AN INAUGURAL ADDRESS ON PATHOLOGY, PAST AND PRESENT.

Delivered in the Course of General Pathology in the University of Edinburgh.

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GENTLEMEN,—Coming before you to-day for the first time as the formal occupant of the Chair of Pathology in this University, it is fitting that I should, in accordance with precedent, address to you some statement of the past history of the chair, and of the present relations of my subject to the study of medicine.

Just fifty years ago, the first separate course of general pathology in this University was commenced. Previously, indeed, it had formed a part of the course of the Institutes of Medicine, in its three branches of Physiology, Pathology, and Therapeutics, just as there was but one chair of Anatomy and Surgery. The growing importance and extended knowledge of physiology would soon have rendered such a separation inevitable, had not the prerogative of the Crown somewhat rudely and forcibly intervened, and, without consultation with any of the medical faculty, or, indeed, with anyone, appointed Dr. John Thomson professor of general pathology, and made attendance upon his lectures imperative upon all candidates for graduation.* No wonder that the medical faculty viewed such a course with disfavour, and that such eminent pathologists as Alison, Syme, and Christison were strongly opposed to the foundation of the chair in such a manner. It is not worth while to follow the course of the disputes and difficulties which ensued, or to revive long-buried controversies. The founders of the chair have at least the credit of foresight in seeing what must in a few years have come to pass, and profiting by it; and Professor Thomson was, as his *Lectures on Inflammation* (published in 1813) show, no mean pathologist in his earlier days. During his tenure of the professorship, pathology did not suffer in the school; but it was by the labours of his colleagues, rather than his own, that it was enriched. On his death in 1841, he was succeeded by Dr. Henderson, who retained the chair till 1869. I know not what influence may have been exerted by it during his long tenure of office, but it cannot have been marked in the hands of one who, whatever his genius and accomplishments, presented the strange spectacle of professing a subject whose methods are practical, and whose principles are the basis of scientific medicine, whilst he practised a system of therapeutics† grounded on the wildest theories, and uncontrolled by scientific observation. Thus, for thirty-eight years after its foundation, the chair, instead of advancing on the lines of observation and research which should have made it a distinguished aid to science, remained practically useless for that purpose.

It would ill become me to attempt any worthy record of my distinguished predecessor, Dr. Sanders. What he was as a man, as a physician, and as a pathologist, is better known to you. His character and life-work are fresh in the memories of all; and we this day mourn his loss. This only will I say with regard to what he did for this chair: recognising the great importance of pathology as a branch of practical medical education, convinced that to be of real value it must be grounded on observation rather than on theory, and that morbid anatomy in its fullest development must be one of its main supports, he set himself to work to build up, step by step, a full and thorough teaching of pathology in all its branches. And he thus accomplished, not merely a complete course of systematic teaching, but he so organised and arranged the means and appliances for practical study as to be prepared for any future developments of the science. What he has done in this respect will yet, I trust, bear fruit for many future years, though he did not live to see and enjoy its full fruition. Let us remember that it is to him we owe the establishment of laboratories for the practical study and teaching of pathological anatomy, histology, and

chemistry; and that whatever future researches may be carried out in the new laboratories will be in a measure due to his influence.

But it is time that I should define to you the scope of the subject taught from this chair.

Pathology has been defined as the science of disease, as distinguished from physiology, the science of health, bearing a similar relation to the morbid structure and functions of the body to that which physiology does to its healthy condition. The name *General Pathology*, as given to this chair, was, I believe, intended to distinguish the subject from that special pathology which is to be learnt in the study of surgery and medicine, and to include all those general facts and laws relating to disease which can be advantageously studied apart from the special diseases of which they form an element.

So long as disease was regarded as a sort of morbid entity, as the working of a spirit or evil humour which entered into the body and settled down upon and deranged the action of various organs, so long only could pathology be studied apart from morbid anatomy. We have gradually come to see that the derangement of functions which we call disease is inseparably connected with an altered physical or chemical condition, which in many cases becomes obvious as a structural change; and that, if we would understand the nature and course of disease, we must investigate the conditions of structure which underlie the outward phenomena.

It is in this way that morbid anatomy, in its widest sense, has come to be inseparably linked with general pathology.

Pathology, then, includes in its scope—

Morbid or Pathological Anatomy, that is, the study of all the altered conditions of diseased organs, in their characters physical and chemical, and their relations to one another, whether revealed by the naked eye, the microscope, or in other ways. It investigates, too, the conditions of their occurrence, and seeks to elucidate the mode in which the visible changes have been brought about.

