of their teaching ability with the practical pursuit of science. It was a combination which had left its mark upon the Edinburgh School, which still continued active, and which, he trusted, might long endure.

As Principal, Turner gave a dignity to all University functions. This was specially noticeable at Graduation and Laureation Ceremonials in the M'Ewan Hall, where, impressive in his robes of office, he officiated on these occasions. The sometimes boisterous elements in the upper gallery found that the steadfast look which, in former days, had silenced incipient disturbance in the Anatomical Theatre, had lost none of its authoritative quality.

When interruption of the proceedings was threatened by undue ebullition of spirits, his eyes remained fixed upon the gallery, and his voice sternly enjoined silence in the well-known formula, "That will do, gentlemen." Turner officiated for the last time in the M'Ewan Hall at the Graduation Ceremonial on July 9, 1915, and in his address to the graduates in Arts and Medicine he pointed out that other questions, infinitely more important than our individual pursuits and careers, were occupying our thoughts, and required for their solution the exercise of the best of our judgment.

The historic Empire of which we are citizens is experiencing a period of stress greater than it has ever previously been subjected to, for our position as one of the great nations of the world has been, and is, seriously threatened. A powerful nation with which we have been for more than a century and a half in friendly communion, and with whose Royal Family ours is united by ties of blood, has expressed in terms of hate its sentiments and intentions towards us. Its governing classes, civil and military, are dominated by a reckless ambition to become the master nation of the world, irrespective of the rights and feelings of other nations. A colossal vanity has enfeebled their minds and caused them to believe and say that they are the source and centre of intellectual thought and effort, and that other nations must be subservient to them. This view of their world mission is not limited to the official classes, but it is inculcated in the Universities and the State Schools, and forms a part of their educational system. It is significant that they have not claimed to be leaders in morals, for their methods in warfare are brutal, and are as cruel as those practised by the untutored savage. Their aim is to terrify their foes, to crush out the courage of their opponents, and to bring them under subjection; with them the end justifies the means. Such sentiments and the acts which have resulted therefrom have roused a spirit of antagonism in the other European countries, and have led these nations to join together to crush the evil.

We could not sit quiet with folded hands. We are not a decadent people. The national sense that our intellectual freedom and liberty of action must be preserved at all costs has become the creed of the British Empire. Scotland, this city, and the University resolved to play their part. The

University has prepared a Roll of Honour, which testifies to the efforts which she has made since war was declared. Our Chancellor, who heads the list, is First Lord of the Admiralty; our Rector is Secretary of State for War; 65 members of the Staff engaged in teaching and administration are serving with the forces; 2200 graduates, forming from one-fifth to one-sixth of the total number of graduates, have joined the Navy and Army, either as combatants or in professional and other capacities. Of these, 1525 are graduates of medicine, 361 names are those of former students who had not as yet graduated; 853 are those of students many of whose names have been transferred to the roll of graduates. In addition, 457 of the present students are in the process of training in the Officers' Training Corps, to be ready to receive commissions after graduation. In all, 4000 names are included in the University Roll of Honour. The King has conferred orders and medals on 27 of our members, whilst the Field-Marshal has named 72 in his despatches. This great effort on the part of members of the University has not been accomplished without sacrifices on the part of many—studies have been interrupted and in some cases will never be resumed. Professional careers, after a most promising commencement, have been broken; wounds have been received occasioning great pain and suffering, and in many cases permanent injury. The death roll, alas! contains 62 names, almost all killed in action either at sea or on land.[1]

During his long life four sovereigns occupied the throne. Had he been born two years earlier, he could have added George IV. to the list of crowned heads who ruled during his lifetime. From Queen Victoria Turner received both his Knighthood and his Order of the Bath, though the insignia of the latter were handed to him by King Edward VII. at the Palace of St James. In 1897, as the senior member of the Senatus, he took the place of Principal Sir William Muir, whose health did not permit him to undertake the journey to Balmoral for the purpose of presenting Queen Victoria with the congratulations of the Uni-

[1] These figures indicate the Roll of Honour at the end of the first year of war. They have been largely added to since that time. In the summer of 1916, the total of those serving had reached nearly 5000, and 368 had given their lives.

versity on the occasion of her Diamond Jubilee. In the summer of 1902, he went to London, again as Sir William Muir's deputy, to attend the Coronation Service of King Edward VII. in Westminster Abbey, but like others travelling south on a similar errand on that momentous occasion, he learnt at Crewe that the ceremony was to be postponed on account of the serious illness of the King. When the Coronation ultimately took place in the month of August, Turner was on the Continent, and the University was represented in the Abbey by Sir Ludovic Grant. In June 1911, he witnessed the Coronation of King George V. and Queen Mary, obtaining a seat in the Abbey as the representative of the Royal Society of Edinburgh, of which he was then President. Although his attendance at these and other public ceremonials formed part of his official duties, they were a source of great interest to him. He was particularly careful in preserving the rights of the University on such occasions, and in seeing that her position was duly recognised.

During the thirteen years of his Principalship, Turner had the great privilege of being associated with Mr A. J. Balfour as Chancellor of the University. Their relations, which were always most cordial, were not solely official, as Turner received from him and from his family much personal courtesy, and, on more that one occasion, he enjoyed Mr Balfour's hospitality at Whittingehame. Five Rectors held office during the same period. His old friend Lord Finlay, as Sir Robert Finlay, occupied the position in 1903, and he was followed in turn by Mr R. B. Haldane (now Lord Haldane), Mr George Wyndham, the Earl of Minto, K.T., and Field-Marshal the Earl Kitchener. In thus honouring Sir Robert and Mr Haldane, the students of Edinburgh University had chosen as their representatives upon the Court two men who, like themselves, had at one time been matriculated students of their Alma Mater. When

vacating the office of Rector in 1908, Mr Haldane thus expressed himself:—

War Office, Whitehall,
22*nd October* 1908.

My dear Principal,—The time is drawing near when my term of office as Rector of the University expires, and I wish, in anticipation of the actual date, to say a few words of farewell to yourself. My feeling of sadness is the greater because of the quality of those relations with you, which, so far as they are official, will terminate, These relations have been delightful—you have always been ready with the wisest counsel and best guidance when I needed help. My consolation is that the official termination need not affect in the least the personal friendship which has grown up between you and me in the three years during which I have held office.

To me it was a source of real gratification to find myself elected by the students to the highest place they could give me in the old University which I had known intimately ever since my youth. I shall always retain the deepest interest in its welfare. Many changes have taken place since I entered its portals nearly thirty-five years ago, but they all of them have been changes in the direction of development and reform, and they will be followed, I hope, by yet greater growth of the same kind.

Will you convey to my colleagues in the Court my sense of regret at parting from them. I wish I had been able to escape from public duties for sufficient time to be able to attend the Court and to say farewell to them personally.—
Yours very sincerely, R. B. Haldane.

Amongst his colleagues upon the University Court, with whom he was intimately associated, and whose assistance meant so much to him, four were in office during the whole period of his Principalship—the Honourable Lord Dundas, as the Chancellor's assessor, Professor John Rankine, representing the Senatus, and Dr F. D. Lowe and Dr R. M'Kenzie Johnston from the General Council of the University. Professor Malcolm Taylor had been Secretary since 1892, but the state of his health compelled his resignation five months before Turner's death, and Sir Richard Lodge took over his duties.

