

**Address at the opening of the Anatomical Department in the new medical buildings of the University of Edinburgh, delivered October 27th / by William Turner.**

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ADDRESS

AT THE

OPENING OF THE ANATOMICAL  
DEPARTMENT

IN THE

NEW MEDICAL BUILDINGS OF THE  
UNIVERSITY OF EDINBURGH.

—◆—  
DELIVERED OCTOBER 27TH,

BY WILLIAM TURNER, M.B., F.R.S.S.L. & E.

PROFESSOR OF ANATOMY,  
MEMBER OF THE GENERAL MEDICAL COUNCIL.

—◆—  
LONDON: 1880.

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## ADDRESS.

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GENTLEMEN,—We meet together this morning on an occasion which will be for ever memorable in the history of this University and of the Chair of Anatomy. We inaugurate that portion of the new buildings of the University which is to be devoted to the study and teaching of anatomy; and 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 the convenience of the arrangements they provide for the purposes for which they are designed, are unsurpassed in the British Empire.

It is now about ten years since the authorities of this University began seriously to consider the necessity of extending the buildings. Various causes had combined to make this a necessity; a considerable increase in the number of professors and in the subjects taught since the existing buildings were erected, requiring an addition to the number of class-rooms; an annual growth in the number of students, causing the class-rooms to be too small to give the proper accommodation; a complete change in the character of the teaching of many of the subjects, more especially those of medical study, owing to the development of practical methods of instruction, and



the inefficiency, both as regards number and size, of the apartments used for that purpose; the natural growth of the museums of the University, which by the accumulations of years had outgrown the space allotted to them.

At the first it was thought that, if new buildings were provided for the large departments of anatomy and chemistry, a sufficient amount of space would be set free in the existing buildings for the accommodation of the other subjects of study requiring an extension of room. On further inquiry, however, the Senatus became satisfied that the needs of the various departments could not in this way be properly provided for; and, after a full consideration of all the circumstances, it was decided that the proper course to take was to devote the existing University buildings to the services of the faculties of arts, divinity, and law, and to transfer the medical faculty to a new building, which would at once afford sufficient accommodation for lecture rooms, museums, laboratories, and other apartments for practical work.

The question of a site for these new buildings had then to be settled, and as it had been decided by the managers of the Royal Infirmary to remove that great institution to the site on which it now stands, the ground on which it then stood was looked upon as suitable for the purpose. Accordingly negotiations were entered into to acquire the old infirmary site for university purposes, but in the course of time the negotiation fell through, and it was fortunate that it did so. For if this scheme had been carried out, then the construction of the new buildings of the University could not have been commenced until the present year, after the managers had vacated the old infirmary;



and if they had been constructed there, then the medical school of the University would have been at an inconvenient distance from the new infirmary. It was therefore resolved by the Senatus to acquire, if possible, the ground of Park Place and Teviot Row; and the means of effecting a considerable portion of that purchase was provided by a bequest of the late Sir David Baxter, who, in this as in so many other matters, proved a wise and liberal benefactor to the University.

A subscription was then set agoing to procure funds for the purchase of the rest of the site, and the erection of the buildings thereon; and through the exertions of a committee of public-spirited citizens, presided over by the Principal of the University, for whose services in the promotion of this great work we must for ever feel deeply grateful, and having as two of its most zealous members the late and the present Lord Provosts of the city, a sum of about £80,000, in addition to the Baxter bequest was raised. The Government was then appealed to for assistance, and a grant from the Treasury of £80,000 was obtained.

Whilst these important financial arrangements were being made, the architect, Mr. R. R. Anderson, was preparing the plans. The instructions that he received were to provide each subject of medical study with a distinct lecture theatre, and with rooms for practical study appropriate to the teaching of that subject; that the rooms should be spacious, well-lighted and ventilated, and conveniently arranged; that there should be a large anatomical museum, and that the departments of anatomy, surgery, pathology, and practice of physic should be grouped around the



museum, so as to have convenient access to it for specimens. Two years ago the foundations of the building were begun, and now we welcome you in the department which has first been completed. 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 possessor, 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.”