Grouping together those changes which are alike in the several organs or tissues, and eliminating that which is peculiar to the individual organs, it establishes certain groups or orders of morbid changes which form the subject of *General Morbid Anatomy*.

But it goes yet further; and, by investigating the mode in which the altered constitution of the organ affects its function, and gives rise to symptoms, it forms a great part of the basis of the subjects of *Pathogenesis* and *Pathological Physiology*.

But pathology, as including the science of disease, is not content with registering its effects; it traces them back to their origin, and, under *General Aetiology*, it endeavours to study the general causes of disease, whether external to the body or within it, and to investigate their mode of action.

And, lastly, finding that there are processes of deranged action, morbid modes of motion, so to speak, which, grouped in various ways, enter into a multitude of diverse diseases, but which have fixed laws which govern their course, we group these together for study under the heading of what is strictly defined as *General Pathology*.

I have emphasised this connection between general pathology and morbid anatomy, or, to put it in a wider form, between disease and its physical basis, because in the history of medicine we find that, in proportion as this connection has been recognised, has been the advance in its exact knowledge. Yet we must ever bear in mind that the study of the forms and reactions of dead matter can only guide us to a certain point; that it is living matter with which we have to do; and that it is by the exact study of the phenomena of life that we must bridge over the chasm between dead morbid anatomy and living pathology. If we start with the study of phenomena without the guide afforded by the knowledge of their physical conditions, we shall never reach solid ground, but wander in the quagmires of speculation; whilst, if we omit to recognise the properties of life, we shall equally fail. It is thus that physiology, biology, and experimental pathology, together with clinical medicine, are the inseparable adjuncts of morbid anatomy in working out scientific pathology. It is thus that the study of living matter in all its forms, and of the influences which act upon it, is of vital importance to the pathologist.

I would now ask you to look back at the history of morbid anatomy, in order to realise how it has grown and acquired its present position as the groundwork of pathology. For, until morbid anatomy had successfully asserted this position, pathology had no scientific existence, and the theories and doctrines evolved by a combined observation of symptoms and a rise of the imagination have passed into the region of historical curiosities.

Morbid anatomy was studied at a very early period of the history of medicine. Hippocrates (460 B.C.) is usually spoken of as the earliest to pay attention to it, but there can be little doubt that in India, long before Hippocrates, there was some knowledge and use of it. Eras-

* The Chair of General Pathology in the University of Paris was founded by Louis Philippe in 1830, in a somewhat similar way, after the Revolution, and Broussais was appointed first professor.

† Dr. Henderson became a homoeopathist.

stratus and Herophilus are said of Pliny to have studied it. Aretæus* seems far to have excelled his predecessors in his acquaintance with it. But Celsus, who probably lived in the time of Tiberius, and whose work, *De Re Medicâ*, is still in use as a subject of examination by some medical bodies, appears to have attached no importance to it as a part of the study of disease. Galen,† in the second century, studied morbid anatomy both practically and historically, and recognised more fully than his predecessors how often structural change was associated with functional derangement.

But, just as the Mohammedan conquest of India was to destroy Indian medicine, so did the overthrow of the Roman Empire arrest all progress in science in Europe; and medical science, during the Middle Ages, became obscured, and lost, instead of gaining, knowledge. The history of morbid anatomy is practically a blank until the seventeenth century, although here and there isolated observations were recorded of anatomists and surgeons. With the revival of science came the revival of medicine.

Nearly 1,500 years elapsed before the next work of value on morbid anatomy, when the *Sepulchretum*‡ of Bonetus appeared, a work in which some systematic attempt was made to connect the appearances in the dead body with disease in the living.

Eighty years later, the first great systematic work on morbid anatomy, that of Morgagni,§ was published. Morgagni was a pupil of the illustrious Valsalva at Bologna, and was professor of anatomy at Padua from 1715 to 1771. In his work he brings together an enormous amount of accurate observation upon morbid anatomy, both from his own personal work and from other sources, and attempts to show how the changes found were related to the production of symptoms.

Morgagni, therefore, took the first step towards the establishment of a scientific pathology by attempting to localise disease. But it needed the discoveries of structure and function to complete the connection between morbid anatomy and pathology.