In the Senatus, Turner kept the varied threads of business free from entanglement, and carefully and cautiously guided the actions of his colleagues through the many problems which came under discussion. In Sir Ludovic Grant, so long the Secretary, Turner possessed a friend upon whose judgment he placed great reliance. "I must see what Sir Ludovic thinks of this," was a phrase which he not infrequently used when some difficulty presented itself before him. It was natural that, during his Principalship, he should preserve a special interest in his old Faculty, and after Professor Cunningham's death it was a pleasure to Turner to see the Deanship, which he himself had occupied thirty years before, placed in the hands of Professor Harvey Littlejohn, the son of his old friend, Sir Henry.

It is not inappropriate to glance at the changes which Turner had witnessed in the personnel of the Medical Faculty during the forty-nine years which embraced his connection with the Senatus. The Chair of Medicine stands first with no fewer than five occupants—Alison, Laycock, Grainger Stewart, Wyllie, and Lovell Gulland. Of the remaining eleven Chairs which constituted the Faculty at the time of his election in 1867, Pathology, Surgery, and Clinical Surgery had each been occupied by four professors; Botany, Natural History, Chemistry, Anatomy, Physiology, Medical Jurisprudence, and Midwifery by three; and Materia Medica by two. When Sir Robert Christison resigned the Chair of Materia Medica in 1877, he was succeeded by Sir Thomas R. Fraser, who held the appointment until 1918. Sir Thomas, therefore, whose tenure of office extended to forty-one years, was Turner's oldest active colleague in the Medical Faculty. He succeeded him as Dean, took his place as representative of the Senatus upon the Court when Turner was made Principal, and in 1905, he became the Court's representative upon the Medical Council when Turner retired from that body. Thus, Turner

had forty colleagues in the Faculty of twelve, and if the occupants of three of the four new Chairs founded during his academic life be added, the total is forty-three, certainly an unusual experience in the active period of the life of one man. Three former colleagues, to each of whom Turner was deeply attached, survived him, though they were no longer members of the Medical Faculty—Alexander Crum Brown, Sir Alexander Russell Simpson,[1] and John Chiene; all of them had retired during the period of his Principalship.

Though we have attempted in our narrative to reveal the gradual progress of the University during the years of Turner's association with the Medical School, a glance at the matriculation figures of 1858-59 and those of 1913, the year before the Great War, is not without interest. The total number of matriculated students had increased from 1336 to 3261; of the latter, 549 were women—an element not represented in the previous century. In the Faculty of Medicine the figures were 526 and 1315; in Arts, 537 and 1200; in Law, 237 and 254. The new Faculty of Science enrolled 412 members in 1913, and that of Music 20. No information is available in regard to the matriculation in Divinity in 1858, but in 1913, 60 students enrolled in the Faculty.

In addressing the graduates at the Jubilee dinner of the Edinburgh University Club of London, in May 1914, Turner said: "If you desire to have a University which is not decadent, but which is virile, you must have students who are not decadent but virile, and you must have graduates who are not decadent but virile, because we look to our graduates to carry on the reputation of the University over the world; and, so long as this is done, Edinburgh will retain her place as one of the great University

[1] Sir Alexander Simpson met with a fatal accident two months after Turner's death.

academic institutions in the country." These words recall to our memory a passage from "Æquanimitas,"[1] which may fittingly be quoted here: "The great possession of any University is its great names. It is not the 'pride, pomp, and circumstance' of an institution which bring honour, not its wealth, nor the number of its schools, nor the students who throng its halls, but the *men* who have trodden in its service the thorny road through toil, even through hate, to the serene abode of Fame, climbing 'like stars to their appointed height,'—these bring glory."

Turner maintained a real interest in all matters connected with the University life of the students, and when the various inter-University conferences and congresses met in Edinburgh, he took the opportunity of welcoming the delegates. He displayed the same sympathy in connection with the different Students' Associations, his pride in the cosmopolitan character of the University leading him to take a special interest in those more immediately associated with the Overseas Dominions and with the Indian Empire. He kept himself closely in touch with all that pertained to the welfare of the Students' Union, from the time of its inception to the completion of the new buildings and the library extension in 1906. The scheme for enlarging the Union buildings had been launched in 1902, the committee selected for the purpose of carrying it through being presided over by Professor Thomas Annandale. The members of the Union must always remain indebted to him for his active share in helping them through their difficulties and in obtaining the assistance of his friend Sir Donald Currie at a time when the financial position of the club was far from satisfactory. In spite of the efforts of the Committee in raising subscriptions, and the generous response which was made

[1] "Æquanimitas" and other Addresses, by Sir William Osler, Bart.

by Sir Oliver Riddell and others, and notwithstanding the resolution arrived at by the members of the Union to raise their annual subscription in order to meet the additional expenditure, additional funds were required to place it upon a sound financial basis.

At the luncheon in the Union, on July 27, 1906, following the graduation ceremony at which Sir Donald Currie had received the honorary Doctorate in Laws, Turner was able to announce the satisfactory termination of the difficulties which had hitherto weighed so heavily upon the Committee.

This luncheon [he said] has now become a very important part of the work and the pleasure of our summer graduation, and those of us who during the last two or three years have been present at this ceremony will have recognised what an important change has taken place in the Union building. Even those who were here last year will recognise how greatly the Union has grown, and, I think I may say, has grown so that I doubt if there is in the United Kingdom a University Union, managed by students, which is on so efficient a scale as this is. You cannot expect to have a building of this kind without expense being incurred. How to provide the money has been a matter of great concern to those who have taken an active part in the carrying through of this great work; but a very happy thought occurred to an active member of your Committee, Professor Annandale, and that was to this effect: "I know Sir Donald Currie; I know what a liberal-minded man he is, and I think if the facts of the case were put before him he will perhaps help us to get rid of our liabilities." There is another very active member of this Union, Mr James Walker, who has a talent for figures. He has also a talent for administration, and he prepared a statement of the cost of the building which he submitted to Sir Donald, This was to the effect that £14,000 would be required in order to pay for the site, and for the construction of the building and for fitting it up, in addition to the sum of £7000 which had been previously subscribed. One of the features of this building is the large and very handsome library—handsome, that is, in its position, but limited in the number of its books. These facts were put before Sir Donald Currie. The sum for

providing the library with suitable books was £4000—altogether £18,000 was what was required. This question has been seriously considered, and I am authorised on the part of Sir Donald, who has given me the authority, because he thought that I, as Principal, ought to be the person to make a statement on this occasion. What he suggests as a solution of the difficulty is this: Sir Donald is a Scotsman; but there is another great Scotsman in Scotland who takes a great interest in education, and who has done much for Scottish students and for Scottish Universities,—I refer to the laird of Skibo, Mr Andrew Carnegie. Sir Donald thought it might not be inadvisable to lay the case before Mr Carnegie. He has done so, and Mr Carnegie has intimated his intention to become a partner with him in the working out of the problem. The Treasury at Westminster has laid down the important principle, in giving public money, that a locality ought to do something and the Treasury will help. This rule is a wise one; and it has been applied not only by those who get Government grants, but by those who, like Sir Donald Currie and Mr Carnegie, have been in the habit of giving out of the fulness of their wealth to public and educational purposes. The scheme is as follows: Sir Donald proposes to give £6000; Mr Andrew Carnegie agrees to become a partner to the extent of £6000. I think you will understand from what I have said as to the locality participating, that it is the locality that must provide the remaining £6000. I do not hesitate to say that it will do so; but the question is, How long should the locality take to collect the sum? Sir Donald suggests this time next year, but I would suggest the end of next year.

With the necessary sum provided by the locality, and with the property duly secured to the University under a clause in the Trust, the Union was assured of a fresh lease of life.