And now, gentlemen, let us take a rapid survey of the origin of the School of Medicine of this University, which dates from the first quarter of the last century—a period which marks also the rise in a more or less complete form of medical schools in several of the other universities in these islands. Up to that time, as was not unnatural, when we consider that so many of the universities either owed their existence to papal bulls or were modelled under their influence, these academic institutions had been almost exclusively regarded as training-schools for ecclesiastics and for promoting the study of theology. But at the beginning of the last century a great national awakening to the need of instruction in other departments of knowledge took place, which led in this University to the institution of the faculties both of medicine and law.

It is true that lectureships and professorships of medicine had been founded in many of our universities at an earlier period. In Aberdeen, for example, a “Mediciner” was



appointed so long ago as 1522. In Oxford and in Cambridge regius professorships of physic had been founded by Henry the Eighth about the middle of the same century. The professorship of physic in Trinity College, Dublin, dates from 1618. Professors of medicine were also appointed in this University in 1685, but it does not appear that they ever attempted any systematic teaching.

It is impossible, indeed, for a school of medicine to have vitality until provision is made for teaching anatomy ; and it was not until the beginning of the last century that distinct teachers were appointed in the universities for imparting instruction in that subject. A chair of anatomy was founded in Cambridge in 1707 ; one in Glasgow in 1718. In Dublin an anatomical theatre was built in the University in 1711, in which lectures on anatomy, chemistry, and botany were delivered, and in 1784 these lectureships were converted into professorships.

Efforts had been made during the last ten years of the seventeenth century by the Incorporation of Surgeons of this city to provide for their members and apprentices instruction in anatomy, and an anatomical theatre was built for that purpose ; but it does not seem that the lectures and demonstrations were delivered regularly, and the conditions under which the instruction was imparted threw many difficulties in the way.

In 1705 the Town Council of Edinburgh, then the patrons of the University, allotted to Robert Elliot, surgeon, who held the office of public dissector of anatomy to the Incorporation of Surgeons, the sum of £15 of yearly salary, as an encouragement to pursue the teaching of



anatomy. This is the first record of the introduction of the study of anatomy into the system of teaching in this University. In 1708 the Town Council appointed Adam Drummond "to be conjunct professor of anatomy with Robert Elliot, chirurgion apothecary and professor thereof." It is doubtful, however, if either of these professors, or John M'Gill, who succeeded Elliot in 1716, did more than give occasional demonstrations on the anatomy of the human body. The commencement of the medical school as a definite organization for affording systematic instruction in anatomy and in other departments of medical study, dates undoubtedly from the appointment by the Town Council in 1720 of Alexander Monro, *primus*, to the chair of anatomy in this University. In the beginning of the winter of that year he delivered a regular course of lectures on anatomy and surgery, and during the same session Monro induced Dr. Charles Alston to lecture on *materia medica* and botany. In 1726 Drs. Plummer and Innes were appointed to the chair of chemistry, and Drs. St. Clair and Rutherford to those of the practice of physic and the institutes of medicine; and immediately after their appointment all these gentlemen began to deliver regular courses of lectures. The medical school was now very completely organized according to the requirements of the time, so far as regarded provision for the delivery of lectures on the chief branches of a medical education. But an infirmary for the practical study of disease was still wanted to give completeness to the system of instruction. A scheme was therefore proposed by Monro's father and the members of the Royal Colleges of Physicians and Surgeons, for raising



a subscription and building a hospital for the reception of the sick. Monro himself, in conjunction with the Lord Provost Drummond, actively promoted the work, and in a short time a hospital was provided. How thoroughly these founders of our medical school had grasped what was essential in a training for the practice of our profession is shown by the way in which they utilized the infirmary after it was erected; for Monro frequently gave lectures on the surgical cases, whilst Rutherford began in 1748 to deliver clinical lectures on the most remarkable medical cases in the wards.\*