The next work of importance|| was that of Matthew Baillie,¶ who in 1799 began to publish the first illustrated work on morbid anatomy. But it was to John Hunter that Baillie was indebted both for inspiration and for the material from which most of his drawings were made; and it is, I believe, to the influence of John Hunter, renowned alike as anatomist, physiologist, and pathologist, that we may in a great measure trace the revival of pathology which followed.

With the beginning of the present century began the real and thorough study of morbid anatomy. It seems strange that so simple and obvious a method of studying disease should have been little practised for so many hundred years, and that, within the lifetime of some here to-day, it has grown to its present vast proportions.

We owe to great anatomists, who in most cases were also surgeons, the commencement of this movement of revival. They had most to do with the dissection of dead bodies, and the deeper and more attentive study of anatomy was a guide to altered as well as to healthy structure. The systematic application of these studies to medicine was yet to come, and it was in France that the first great movements took place.** The

* Aretæus of Cappadocia, who lived in the time of Vespasian, goes even so far as to mention the production of hemiplegia of one side by disease of the opposite cerebral hemisphere, and of paralysis of the same side in disease of the spinal cord. He described, too, intestinal ulcers, and speaks of jaundice as caused by obstruction of the bile-ducts by scirrhus, or by inflammation.

† Galen (130-200 A.D.) left on record a large amount of pathological lore, but how much originated with himself is doubtful. It is to him that we owe the introduction of pathological experiments upon living animals.

‡ Boneti *Sepulchretum*, published 1679. There is an attempt to trace diseases to their anatomical seats, but much that is fabulous, and too little personal observation.

§ J. B. Morgagni, born in 1682, studied under Valsalva at Bologna, became Professor of Anatomy in Padua University in 1715, and held that post till his death in 1771. He was a great friend of Santorini. His great work, *De Causis et Sedibus Morborum per Anatomiam Indagatis*, was arranged mainly on the basis of symptoms and orders of symptoms, cases being taken in which like symptoms were observed, and the symptoms discussed in the light of *post mortem* examination. This method was the only one possible in his day, when the seats of various functions had been but very imperfectly determined; and it was in accordance with the semiological system of medicine of his day. It was a first step to the localisation of disease to localise the cause of the most prominent symptoms. The aphorisms of Hippocrates had still a remarkably strong hold even upon so independent an observer as Morgagni, and he hardly ventured to question them in the face of the strongest evidence.

¶ Those of Lieutaud in 1667, and Ludwig in 1785, may also be mentioned.

|| On the *Morbid Anatomy of some of the most important parts of the Human Body*, illustrated by engravings, London, 1799. Nearly half of the drawings are from "specimens in Mr. Hunter's collection," and many others "from Mr. Heavyside's collection," which was given thirty years later to the Hunterian Museum. We must remember that John Hunter's museum was practically the first museum containing specimens of pathological anatomy. Other museums were founded at Amsterdam in 1789, at Leyden in 1793, Berlin in 1796; and later, those of Vienna, Florence, and Paris did much to aid in fixing observations.

** Text-books of Pathological Anatomy began to appear towards the early part of the century—that of Conradi in 1795, Voigtel in 1824, Meckel in 1811, Otto in 1814, all of German origin.

names of Bichat, Laennec, Andral, and Cruveilhier, are pre-eminent amongst the many active writers. Of Bichat I shall have to speak later. Laennec,* during his earlier years, devoted himself ardently to pathological research, but his labours, after his discovery of mediate auscultation, were mainly directed to that subject, although his influence greatly assisted in the work.

In the earlier years of this century, the French medical world was under the domination of the ideas of Broussais, who, in 1816,† promulgated his doctrine of so-called "physiological medicine", in which the stomach became the centre and source of all diseases, and varying degrees of inflammation of the stomach and intestines the starting-point of all pathological changes. Against such theories, the school of pathological anatomy of Bayle and Laennec, Cruveilhier and Andral, asserted itself, and gradually made good the cause of the "medium of observation", grounded on chemical study joined to morbid anatomy.