Turner resumed his official duties at the University at the commencement of the autumn session of 1915-16, after a holiday spent in North Wales. The question of resigning office had occupied his mind for some considerable time; but when war broke out, and

the necessity arose for every man and woman to assist their country, he felt that to voluntarily resign his post while he was still able to work was equivalent to deserting the ship in the hour of her need. The war, which had now entered upon its second year, undoubtedly weighed heavily on his mind, and probably played some insidious part in undermining his vitality. He maintained an untiring interest in the welfare both of the members of the University staff, and of the students past and present who were fighting their country's battles at home and abroad. He was keenly interested in the preparation of the University Roll of Honour, and spent many hours with the Committee scrutinising and helping to compile the ever-increasing list of the names of those who had fallen.

As the winter advanced, Turner seemed to those who were in more immediate touch with him, to be feeling for the first time the weight of his years and the onerous nature of his duties. More than once he found it necessary to vacate the chair at a meeting of Senatus before the conclusion of business, a most unusual step for him to take. After the Christmas vacation, he seemed to be again in better spirits, and he attended the special service in St Giles on Sunday, January 30th, reading the lessons with his usual force and fervour. A week later he was obliged to keep his room, and finally to remain in bed, and seek the advice of his old friend and pupil, Sir James Affleck, who gave him ungrudgingly his attention and skill. But his condition at first was not such as to cause his family any undue anxiety, and he was able to attend to some work in which he was specially interested. The University Court was to meet at the beginning of the week following his illness, and he wrote to Sir Richard Lodge: "The possibility of my not being fit to attend the meeting on Monday is giving me much anxiety. In preparing your programme, can you

arrange to place for early consideration such matters as you would consider my presence desirable for, so that I might perhaps be able to assist in those items of business and then leave." But on the day previous to the meeting of the Court, he became suddenly worse, and forty-eight hours later, on the morning of February 15, 1916, he passed away at the age of eighty-four. Turner died, as he had lived, in harness, and the manner of his death was such as he himself would have chosen.

CHAPTER XXI.

SUMMARY OF TURNER'S CHARACTER IN ITS RELATION TO HIS ADMINISTRATIVE WORK.

In attempting to summarise the administrative and educational work in which Turner was engaged, and at the same time to sketch the main points in his character, which enabled him to take the outstanding position which he finally held, it is not sufficient to confine our review to the thirteen years of his Principalship. If the story, which we have endeavoured to tell in these pages, teaches anything, it reveals the fact, that while he accomplished much as Principal, his activities in the interests of his profession and of the University of Edinburgh date from the time when he entered the Senatus Academicus in 1867. We have no means of knowing whether he took any active part in University affairs during the thirteen years of his demonstratorship, but it is unlikely that he was more than an observant and thoughtful spectator during that period.

Turner was specially fortunate in being associated with an epoch of great development and expansion in medical legislation, and in the educational life of the Scottish Universities. Educated at a time when there was no central authority to guide the different Medical Licensing Bodies, when each of them, according to their own lights, taught and examined their candidates with a view to practise, he had actual experience of methods which certainly required re-

formation. The Medical Act of 1858 established the General Medical Council as a central body of control, and urged upon duly qualified medical practitioners the advantages of registration; but owing to its defect in one important point, many years of controversial legislation followed its introduction, while the Act of 1886, in the framing of whose fundamental principles Turner took a leading part, placed the qualification of practitioners upon a more comprehensive basis.

His official connection with the University went back to the time when the Municipality of the city controlled and managed her affairs and exercised the bulk of the patronage. But in 1858, it was generally felt that the time had come when the University should no longer be ruled by a non-academic body, and accordingly the Universities (Scotland) Act was passed, which remodelled the whole constitution, and entrusted the administration of the University to the Senatus and the Court. She thus became a self-governed society of graduates. Thirty-one years later, the Act of 1889 gave the University Courts wider and increased powers, and the Commissioners effected many important developments in the system of education. The whole period of fifty-eight years (1858-1916) was, therefore, one of great activity, and during the major part of it Turner was constantly engaged in promoting the welfare of the profession and of the University, and was frequently taking a foremost place in effecting improvements.

It was essentially a period associated with the development of the teaching of science, one of the distinct landmarks in the history of the Victorian era. It was a period in which the Universities, while retaining in their system all the old subjects of training, required to introduce much new matter in order to meet the conditions of modern life: it was a period, therefore, in which provision had to be made, not only for those who were entering the learned professions,

but for the many who desired to become engaged in commerce, in manufactures, and in engineering. Hence, the Universities were called upon to consider the application of science to the arts and industries. The period was marked, therefore, by a revolution in the methods of teaching. Practical instruction largely displaced, or was superadded to, the older lines of imparting knowledge by means of systematic lectures and occasional demonstrations. Consequently, this entailed the construction of new laboratories and museums, and necessitated the carrying through of the large scheme of University extension, which commenced with the building of the New Medical School, and which has continued to develop other offshoots in different parts of the city. New curricula and degrees in Pure and Applied Science were introduced in the subjects of Engineering, in Public Health, in Agriculture, Forestry, and Veterinary Science. It led to the development of the lectureship system in Science, a system which found still further extension in the faculties of Medicine, Arts, and Law, while the widespread benefits of the Carnegie Trust, as applied to the financial assistance of the University, did much to further the end in view. A closer relationship began to grow up between the Secondary Schools and the University, and with the object of improving the position of the teachers, the University established a Diploma and a Degree in Education.

It is not given to every man in his generation to be so richly provided, as Turner was, with so many opportunities of exercising his talents and of proving his capacity as a man of affairs. Few men are endowed with the physical vigour and the robust health which gave him more than the average span of life, and the stamina which permitted of unremitting application and of continuous endeavour during so many years. While fortunate both in the circumstances in which he was placed and in the character

of the men with whom he was associated in his work, it is none the less a matter of interest to dwell briefly upon some of those personal qualities which brought him to the forefront amongst his compeers of more than one generation. "Human character is influenced by example and precept; by life and literature; by friends and neighbours; by environment and by the spirit of our forefathers, whose legacy of good words and deeds we inherit. But great unquestionably though these influences are acknowledged to be, it is nevertheless equally clear that men must necessarily be the active agents of their own well-being and welldoing, and however much they may owe to others, they themselves must in the very nature of things be their own best helpers."[1]

Turner has acknowledged the influence which the precept amd example of three men exercised upon him in his earlier life: Christopher Johnson, the cultured practitioner of his apprenticeship days in Lancaster; James Paget, the distinguished teacher and surgeon during his student life at St Bartholomew's Hospital; and John Goodsir, the scientific anatomist and his "Chief" during the thirteen years of his demonstratorship in Edinburgh. All were men of high character, to whom anything that was small or mean was distasteful; they exemplified the virtue of patience, diligence, and constant application, and demonstrated by their manner of living and working that there is no royal road to success. But whatever he gained through his early association with them, the environment of his boyhood certainly developed in him some of those qualities which set their mark upon his character, as it was revealed in after years. Brought up in a home in which there was no paternal guidance to direct him, and in which economy had always to be practised, he early became dependent upon his own exertions. No social influence came to his aid. From the outset, therefore, he learnt the

[1] Smiles. 'Self-Help.'

value of self-reliance and the necessity of depending upon his own judgment of men and things. He soon recognised the need of hard work and indefatigable industry, if success were to be attained. His early letters to his mother and his brother have made this quite clear. As he grew to manhood, the further development of these qualities gave him determination, a strong will, and the courage of his opinions, while his capacity for work increased rather than diminished with maturer years.