Monro had been specially trained under the guidance of his father—one of the great objects of whose life was to develop a school of medicine in Edinburgh—to become a teacher of anatomy. His success was marked from the beginning, and gave proof of his ability as a teacher, as well as of the need that existed in Scotland for the establishment of a school of medicine. From his class-lists, now in the possession of the chair of anatomy, I find that he began with fifty-seven students, and that the class gradually increased, until, in 1744, 150 students attended his prælections. Owing to the political troubles of 1745 the class fell that year to seventy-six, but in the following year it rose to 182, which was the maximum number it attained during his incumbency of the chair.

\* The authorities for this summary of the rise of the Edinburgh School of Medicine are the Memoir of Alexander Monro, *primus*, prefixed to his collected writings; the Histories of the University of Edinburgh, by Bower and by Dalzel; Dr. Gairdner's Historical Sketch of the Royal College of Surgeons of Edinburgh, and his Sketch of the Early History of the Medical Profession in Edinburgh; and most fully in Professor Struthers's Historical Sketch of the Edinburgh Anatomical School.



The seed which had been sown by the founders of the school fell upon good ground, and under the fostering care of Alexander Monro, *secundus*, and of his able colleagues, Robert Whytt, William Cullen, Joseph Black, John and James Gregory, and Andrew Duncan, it became a stately tree. A great increase took place in the number of students attending the medical classes in the latter half of the last century, who were attracted in large numbers from England, Ireland, and the Colonies, and in consequence of that increase the buildings of the University with which you are all familiar on the South Bridge, were projected, and in the course of time constructed. From the records of the anatomical class I find that the pupils of the second Monro, whose reputation as a teacher and investigator was even more renowned than that of his father, numbered for many years between 300 and 400, and that in 1783, 436 students attended his class.

In the earlier half of the present century the school as a whole continued to prosper, although from the circumstances of the anatomical chair, the number of pupils in attendance on that class was much diminished. With the appointment in 1846 of John Goodsir, one of the most philosophical of modern anatomists, to the chair of anatomy, an important revival took place in the character of the teaching, the class once more assumed a foremost position in the school, the students greatly increased in numbers, and in 1852-53 mustered 368 pupils.

The appointment of a Royal Commission in 1858, under the presidentship of one of the most sagacious of living Scotchmen, the present Chancellor of our University, effected a great change in the constitution of the University



and in the regulations for graduation. By the ordinances of that commission a preliminary examination in arts for medical students was rendered compulsory, the board of examiners was organized on a wider and better basis, the degrees of M.B. and C.M. were instituted, and the degree of Doctor of Medicine was ordered not to be given until candidates had reached the age of twenty-four years.

The immediate effect of these ordinances was undoubtedly to diminish the total number of students of medicine frequenting the University, which fell in 1868-69 as low as 403. For it required a few years to bring the education imparted in the schools into harmony with the requirements of the preliminary examination. When this was, however, established, students once more began to flock to Edinburgh, and from 1869 to the present date a yearly increase has been going on, not by slow degrees, but by leaps and by bounds, until in the last academic year the total number of students of medicine reached 1,253. In the general prosperity of the school the class of anatomy has participated, for 679 students were enrolled as members of it during the last winter session. Under the influence of these ordinances the prestige of our medical degrees has been very materially increased. By the institution of the preliminary examination, conducted by the same examiners as for the degree in arts, the entrance of illiterate persons has been prevented, and the tone of our students and graduates has been elevated. By the widening of the professional examining board and the admission of a number of non-professorial examiners equal to that of the professorial staff, the character of the examination has been raised. By the power given to the



Senatus to administer the affairs of the University, numerous improvements and additions have been made to the educational arrangements.

It may not be without interest to inquire how it was that, whilst during the last century important schools of medicine arose as parts of the educational machinery of the universities in Edinburgh, Glasgow, and Dublin, yet that no corresponding development occurred in the great English universities in Oxford and Cambridge.

In a presidential address delivered in August last at the annual meeting of the British Medical Association in Cambridge, Professor Humphry related the circumstances which in his judgment repressed the formation of medical schools in the two ancient English universities. He placed in the front rank of antagonistic causes the proximity of Oxford and Cambridge to London, which, from its greater wealth and the more abundant opportunities that it afforded for study, attracted the practitioners, teachers, and students of medicine; also the influence exercised by the powerful competing Corporations of Physicians and Surgeons in the metropolis, which had power to grant licences to practise.

But in connection with this argument I would point out that powerful medical and surgical corporations were not and are not confined to London, but that similar institutions, exercising large local influence, possessing many privileges, having the power of licensing, and up to a recent period even a monopoly of granting licences to practise in certain districts, were and had been for many years established in Dublin, Edinburgh, and Glasgow, and yet the medical schools connected with the universities in those cities grew and flourished.



One cannot doubt, if there had been a university in London when the national demand for an improved medical education arose in the beginning of the last century, that in England, as in Scotland and Ireland, competent professors would have been appointed in it as parts of its educational machinery, and a medical school of influence and renown would have been created. The scientific and practical training of the medical practitioners in England would not have been left to the private enterprise of the physicians and surgeons attached to the London hospitals, but would have centred in the university, whilst the hospitals would have been adjuncts to it as places of clinical study.

England suffered therefore, as regards medical education, a great loss from not having had a metropolitan university during the last century. And when one was founded during the present century, it was established on so peculiar and exceptional a basis—as a mere examining board—that it provided no educational training, and has exercised therefore little if any influence upon the education of the great body of practitioners. Hence there has arisen 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 look 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 you bring the great body of the profession 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 our profession advance in the estimation of the public.

But other causes than proximity to a great metropolis and the influence of powerful medical corporations tended to repress during the last century the development of medical schools in the two ancient English universities. In them much longer than in Scotland did the idea prevail that their primary function was to train ecclesiastics. The system of each of these universities, which practically gave the control over the education, not to a body of professors, but into the hands of the fellows and tutors of the different colleges; the semi-monastic life imposed on the resident fellows, so many of whom were required to enter into holy orders; the valuable endowments attached to the different wealthy colleges conferred as prizes on those who entered the Church as a profession—all tended to keep the system of education in a particular groove, and to check its expansion. But, further, the imposition of a religious test, both on teacher and student; the necessity of having to reside in a college, with its attendant expenses; the absence, in England, of such a complete set of parochial schools as prevailed in Scotland, in which the child of the peasant could obtain the rudiments at least, and in many schools much more than the rudiments, of a training in classics and mathematics—excluded from the English universities a large body of the nation, and restricted their privileges to members of the Established Church and to the wealthier classes of the community. There can be no doubt that the expense and other difficulties which beset the path of so many young Englishmen in obtaining a university training and degree in medicine



in the southern division of the island, sent them across the border to Scotland, and contributed in no small degree to the prosperity of the Edinburgh School of Medicine.

It required the free light and air, and the wider conception of the relations of a university to the life of a nation, engendered by the progress of knowledge during the present century, to break down the long existing exclusive system of the English universities, and to bring them into closer contact and sympathy with modern thought and work. During the last twenty-five years a considerable addition has been made to their staffs of professors, and educational duties have been required of them; tests have been abolished; a non-collegiate system of residence has been sanctioned; endowments have been thrown open to a wider range of persons; museums, laboratories, and other means and appliances for affording instruction in the sciences have been constructed and obtained; the curriculum for the degree of Bachelor of Arts has been remodelled, and a much greater latitude as regards the subjects both of education and examination has been granted to candidates. Medicine and the sciences on which it is founded have shared in these improvements. Unquestionably the small population of the districts in which Oxford and Cambridge are situated, and their proximity to London, will always throw impediments in the way of a development of the practical and clinical parts of a medical education; but the undergraduates of these universities who intend to enter on the study of our profession, have now the opportunities of being trained in the fundamental sciences on which the practice of medicine is, or ought to be, based; and in



Cambridge provision is also to some extent made for imparting a knowledge of the more advanced subjects of professional study.