In spite of his pleasure in work, he was very far removed from the type of industrious student depicted by Robert Louis Stevenson : of the man who sowed hurry and reaped indigestion ; who put a vast deal of activity out to interest, and who received in return a large measure of nervous derangement and became a recluse in the garret. On the contrary, along with close application, Turner developed a wide outlook upon life. There was nothing small or parochial in his views or in his general conception of the scheme of things, while, in the larger educational questions, which occupied so much of his time and attention, he distinctly showed an imperial attitude of mind. The training which he gave himself undoubtedly conduced to the development of the wider outlook, and his work was stamped with the impress thus given to it. He was an omnivorous reader ; history, the study of architecture and art, biography and travel, gave him an extended knowledge of the world and of the character and actions of men. He had a great belief in the educational value of travel, and though the nature of his work prevented him from taking prolonged world tours, he broadened his vision and gained experience by frequent visits to the neighbouring European countries. He rarely, too, missed an opportunity of mixing with people, and coming into contact with men of diverse views and professions, and he entered freely into the public life of the city. The character of his scientific re-

searches, especially of those upon anthropology, doubtless fostered and broadened his general outlook, as he studied not only the physical development of the peoples of the globe, but their environment, their habits of life, their manners and customs. His training along these lines could not fail to be reflected in his relations with men, and with the various problems which presented themselves before him.

It is difficult to apportion the balance between qualities which are by nature inherent in an individual and those which are acquired as the result of precept and training. The two probably become blended, and the results of experience and education are grafted upon the qualities which have been inherited. Nature had certainly endowed Turner with certain gifts which added greatly both to the strength and to the charm of his personality. An unusually retentive memory was of enormous advantage to him, not only as a teacher, but when engaged in the transaction of business, giving him a mastery of the details, and making him thoroughly conversant with all the facts pertaining to the matter in hand. For this reason he was very intolerant of inaccurate statements, and had little sympathy with work which was only partially prepared. He possessed an abundant store of common-sense, which made the right course obvious to him when others found it perplexing. He had a keen insight into the character and mental attitude of men, which frequently enabled him, in debate, to anticipate from whom opposition would come and whence difficulties might arise in the course of discussion, a power which placed him in a position of preparedness. He had the ability, too, to foresee the ultimate result of certain matters of policy, the effect of which others were sometimes inclined to regard with scepticism, but as to which future events proved that his view had been correct. He took the large view of questions in preference to the small one, and in this he showed his statesmanship.

He exhibited a gentleness and sympathy with the difficulties of others, and a complete understanding of their attitude, even though it differed from his own. Always just, a judicial fairness characterised his actions, and while he was resolute, and liked to have his own way, and usually meant to have it, his ruling was not stamped with a spirit of domination. *Suaviter in modo, fortiter in re*, admirably expresses his position.

> "He stood foursquare to all the winds that blow,
> Not yielding place to either friend or foe
> When he thought right. May we then not do less,
> Remembering still his genial kindliness."

In leaning to the side of prudence and caution, especially in financial matters, his attitude did not always appeal to his fellow-workers, but it was usually justified by the chronically impoverished condition of the University funds. In his later years, he escaped the tendency, often common in the mental outlook of older men, to regard as all-sufficient for the future what had proved so satisfactory in the past. For this reason, he was prepared to consider and then to accept fresh views in the interest of progress. An innate modesty characterised both his actions and his writings; perusal of all that he has written, whether in his scientific or in his administrative work, fails to give a clue to the all-important part which he himself played in adding to the sum-total of knowledge, or in furthering the interests of his profession. He had the natural, healthy ambition to succeed, but it was sufficient for him to recognise that the end for which he worked had been achieved; and while the share which he had taken in bringing this about gave him the greatest satisfaction, he did not seek any self-advertisement. He furnished a striking example of a life lived with the object of advancing his profession and of benefiting the community of which he was a member. Such were the qualities with which he in-

spired the affectionate esteem of those amongst whom he worked, and which made him a leader in the councils of his colleagues.

Turner was intensely proud of the University, and her best interests at all times claimed his first consideration. He had as profound a belief in her continued vitality and future prosperity as he had in her past success. His work, on her behalf, was not merely directed towards equipping the University for the more immediate requirements of the moment, but with the view of providing for her future needs. The great principle which underlay all his efforts was embraced in the idea of continuous progress; there must be no standing still. The satisfaction which he derived from the successful accomplishment of one important piece of work merely served as a mental stimulus for commencing some fresh undertaking. He had a deep-rooted belief in the value of the Scottish system of education, and in the soundness of the methods of the Scottish Universities. No one can follow his actions or read what he said during the long-drawn-out controversy over the attempted establishment of the one-portal system, without fully realising this. His evidence before Mr W. E. Forster's Committee, and his own Minority Report presented to the Medical Acts Commission of 1881, breathed the spirit of his conviction that he was fighting for a cause in which he thoroughly believed. But his whole life indeed proved the sincerity of his belief. Although an Englishman and educated in England, he early became convinced of the value of the Edinburgh plan in the training of the student of medicine. It might truthfully be said, indeed, without disrespect, that because he had been educated in a London school of that period, he was able to appreciate more fully the advantages which the Scottish system provided. He was sometimes twitted at having become more Scottish than the Scot, but he was

not averse to admitting the truth of the soft impeachment.

University education, in his view, must aim at something more than the teaching of the bare necessities required by the practical man in the discharge of his professional duties. Instruction in the purely scientific side of a curriculum, demanded from the teacher the exposition of a greater breadth of view than what was contained in the more practical details of his subject, and he maintained that scientific classes should not be dragged down to the minimum of professional requirements. "In schools which are mainly or even exclusively technical in their methods and practice, the scientific or philosophical principles of a subject are apt to be lost sight of in the efforts made by a teacher to impart, and by the student to acquire, such routine knowledge as may be readily utilised for professional purposes. But when subjects of professional study become a constituent part of the educational system of a University, they should be based upon a literary and philosophical or scientific foundation. If this is faithfully carried out, the Universities will succeed in raising the standard of professional knowledge throughout the country, and in introducing into the several professions men of wide general culture and of more varied attainments than can be looked for, when the subjects are taught exclusively in their application to professional practice." "The fulness of life," he pointed out on one occasion, "has been said to consist in the balance between the flesh and the spirit, each of which has its own allotted sphere." "The fulness of medical education," he added, "is in the due preservation of the balance between the scientific and the practical." [1]

It was not the system alone, or its purely intellectual advantages, which appealed to him, but he was certain of the value of the moral benefit to be

[1] Sir William Turner: Address at Oxford, 1893.

derived from a University training in medicine. "The higher tone and character and the conduct of the medical profession in Scotland, and the position which it holds in the eyes of the public, are largely due to the fact that the great bulk of its members are graduates of one or other of the Scottish Universities. They had it early instilled into them that the graduate of medicine should be a man who held his profession as something more than a mere matter of trading. It was a profession which appealed to the highest sentiments of human nature, and it was the duty of each one to discharge the duties of his profession from that high and noble point of view."

Thus, Turner's life in Edinburgh was contemporaneous both with the commencement and with the consummation of a number of important events in the history of professional education. His life's work constituted, indeed, a distinct chapter in medical history. It were perhaps unwise, nay, even hazardous, to venture to predict what the future may have in store for the profession which he adorned, and for the University in whose interests he laboured. The Great War in which his closing years were passed has broken the continuity of peaceful progress. The tremendous upheaval which has thus been brought about cannot leave the minds of men untouched, and already the mutterings of approaching changes portend the advent of an era that may differ, in many respects, from that which has preceded it.

A fresh chapter in the medical history of the University will be written at some future period. It may, or may not, be woven round the life of one man, but, whatever changes it may reveal, it will assuredly show that there has been no standing still, and that the march of progress has been ever onwards.

CHAPTER XXII.

L'ENVOI.

Home life—A Conversationalist—Science and Faith—A public speaker—Holidays—Friends—Retrospect.

In his home, which was the centre of so many of his interests, Turner was singularly fortunate; the mutual goodwill and sympathy which he could always rely upon finding there meant so much to him when constantly occupied with work. This was due in great measure to the character of his wife, his intimate companion for forty-five years, who not only devotedly helped him and sympathised with him in his earlier struggles and difficulties, but shared with him his later triumphs and the fruits of his success. The most gentle and kind-hearted of women, she died on January 8th, 1908, leaving behind her naught but memories of a life which had endeared her both to her family and her friends. After her death he became more and more dependent upon the help and care of his two daughters, Amy and Constance, not only in his home life but during his holidays. As experienced travellers and accomplished linguists, they assisted him in his journeys abroad, making easy the difficulties and minimising the inconveniences attending Continental travel. His two elder sons entered the medical profession. William Aldren settled in London as a consulting physician,

turning his attention more particularly to the study of the diseases of the nervous system; while the second, Arthur Logan, remained in Edinburgh, and engaged in surgical work in the diseases of the ear and throat. His youngest son, Francis Robert, became a farmer, following his calling in Roxburghshire, in the same neighbourhood as that in which his maternal grandfather had lived.

Turner delighted in the society of young people of both sexes, and this, like his intercourse with his students, served to keep him perennially youthful in mind. In his later years, he derived great pleasure from the companionship of his grandchildren, of whom he had five, and he watched their progress with ever-increasing interest. As the friends of his own age died, he formed fresh friendships with the younger generations, and with those who were intimate with his children. "Ever a welcome guest himself, he was also a most genial host, a trait in his character which was seen to advantage as often as he dispensed his hospitalities in connection with University functions and events. It was when surrounded on such occasions by his guests, by men eminent in some branch of science, literature, or art, by colleagues and friends, that the lighter, brighter, and very genial side of his nature was fully disclosed and realised. Then the indefatigable investigator in scientific matters, the cautious administrator and the disciplinarian, simply became a lovable human being with kind thought for all, overflowing with ready wit and pleasant humour."[1]

The same good-fellowship and the zest of enjoyment in the society of his friends characterised his attendance at many social meetings,—at the dinners of the various Edinburgh University Clubs throughout the country, where his presence was always welcomed, at the Royal Society Club, and at "The Æsculapians." There the more humorous and brighter side of his

[1] Professor Malcolm Taylor, D.D.

nature added to the pleasure of the ovening. He was elected to the Æsculapians in October 1868, when Sir James Y. Simpson, George Combe, Daniel Rutherford Haldane, James Donaldson Gillespie, Douglas Maclagan, Andrew Wood and John Smith, were some of the active members of the Club. Turner was the senior Æsculapian when the War put a temporary end to the convivial dinners of the Club, "where songs and verses, new and old, with twinkling scraps of literary genius, enlivened mostly all the meetings, and confirmed the indisputable maxim of the old philosophers, *Dulce est desipere in loco—varietas delectat.*"

Turner's long experience and his wide outlook on life gave a singular interest and a charm to his conversation, while his memory of events was always fresh and accurate. To his family and his more intimate friends his conversational powers were well known. "I have seen more of him than usual this winter," wrote one of his colleagues in the Senatus after Turner's death. "It was a great pleasure and privilege to talk with him on these occasions. There seemed to be no abatement of his natural force; his judgment was as vigorous and as sure as it had ever been. He could always illustrate anything that we talked about out of his own rich experience. He remembered accurately things which I can recall my parents discussing when I was a boy. I don't suppose we ever mentioned a point in University or National politics of the last sixty years regarding which his memory was not perfectly accurate. I shall always look back to these conversations, which enabled me to see how his mind worked, and which admitted me to his confidence in a way which would otherwise have been impossible." He did not weary his listeners. From his rich store of knowledge of past events he was able to give interest to his conversation, while his verdicts upon men and their actions showed a penetrating insight into character.

But many, other than his more intimate friends, profited by intercourse with him in his leisure moments. The acquaintances picked up in his travels can look back with pleasant recollections to the hours spent in his society. Some of them indeed, though strangers at first, but meeting more than once under similar conditions, established a lasting friendship as the result of these occasional holiday experiences. Memories of some particular place are often impressed upon the mind, or rendered more vivid, by some special incident, by a notable excursion, the beauty of the scene, the brilliancy, or otherwise, of the weather, or from some less romantic cause. But there are some to-day whose recollection of a holiday has an added interest, or is again stimulated, by the memory of a chance meeting with Turner. To one, the picture of the courtyard of some old hotel in Normandy is again unfolded, where in the background the *chef* in white cap and apron is taking his well-earned leisure, and Madame at the table in her office window is closely inspecting her books. Here, the after-dinner cigar, with the coffee and the Benedictine, and the one or two remaining hours of the day, have passed all too quickly in conversation with him. Perchance, to another, it is a verandah facing the sea, with the long stretch of sand in the foreground, and beyond, the distant lights of a steamer making her way down channel. Or again, the terrace of some mountain hotel in the Alps, with the moonlight casting deep shadows in the valley below, and lighting up the distant peaks with almost "uncanny" detail. It may be the recollection of an Italian garden in spring, rich in its colouring of roses and wistaria, or nearer home, the smoking-room or lounge of an English hotel, or of a country-house in Scotland.

Turner made no parade of religion. Although a regular attendant at church, it was not his habit to talk about spiritual matters. He was a member of

the congregation of St John's Church in the days when Dean Ramsay and Dr D. F. Sandford, afterwards Bishop of Tasmania, ministered there, and he continued his attendance in the time of their successors. Like many other men of science, like his friends Lord Lister and Sir John Murray, the elucidation of scientific facts did not destroy his belief in the existence of an Unseen Being. To him, there was nothing in the data which science revealed that was inconsistent with the possession of a faith in some one higher than ourselves. He held no narrow sectarian views. Had he taken any active part in religious questions, he would have shown that he was an active supporter of the union of the Churches. The men of various denominations who assembled in the chancel of St John's on February 19, 1916, to pay their last respect to one whom they admired and regarded as a friend, unconsciously perhaps, but none the less truly, were carrying out in the letter, the spirit of reconciliation which certainly marked his attitude towards the Churches. He welcomed the opportunity frequently given to him of reading the Scripture lessons of the day at the special services in St Giles, when the Officers' Training Corps paraded, and his clear and resonant tones rang through the old Cathedral, impressive in their earnestness and in their reverent regard for the words which he uttered.