And now, Gentlemen, we may perhaps devote a few minutes to the consideration of the question of why it is that the study of Anatomy has for centuries, by common consent, been made the foundation of medical education. Anatomy forms the basis of the biological sciences; just as a knowledge of the laws of motion is essential and must be constantly recurred to at every step, before any true progress can be made in the investigation of the physical sciences: so must the structure of the human and animal frame be appealed to in all attempts at classification, in all inquiries into the adaptation of parts to their uses, in all discussions respecting the functions they perform in a state of health, and the alterations or disturbance in those functions which take place in the course of disease.

As a branch of medical training anatomy may be looked at from two points of view—either in its direct relations to the science and practice of medicine and surgery; or as a valuable educational exercise for disciplining the mind to habits of observation, accuracy and patience, and for strengthening the memory and reasoning powers.

In its direct relations to the Science of medicine it is of importance as the science which treats of the development, structure, position, form, and relations of the constituent parts of the body, and of the construction of the body as a whole; so that in applying yourselves to this subject you are, in short, studying the mode in which the complex mechanism of the human framework takes its rise, is put together, and is adapted to the performance of its work.



If you are to understand by the term Morphology the study of form, internal and external, superficial and deep, then the term anatomy embraces not only morphology but something more. For superadded to the conception of form, position, and relations you have that also of structure and construction. Hence by its study you are enabled to realize the nature of that mechanism which, though you examine it in its dead or passive condition, has yet at one time teemed with life and activity. The study of anatomy is therefore a necessary preliminary to that of physiology, which treats of the functions performed by the organs and tissues of the body when in a state of health ; and to that of pathology, which treats not only of disturbed function, but of altered structure. Hence, by the common consent of the schools, anatomy is regarded as a fundamental subject, and forms a part of the early training of every student of medicine.

But anatomy has also a direct relation to the Practice of medicine and surgery ; it is by its study that you become acquainted with the position, structure and relations of all those tissues, organs, and parts, the diseases or modifications in the structure or functions of which you, as prospective practitioners of medicine, have to make yourselves acquainted with. By the careful dissection and manipulation of parts your hand becomes trained to recognize differences in form and structure, and fitted to execute such operative procedures as may be required in the exigencies of practice. It is only after you have acquired an accurate conception of normal anatomy and physiology that you can hope to apply your knowledge to the diagnosis of disease, so as to feel certain of the ground on



which you stand. Now, as the relations of anatomy and physiology to the practice of medicine and surgery can only be properly realized by the student after he has seen something of that practice—after he has, in short, attended for some time the wards of an infirmary and come face to face with disease—the study of these two fundamental sciences should not cease in the early years of a medical curriculum, but ought to overlap, for a time at least, with the hospital work. Hence I am unable to agree with those educationists who would draw a sharp line of demarcation between the study of anatomy and physiology and the final subjects of medical study. The attention of the student ought not, in my judgment, to be withdrawn from the one until he has been introduced to the other by attendance in the wards of a hospital.

I have now told you, gentlemen, what I conceive to be the relations of anatomy to medical science and practice. There are some, however, who fail to recognize this comprehensive aspect of the subject, and who seem to limit it to the study merely of the form, position, and relations of parts, without any reference whatever to their development, structure and mechanical arrangements; as if the topographical relations of parts and organs embraced the whole science of the subject. But such a limited conception of what is meant by the term anatomy, and what ought to be included in its teaching, is most unphilosophical. It has not been the creed of this University or of the other Universities in Scotland. Here, where the tradition of the character of the teaching of the second *Monro* still lingers in the schools; here, where *John Goodsir*, within the recollection of so many of us, 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.

Such an erroneous conception, indeed, of the science could never have arisen in a university system of teaching. For by the introduction of the medical sciences into a university curriculum their teaching acquires a breadth and comprehensiveness such as is scarcely attainable in a purely technical school. Their teachers have to regard them not merely with reference to the requirements of a particular profession, but also in their more general bearings. The educational horizon is not, and ought not to be, bounded by the standard of examination exacted either by the University herself, or by other examining boards, but should ever be pushed onwards with the advancing wave of knowledge.

On the other hand, in the purely medical schools, the education has undoubtedly a tendency to become confined within particular limits. There have been, and without doubt will always continue to be, men attached to these institutions actuated by a noble desire to advance the science of medicine, and to inspire similar feelings into the minds of their pupils; and to those who first guided my steps along the thorny paths of professional study I cannot too strongly express my indebtedness. But many of the teachers have as their object not so much to contribute by their own efforts to the progress of medical science, as simply to prepare their pupils for the examination ordeal to which they will have to be subjected. There is thus engendered in the mind both of teacher and pupil the feeling that the examination is the main end or object



of education ; that the education should be subservient to the examination, and not the means of strengthening the student's mental powers and filling him with knowledge.

Let me give you an illustration of this. A much-valued friend of mine, now occupying one of the most honourable positions open to a member of our profession, told me, not many weeks ago, that when during his studentship he was applying himself one day most industriously to the dissection of the muscles of the back, the demonstrator in charge of the dissecting-room came to him and said, " Why are you wasting your time in dissecting those muscles ? They do not examine on them at the Hall." Notwithstanding this remonstrance my friend persevered with his work. He had a higher conception of his educational needs than had his teacher, or he never would have attained his present high and dignified position.

Such a mode of looking at structure would, I will venture to say, never have presented itself to a teacher in a university. Take these muscles of the back, for example. No one who ever attended the lectures of my late distinguished predecessor in this Chair can forget the care with which he explained their attachments and arrangement, and showed how they acted in producing the beautiful yet complicated movements of the spinal column. There is, indeed, no part of the human mechanism which presents more features of interest in connection with the movements of the body than the joints and muscles of the spine. And note what has been the practical result of their careful study. An eminent American surgeon, Dr. Sayre, has founded on it a method of treatment of curvatures of the spine based on rational and not on empirical principles.



One sometimes reads in introductory and other addresses that anatomy, descriptive and topographical, is a perfect and complete science, and limited in its scope; that all that is or can ever be known about it is recorded in books; that its study, whilst admirable as an exercise for the memory, and as a training for habits of accuracy, exactness, and patient careful observation, is yet of little or no value in forming the mind to reason out the complex facts of biological science, or to strengthen the critical faculty. Such statements are full of fallacy; they show an entire want of appreciation of the real scope of anatomical science, and of its many-sided aspects, and a want of knowledge of the progress which it has made and is still making. I could give you many illustrations of the erroneous nature of such remarks to prove to you that anatomy is an advancing science, and that it exercises, and will for all time continue to exercise, an important influence on the progress of physiology and pathology, and on the practice of both medicine and surgery; but I shall refer to a few only of the advances which have been made since I became a teacher of anatomy twenty-six years ago. And in selecting these, observe that I do not include one of the innumerable additions to our knowledge of structure, both macroscopic and microscopic, but confine myself to the form, position, and relations of parts and organs.

During my studentship the topography of the cerebral convolutions and lobes was very imperfectly known, and the description of their arrangement was meagre and wanting in precision. The publication, however, in 1854 of the important memoir of Gratiolet at once threw a



flood of light on the arrangement. Anatomists in this and other countries followed up the subject with much zeal, with the result of placing our knowledge of the surface anatomy of the brain on a definite basis as regards the relations of the convolutions to each other and to the surface of the head.