The Rev. Dr John Kelman has given an account of a Sunday evening service in the old Operetta House in Chambers Street, where he addressed the students upon the subject of Faith and Character.[1] It had been Sir William Muir's custom to preside on such occasions, and when Turner succeeded him as Principal, he consented to occupy the chair. When Dr Kelman had finished his address, the Chairman rose and faced his audience. "A dead hush fell upon the meeting from pit to topmost gallery, and the clear incisive words seemed to fill the whole building, and

[1] The Student Memorial Number, 1916.

to find the heart and conscience of every man in it. It was not a long address, but it was a memorable one, and I believe he used to speak of the occasion as the first on which he had spoken in public on the subject of religion. 'Gentlemen,' he said, 'we have heard to-night of the effect of a man's faith upon his character, and I was reminded in this connection of one of the most famous men in history. Napoleon Buonaparte was a man of faith. He believed in his star. But that means simply that he believed in himself. When a man believes in himself with a faith like Napoleon's, that faith will do much for him and carry him far. It carried Napoleon from victory to victory, almost to the throne of Europe, and then it carried him to St Helena, and left him there to die in exile. If you believe in yourselves only, and take that belief for the guiding star of your life, no doubt it will carry you far also. By unflinching self-confidence you may scale many of the heights of life, and storm many of its citadels. But just as certainly as his faith landed Napoleon on St Helena, so certainly your faith, if its object be but yourself, will land you too in exile, and leave you there to death. But if you find an object for your faith higher and greater than yourselves, the faith of Jesus Christ, that faith also will carry you from victory to victory, and in the end will establish you in that place for which you were born, and where alone you will find your true destiny.'"

As a public speaker, Turner in his later years was in considerable request. Though not an orator, he acquired much readiness and facility in speaking on the platform. His powerful voice, which could be well heard in any hall in which he spoke, and the manner of his delivery, compelled attention, while the subject matter of his speeches was usually to the point, and contained information of interest to the majority of his audience. His proficiency had been attained by practice. He acted upon the principle of never re-

fusing to speak in public when asked to do so, as he regarded this as the best method of acquiring both confidence and readiness. A speech was always carefully thought out beforehand and often written out, its chief points being committed to memory. The manuscript was, not infrequently, in his pocket when he rose to speak, but as a rule he delivered what he had to say without reference to his notes. After his speech at the opening of the M'Ewan Hall, some of his friends expressed their regret that he had read his address, but he excused himself on the grounds that, as the occasion was so important, he could not risk the possibility of failure.

Perhaps one of the best of his public utterances was that delivered in the Music Hall at the dinner given by the Royal College of Surgeons of Edinburgh at their Quater-centenary Celebrations in the summer of 1905. In the light of the events which have transpired since that time, there is almost a prophetic significance attached to what he said. His old friend Sir Patrick Heron Watson, as President of the College, presided, and the large company which filled the Music Hall included men from nearly every corner of the globe, many of whom were Turner's old pupils. Before he rose to propose the toast of "The Guests," which was coupled with the name of M. Paul Cambon, the French Ambassador at the Court of St James, the speeches had not roused much enthusiasm, but, when his well-known voice was heard, his words and the sentiments which they conveyed did not fail to carry the audience with him.

After referring briefly to some administrative points which bore upon the occasion, he continued :—

If I may venture to say so, this meeting has a wider significance than the mere gathering of members of a common profession, whose main interest is to study and probe into the causes of disease, and together to work for a common end, the good of their fellow-men. It is something more than a mere professional gathering, because we are honoured with the

presence of M. Cambon, the Ambassador for the great Republic of France. It recalls to our recollection that the alliance between France and Scotland did not come to an end some centuries ago; it is still a living force. There was indeed a time when Scottish scholars, like George Buchanan, were teachers in the Colleges of France; there was a time when Scottish soldiers formed the bodyguard of the Kings of France. There was a time when the King of Scotland chose a Princess of France as his consort; there was a time when a Scottish Princess adorned with her beauty and her charm the throne of France. Those days are gone—gone, never to return, but still a strong sentiment prevails, and I trust ever will prevail, between Scotland and France.

There are few present this evening, I think, who have not travelled in that beautiful country, and who have not brought away with them a strong feeling of regard for *La Belle France*. They have enjoyed its brilliant sunny skies, and they have got rid of the atmosphere of smoke. They have seen noble rivers wending their way to the sea through fertile plains—a land of corn and wine and oil. They have been in its historic cities on the banks of those rivers, and they have seen there examples of the finest Gothic and Renaissance architecture. They have mingled with a people proud, and justly proud, of their nation and race. They have heard a language marvellous in its felicities and in its clear logical methods of expression, and they recognised that in that country there had been produced one of the two great *littératures* of Western Europe, and they have realised the almost instinctive feeling for art which prevailed throughout the country. They have mingled with a people of acute intellect and of great variety of nature, and they recognised that in that people there was a power of restraint, a power of recuperation under great misfortune, which had added to the lustre of the nation.

I can recall an incident which happened to me in my early life, when wandering with a friend on the coast of Normandy. It was in the heat of the day, and we had gone into a village *café* to seek for rest and refreshment. While engaged in conversation with each other, the lady of the *café* had been keenly watching us, and she came up and said in French, "What countrymen are you?" She made two or three guesses, and then we told her we were English. The Channel was within the range of our vision, and pointing her hand towards it, she said, "*Messieurs, nous sommes voisins.*" Monsieur Cambon, *nous sommes voisins!* We are neighbours not only

in geographical proximity, but in thought and in feeling. We represent the two great nations of Western Europe, with whom freedom of thought and freedom of speech are the necessities of life. We welcome you to our board this evening, because we feel that you are the bearer of friendly feelings towards us.

It may appear somewhat of an academic question to endeavour to picture what a man's success might have been in a sphere other than the one which he had actually chosen. Few would be inclined to doubt that, in Turner's case, he would have come to the top in whatever path in life he had selected to tread. He possessed in a marked degree those qualities of industry and determination which were bound to carry him successfully forwards, and if destiny had led him along another road, which required the cultivation of special accomplishments necessary for success in it, he would certainly have overcome the difficulties.

Political life made no appeal to him. Though belonging to the Unionist party, and recording his vote for it at election contests, he rarely, if ever, took any part in political controversy. He was approached with a view to having his name put forward as successor to Sir William O. Priestley in the representation of the University in 1900, but he refused nomination on the ground that his manner of living was ill suited to the kind of life demanded from the Parliamentarian. There is little doubt that he would have made his mark in the House of Commons, where his influence would have been felt. Dr Horne, who succeeded him as President of the Royal Society of Edinburgh, impressed by the part which Turner played in the discussions at Dover House, when the claims of the Society were being laid before the Secretary for Scotland, at the time when the Society was forced to leave its old rooms in the Royal Institution, formed the opinion that he might have become a successful Chancellor of the Exchequer. His knowledge of the state of the money market,

his insight into the value of stocks and shares, and the success with which he handled the investment of the University funds, were indications of the position which he would have made for himself as a member of the Stock Exchange, had he followed a financial career: the same might be said of him had he selected the life of a man of business, instead of devoting himself to science and education.

During his holidays Turner threw off the responsibilities of office; the clouds of care became dispersed, and the sun shed its brilliance over him. His elder daughter thus briefly sketches the holiday aspect of her father's life:—

"Unlike the average Englishman, sport offered him no attractions, and he used often to remark that it was a mystery to him how thousands of people could spend the hours of a winter afternoon watching a football match. In addition to walking, of which he was always very fond, rowing was the only form of exercise in which he indulged. As a youth he made many walking tours in Wales and in the English Lake district, and he climbed the principal summits of the Cumberland and Westmoreland mountains; and again, in later years, he spent several holidays with his family in this beautiful part of England.