And note how this series of anatomical researches has borne fruit in advancing our knowledge of the physiology and pathology of the brain. If these preliminary, but essential anatomical, inquiries had not been conducted we should never have heard of the remarkable experimental investigations of Fritsch, Hitzig, and Ferrier into the functions of the cerebrum. Neither would it have been possible to have localized with precision the seats of morbid processes in the hemispheres, such as enabled Broca to associate right hemiplegia and aphasia with disease of the inferior frontal convolution in the left hemisphere.

The dissections of Dr. Stilling the younger, conducted during the last few months, have proved that the roots of origin of the optic nerves have much more extensive relations than has hitherto been supposed. By tracing a band of these fibres through the pons and medulla to the decussation of the pyramids, he has forced on the attention of physiologists the necessity of reconsidering the functions both of the medulla and the lateral columns of the spinal cord. With every discovery in anatomy, fresh problems are presented to the consideration of the physiologist.

Again, if you compare the descriptions of the cranium written not many years ago with those which have recently been given, you will now find an enormous advance in precision and fulness of statement.



The invention by Cleland, Broca, and other craniologists of new instruments for measuring and delineating the skull and head have enabled anatomists to conduct a series of researches, from which we have obtained a much clearer insight into the construction of the skull in individuals, and into the modifications in its shape and in the proportion of its different parts in the different races of men. Questions of the widest interest in their anthropological bearings have in this manner been elucidated.

The careful study of the arrangement and direction of the cranial sutures by Virchow and others has given us a key to the interpretation of the modifications which may be produced in the form of the skull by their premature closure, on the one hand, and by retarded ossification on the other. So that it would be utterly inexcusable nowadays for an anatomist to commit such an error as was made by a Professor of the standing and reputation of Huschke of Jena, just twenty-six years ago, when he figured a cranium, deformed through premature closure of the sagittal suture, as a normal and typical specimen of the Celtic skull.

In the anatomy of the movable joints, also, great advances have been made, more especially in the acquisition of a more precise acquaintance with the forms of the articular surfaces. It is a mistake to suppose that the character and direction of the movements of a limb are determined solely by the relative positions of the bones, muscles, and tendons. Undoubtedly these structures play an important part, but they are not the only factors to be considered. The direction and character of the movements of a wheel are influenced by the form of its rim and by the configuration of the surface on which



it moves, as well as by the propulsive power applied. And so it is with the joints. The importance of studying the forms of the articular surfaces was indeed insisted on by the brothers Weber in their classical treatise on the Mechanism of the Organs of Locomotion, published in 1836. But great advances have been made during the past twenty-five years in the elucidation of this difficult subject, more especially by the labours of Meyer, Langer, and Goodsir. Should any one of you wish to investigate a complex biological problem, and to bring into play your analytical and critical powers, you will find full exercise for them in the study of the forms of the articular surfaces of the knee-joint, and in the influence which those forms exert on the character of its movements.

The introduction by the Russian surgeon, Pirogoff, of the method of freezing the human body and then making sections through its different parts—a method which Braune of Leipzig has pursued with so much zeal—has enabled anatomists to obtain much more correct views of the relations of the organs to each other, and to the walls of the regions in which they are situated, than could be done by the ordinary methods of dissection. We have, in consequence, a much more precise knowledge of the real position of spleen, stomach, heart, uterus, bladder, and other viscera now than was the case ten years ago. Physicians will profit by these additions to anatomical knowledge, and greater definition will be given to their diagnoses. There is, indeed, no department of practical medicine which has been more a gainer by the introduction of the freezing method than that of obstetrics.



Are we, then, to say that with this year of grace 1880 all further progress in topographical anatomy will cease, that we have reached the limits of our subject, and that henceforth the anatomist must content himself with repeating the observations made by his predecessors, with no hope of himself adding to the progress of knowledge? Such a position would be intolerable if it were true. No man with any intellectual vigour or capacity for thinking and reasoning could be brought to pursue a subject so barren. Anatomy would cease to be a science, and become a mere handicraft. Anatomical teaching would fall into the hands either of the veriest dullards, whose sole object in life would be to earn their daily bread by grinding their pupils up to the level of an examination; or would be pursued for a time by young men desirous of using it only as a stepping-stone to practice. The further development of general biological and medical science, so far as they rest on an anatomical basis, would be stayed.