"More than once a house was taken on Lochearn, in Perthshire, so that he might have an opportunity of spending his vacation with Sir Robert Christison and his family, and more than one summer was spent on the Clyde at Tigh-na-Bruaich, Kyles of Bute, where Sir Thomas Smith was enjoying his holiday, and the two old friends passed many pleasant days in sunshine and in rain, fishing and cruising on the Clyde and its adjacent lochs, in the small steam yacht which my father had hired. Mr John Murray, who was engaged during the eighties in dredging these waters in his yacht the *Medusa*, paid him

several visits, on one occasion accompanied by three distinguished foreigners, well known in the scientific world — the Abbé Renard of Brussels, Professor Boddard of Ghent, and Professor His of Leipsig— all of whom partook of his hospitality.

"During his long life he explored all the most interesting and beautiful places in England and Scotland. Many were the pleasant and profitable days which his children spent in visiting the Cathedral towns of England, and in studying under his guidance the beauties of Norman and Gothic architecture in such famous shrines as Durham and Gloucester, Lincoln and York.

"He recognised the value of travel as an important educational factor, laying stress on the desirability of first reading something of the history of the places to be visited, and of continuing to do the same after returning home, in order that the impressions received might leave a more permanent mark upon the memory. He was singularly free from British insularity, and was quick to observe and appreciate the progress made in the various branches of applied science in the countries in which he travelled.

"With the exception of a tour in Canada and the United States in 1897, his travels were confined to European countries. He had an intimate knowledge of France, Italy, and Switzerland, and had also travelled in Holland, Belgium, and parts of Austria. In his youth and middle life he enjoyed visiting Germany, and made many friends and acquaintances amongst the eminent men of science in that country; but in his later years, Germany had ceased to attract him. A series of holidays which afforded him great pleasure, and to which he always looked back with delight, were those passed in Switzerland, the Dolomites, and the Tyrol. Pontresina, in the beautiful Engadine valley, was a favourite halting-place, and he enjoyed excursions with his colleagues, Professor Crum Brown, Sir Patrick Heron Watson,

and Dr Hunter Stewart, who also spent many vacations in the bracing atmosphere of the high Alps. It was at Pontresina that my father first met the Rev. Dr Gordon Gray, Presbyterian minister in Rome, and the acquaintance ripened into a warm friendship based on mutual respect and kindred interests.

"Writing from Pontresina to Professor D. J. Cunningham in August 1902, the month in which King Edward VII. was crowned, he says: 'This is our third visit to Pontresina, and the place seems more beautiful than before. We are 6000 feet above sea-level, and when we rose on Wednesday morning the ground was coated with snow, which rapidly disappeared under the strong sun. The cold has now gone, and the girls have started on a glacier excursion with the Crum Browns, and Mr Justice Gibson and his daughters, who are staying in an adjoining hotel.

"'We had a function on Coronation Day. The English-speaking people in Pontresina mustered at our hotel at 9 P.M., and drank the health of the King and Queen. The list of speakers was peculiar. A Scoto-Anglian (Mr Leslie Melville) took the chair; an Anglo-Scot (Turner) proposed the King; an Irishman (Justice Gibson) gave the Queen; a Scotsman (Crum Brown) the President of the Swiss Confederation; (an Irishman) the English Chaplain, the previous speakers; and a Scotsman, the Presbyterian Chaplain (Dr Gordon Gray), proposed the Chairman. One was tempted to ask, where were the English on this occasion? Well, they formed the audience, cheered lustily, and sang the National Anthem.'

"Although in his earlier life my father had visited the Italian lakes and the Alps of Northern Italy, it was not until he was well advanced in years that he became acquainted with her cities and the treasures which they contain. After the great bereavement which he sustained early in 1908 by the death of his wife, some of his colleagues and friends urged

him to leave his work for a few weeks and seek in a southern clime the rest and recuperation of which he was greatly in need.

"Accordingly, accompanied by his daughters, he spent a quiet time at Rapallo, one of the most charming and lovely spots on the beautiful Riviera di Levante, after which, feeling strengthened and refreshed, the journey was continued southwards to Rome. Deep was the impression made upon him by the Eternal City, and having once come under its fascination, he was irresistibly drawn to it again and again, each time learning more of the countless treasures it contains.

"Having read Zola's great book 'Rome,' he was determined to see the city as 'Pierre,' the young priest, saw it. Consequently, the first day was spent in driving to the Janiculum Hill, from whence he was able, with extraordinary facility, to pick out from Zola's description most of the famous landmarks.

"Italy had now cast her spell upon him, and from that time onwards the year was not considered complete without a few weeks being spent in some part of the classic land, where he acquired new health and vigour in studying the treasures of her storied past, and in enjoying the beauties with which Nature has so richly endowed her. His last Italian journey was in March and April of 1914, when he travelled as far south as Naples and Salerno, and explored the beautiful coasts of the Tyrrhenian Sea, and the famous Greek temples of Pæstum, which made a deep impression upon him. It was a remarkable feat for a man of eighty-two years of age. Alas! it was the final Continental journey, as only a few months later Europe was plunged into war. He did not, however, relinquish the hope of once more crossing the Channel, and only two months before his death, while reading a book on Rome, he exclaimed, 'I hope one day to revisit Rome, if

only for the pleasure of going into the gardens of the Villa Colonna and gazing once more upon the Eternal City.'

"An eager and enthusiastic sightseer, and gifted with a wonderful and highly-trained memory, it is easy to imagine how charming was his companionship, and what a privilege it was to travel with him. On one occasion, he remarked to an Italian friend that everything in Italy was full of interest. His friend's reply was: 'Ah! no, it is you who find interest in everything.'"

We can recall an amusing incident which occurred during one of Turner's holiday tours in Normandy, when, along with his wife and children, he was making a short stay in Dieppe. One evening while the visitors were at dinner the landlord of the hotel entered the *salle-à-manger*, and, coming forward to the table at which Turner was seated, touched him on the shoulder and, with a somewhat mysterious air, said, that while he was sorry to embarrass Monsieur, he must ask him to go with him to the Bureau, as two gentlemen were desirous of speaking with him. Turner, somewhat surprised at the nature of the summons, but thinking that possibly a friend had arrived and had learnt of his presence in the hotel, rose and accompanied his host to the office. There he found two men, who announced that they were private detectives from England in the employment of his wife, who was much aggrieved at his desertion of her and his family, and they were authorised by her lawyer to bring him back to London. They regretted the necessity, but they must request him to return with them.

The situation appealed strongly to Turner's sense of humour, and, turning to the landlord, he begged that the men might be permitted to look into the dining-room, when they would be able to satisfy themselves that he was enjoying his dinner in the company of his wife and children. What might have

proved a somewhat awkward dilemma thus ended satisfactorily, and Turner used to relate the incident as a warning of what might befall married men travelling alone on the Continent.

During the interview just recorded, the William Turner, who was "wanted," continued to eat his dinner at a small table in a corner of the dining-room, ignorant of the inconvenience which his act of desertion was causing his namesake, and unconscious of the impending summons which he would shortly be required to face. On the following morning he crossed to England with his escort.

Turner had many friends, to a number of whom allusion has already been made in these pages. Like most friendships, those of earlier days take a deeper hold upon the mind and the affections. Some require special mention, James Matthews Duncan, Lord Lister, Sir John Murray, K.C.B., and Daniel J. Cunningham. Turner met Matthews Duncan and Lister soon after his arrival in Edinburgh. Both men were then commencing their careers. Duncan, the senior in years, having been born in Aberdeen in 1826—Lister being one year his junior—was already acquiring an established position in the profession. "A strong capable man; his massive head, firm mouth, and square chin indicated great resolution of character and capacity for continuous labour. But with all his strength of nature he was not a hard man. He was liberal with time, advice, and money also, when it was needed, and the kindly smile and warm shake of the hand always enhanced the value of the gift." This was Turner's estimate of his friend.