But, Gentlemen, this picture of the finality of anatomy which has been painted by some writers is a mere fanciful hypothesis evolved out of the minds of those who are so absorbed in the contemplation of their own side of the shield of science, that they do not seem to recognize that it has more sides than one.

In literature and in art no generation treads precisely in the footsteps of its predecessors. The ever-changing social conditions amidst which men live, the development of fresh habits and of ways of looking at objects and actions, the lessons taught by augmented experience, are constantly modifying the character of the environ-



ment, and producing variations in our modes of thinking and working.

It is the same, if not even to a greater degree, in science, for each new discovery affords a wider platform from which the world of Nature may be surveyed, gives a keener and fuller insight into her complex phenomena, and enables us to obtain a clearer conception of their meaning. In this general advance anatomy participates along with the other medical sciences. Every year adds something to our knowledge of form and structure and of the relations which they bear to function, and a further light is thrown on the mechanism of the human frame.

But there is another fallacy as regards the relations of anatomy to medical education which sometimes finds expression. It has been said that anatomical details, which require from the student so much toil and labour and time to acquire, are but of little use to the busy practitioner, and, indeed, are for the most part rapidly forgotten as soon as the examination ordeal has been passed. And it is implied that what is so soon forgotten can be of but little use, and the time and toil expended in acquiring things of which the memory retains no grip have been misapplied and wasted. Such a statement, plausible though it may at first sight appear, is really of no moment as an argument against the minute study of the details of anatomy. Let us test its value by a reference to other subjects of study, both general and professional.

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 preserved any accurate recollection of the



scores of mathematical details which they had at their finger's 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 classmen 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 dialects 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?

But does topographical anatomy stand alone amongst the subjects of professional study in that the details are soon forgotten? How long do students retain in their memories the dimensions of epithelium and other cells, the breadth of nerve-fibres, and other finer 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, or of the experiments relating to the electric phenomena displayed by that important tissue? What is the need to the great bulk of practitioners of being able to discriminate between the characters of the different kinds of chinchona 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, ~~the~~ 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.

He who will take time and trouble to follow out the ramifications of a nerve from its origin to its distribution in muscle, or skin, or internal viscus; or he who studies minutely the relations of an artery to the surrounding structures, or of an organ to the walls of the cavities in which it lies, and to the other organs contained in the same, or in an adjacent cavity, will, you may be sure, when he goes to the bedside, bestow an equal care in the examination of the patient whose disease he has to study and to treat. The qualities of mind which have led him to strive for precision of knowledge during his anatomical studies will have been strengthened by his earnest application; and the knowledge of form, position, relations, and structure, which he has thereby attained, will find a practical application in his clinical work.

I am well aware that in surgery, for example, owing to



the important discoveries of Professor Lister, the methods of practice are not so exclusively anatomical as was at one time the case. But though by his researches additional factors have been brought into use, a knowledge of anatomy is not the less necessary to the surgeon. Because we have new idols to worship, are we therefore to discard the old gods? Nay, is it not the more necessary to be perfect in our mastery of anatomical details?—for by the development of the antiseptic system of practice, operations are now possible in regions where at one time no one would have thought of performing them.

If you sufficiently apply yourselves to the observation of the facts of normal relations and structure, the mind will become, as it were, saturated with these facts; you will be able to form a mental picture of the part or organ; and when the occasion arises to study that part or organ in a state of disease, you will be able vividly to realize the changes which have been produced in it.

Pursue your studies, Gentlemen, with an earnest desire to cultivate accuracy and to acquire precision of knowledge. Let your motto be "Thorough." May the words of the Preacher be for ever written on the tablets of your memory, "Whatsoever thy hand findeth to do, do it with thy might." And may God prosper the work.