In 1870, Matthews Duncan had failed to obtain the succession to Sir James Y. Simpson's Chair, and in 1877, he had to decide whether he would accept the offer made to him of a post upon the staff of St Bartholomew's Hospital. Turner was somewhat ad-

verse to his migration south, recognising the eminent position to which his friend had already attained in Scotland. "I cannot but feel," he wrote to him, "that a man, like an oak, may have grown too long in one spot to bear transplanting. I shall look anxiously for your decision, and cannot but hope that, for the sake of Edinburgh, you may select to remain with us." But Duncan burnt his boats and went to London, where he made his mark. He promised his friends that he would return each year to Scotland, and he kept his promise. In his long vacations spent at Ashestiel on Tweedside, or at Appin in the Western Highlands, he gave them many opportunities of meeting him. Matthews Duncan died at Baden-Baden in September 1890, where he had gone for a course of the waters, and he found pleasure in the knowledge that he had been able to spend the earlier part of what proved to be his last holiday with Turner and his wife, on the Belgian coast.

Lister, like Duncan, also migrated southwards in 1877, to take up his "mission" in London, so that Turner was thus deprived of the more intimate companionship of two of his friends at the same time. But while his opportunities of frequently seeing Lister thus became fewer, no break was involved in the continuity of their friendship. When meetings in London or elsewhere were not always possible, their correspondence reveals that their earlier intimacy was not permitted to wane from lack of interchange of ideas. There was much that was lovable in Lister's nature, which inspired a genuine affection for him in those who knew him best. In his closing years, when even short visits from his friends were not encouraged, Turner was privileged to see him, if only for a few minutes. "I often think of you," Lister wrote in 1908, "and hope that you will long have strength for your important duties." No one acquainted with the many-sided character of Turner's pursuits, and at the same time conversant with the absorbingly in-

teresting story of Lister's life,[1] as he steadily pursued and finally reached the goal at which he aimed, can fail to recognise that, although the lines along which each of them laboured were widely separated, the difference existed only in the nature of their work. The underlying principles which guided both men, and made their success in their respective careers attainable, were identical. The same simplicity and ideals of life, the same patience and attention to detail, the same perseverance and industry, characterised the methods of each.

Sir John Murray had been a pupil of Turner's in the dissecting-rooms in the early sixties, where he studied anatomy for its own sake, despising examinations for which he never sat, and scorning to take a degree. Yet few men had more honorary degrees and titles conferred upon them in after-life than Murray had. Somewhat abrupt in manner, downright in speech, and direct of purpose, he was essentially a strong man. But he carried beneath a rugged exterior a large heart and a genial and kindly nature. A keen man of science, original and suggestive, he was constantly encouraging others in their scientific pursuits. The work of editing the fifty large volumes of the 'Challenger' Reports was mainly due to Murray's indefatigable energy. In the 'Challenger' office on the top floor of 32 Queen Street, the scene of his labours is thus described by one of his friends and assistants in the eighties.[2] "As we entered the door of the flat, and penetrated the dense cloud of tobacco smoke, the first thing we heard, rather than saw, was John Murray, issuing some order, or announcing some result; the next was the portly figure of the Abbé Renard of Brussels waving a courteous greeting with his perpetual cigar. Murray and Renard were hard at work at the microscope or at chemical reactions in test tubes over Bunsen burners. Piercey and Chum-

[1] 'Lord Lister,' by Sir Rickman J. Godlee, Bart., 1917.
[2] Professor W. A. Herdman, Liverpool.

ley, the assistants, were preparing fresh samples or noting down results. There has probably never been in recent years such a small laboratory, so poorly equipped, which has turned out such epoch-making results. Everything absolutely essential was there, but nothing in the least extravagant. The room with its plain boards and deal tables and sinks looked more like an overcrowded scullery than an oceanographic laboratory." Turner was greatly attracted to Murray, appreciating both his scientific acumen and his strong character. His sudden death, in the spring of 1914, left the world of science poorer, and caused another gap in the gradually diminishing roll of Turner's friends.

In his intimacy with Cunningham, we find an exception to the general rule that the closest friendships are those which we make in our younger days. Cunningham, like Murray, was a pupil, but of a later generation; and, as we have seen, he became Turner's assistant and successor. But whatever their official relations, they were always friends. He developed a strong personal regard and affection for "Dan," as he often called him, and he not only frequently sought his advice, but valued it and acted upon it. We betray no secret in saying that he looked to Cunningham to carry on for many years his own line of work, not only in science, but in the administration of the Medical Faculty. "He was a man full of human sympathy, and always ready to give the best of his nature to those with whom he was associated."

"To-day we buried our colleague Annandale," Turner wrote on December 23rd, 1907, to Cunningham, who was absent from Edinburgh, "a very impressive funeral, the church crowded, a long line of pedestrians to the cemetery. To-morrow I go to Patrick Heron Watson's funeral, and I doubt not that there will also be many mourners. Altogether my surroundings are very depressing." He little realised when he wrote these lines that in eighteen months

he would follow Cunningham's mortal remains to the same cemetery.

Living as Turner did to such an advanced age, he saw the majority of his oldest friends and acquaintances pass one by one before him to the Great Beyond, feeling their loss the more acutely as he reached the greater age.

> "And if I should live to be
> The last leaf upon the tree
> In the spring,
> Let them smile, as I do now,
> At the old forsaken bough
> Where I cling."

Then he too passed on, leaving John Cleland and John Chiene, alone of his old fellow-demonstrators under John Goodsir.

To the citizens of Edinburgh amongst whom he had spent his life, Turner has left the memory of a dignified yet active figure: of a man who had laboured in his own calling in the best interests of the city. With his colleagues and friends in the University, amongst whom he lived and worked, there remains the memory of a leader whom they respected and revered, whose wisdom and experience was at their disposal at all times: of a life devoted to work and free from any striving after self-aggrandisement, and intolerant of everything that was petty or mean. Upon the many generations of students who have passed through his hands, there has been left the impress of a strong personality, of one who could unfold the intricate details of anatomical structure in a lucid and masterly manner, and who invariably sympathised with them in their difficulties. They have learnt to regard him as a man to whom their University owed more than she did to any one else with whom they had come in contact, and through the minds of many of them there sometimes passed the unspoken thought, "Our Alma Mater will never be quite the same to us when he is gone." To generations of students yet to come,

the example of his life should serve to inspire the same lofty aims which animated him. To his children he has bequeathed the inheritance of a happy and united home, the memory of a strong and lovable character and of a sympathetic and generous father, a kind, wise, and ever-ready counsellor, and the example of an unselfish and honourable life.

In one final retrospect, we see embraced the whole remarkable character of his career. The picture of the unknown youth arriving in the city at the dawn of a chill October morning in 1854, without friend or acquaintance, making his way alone to his lodging in Lauriston; and again, when full of years, crowned with success and honoured by the citizens, we see at his funeral service all classes and creeds, the civic and the military authorities, and representatives of the legal, medical, scientific, and teaching professions, paying him their last tribute of respect.

In the words of his friend, Dr Wallace Williamson, preaching in St Giles' Cathedral on the Sunday following his death, "His life was a beautiful commentary on the text, 'I must work the works of Him that sent me, while it is day, for the night cometh,'" words which have been fittingly carved upon the headstone of his grave in the Dean Cemetery.

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