Cruveilhier, the great anatomist, supported the cause by his extensive observations,‡ subsequently embodied in his great work on morbid anatomy. But to Andral§ must be given the credit of fighting, step by step, the detail of the battle against the almost overwhelming opposition of Broussais and his followers, who included a great part of the medical world. In 1823, he published the first volume of his *Clinique Médicale*, in which were arranged, in opposition to Broussais, a great series of clinical and *post mortem* observations, which demonstrated the falsity of the speculations of Broussais. It was the first great move in the conflict of scientific pathology founded on observation against mere speculation, which ended in the complete overthrow of Broussais's system; so that, when Andral succeeded Broussais in the chair of General Pathology in 1839, Broussais's system had already become extinct. That Andral was a diligent morbid anatomist, as well as a brilliant physician and pathologist, is shown by a fact which we casually mention—that he had examined the thoracic duct and principal lymphatic vessels in more than six hundred subjects.|| It was Andral's especial merit that he was not content merely to record morbid appearances, but in every case sought to trace their causes,¶ and to discover how they were related to each other, their order of causation and succession, and the part they played in the production of disease. From this time morbid anatomy has become not merely an observing and recording, but an interpreting science.

Nor must I omit the names of Louis, Bouillaud, Gendrin, Regnaud, and Chomel, who in more special ways advanced pathological anatomy and clinical medicine together.

In England, during the same period, partly from the same causes and partly through the direct influence of the French school, great attention was being paid to morbid anatomy, especially in relation to diseases of particular organs; and the results were becoming apparent about the time when this chair was founded.

In London, three men, all of whom were students and graduates of this University—Hope, Carswell, and Bright—were especially pre-eminent in this direction. Hope, who had studied under Laennec and Andral, was, I believe, one of the first to introduce and teach the method of auscultation in this country. To him we owe the first correct explanation of the mode of production and localisation of cardiac murmurs;** and his first work in this direction was done when

* Laennec was born in 1781, came to Paris in 1800, and studied under Corvisart and Bichat. His work on pathological anatomy was mainly done between 1804 and 1812. For three years, he lectured on morbid anatomy as successor to Bichat. In 1815, he discovered mediate auscultation, and his subsequent labours, till his death from phthisis in 1826, were almost entirely on this subject.

† *Examen de la Doctrine Médicale généralement adoptée.*

‡ Cruveilhier published his first paper on pathological anatomy in 1816 (*Essai sur l'Anatomie Pathologique*). In 1825, he was appointed Professor of Anatomy in the University of Paris, and, in 1829, commenced the publication of his great illustrated work on pathological anatomy (*Anatomie Pathologique du Corps Humain*, vol. 1). In 1835, he was transferred to the chair of Pathological Anatomy.

§ Andral lectured on pathological anatomy in Paris before 1825, in the Extramural School (*Enseignement libre*). In 1828, he was appointed Professor of Hygiene in the University of Paris, and, in 1830, transferred to the chair of Internal Pathology. His *Précis d'Anatomie Pathologique*, the complement of his *Clinique Médicale*, was published in 1829. He died in 1876, at the age of seventy-nine. He was the pupil of Laennec and Lermier. To the latter he owed his opportunities for acquiring material for his *Clinique Médicale*.

¶ *Précis d'Anatomie Pathologique.*

|| How far Andral was in advance even of some of the distinguished pathologists of his day may be judged from these words of Bayle: "The end of morbid anatomy is to bring new light to nosology; its utility is limited to supplying a new means of comparing those organic diseases which are of the same nature, and distinguishing those which, in spite of similarity of symptoms, are of entirely different nature, and belong to another order of disease." And he adds: "One would have a very false idea of pathological anatomy if one imagined that it could throw any light upon the essence of organic diseases, on their immediate cause, or on the mechanism of their production. Pathological anatomy only gives us the knowledge of organic lesions."

** The fully detailed evidence, confirmed by numerous experiments on animals, was published in his work on *Diseases of the Heart*, in 1832, when he was physician to St. George's Hospital.

he was resident physician and surgeon in the Royal Infirmary of Edinburgh in 1824 and 1825. In 1833, he published a valuable *Atlas of Morbid Anatomy*.^{*} But his work was eclipsed by that of Robert Carswell, which appeared in 1838. Carswell's immense industry and artistic ability enabled him to produce a very large number of admirable drawings in addition to those published in his work on pathological anatomy, many of which, purchased and presented to this University by his friend Professor Thomson, we have still in daily use for purposes of illustration.[†]

But of the three men who, at the time of the foundation of this chair, were conferring the greatest services on morbid anatomy and medicine, Richard Bright must take by far the highest rank. He was then lecturer on the Practice of Medicine at Guy's Hospital, and had just completed the publication of those *Reports of Medical Cases* (1827 to 1831) by which his name will be handed down to all succeeding generations; for they contain in the foremost place those observations on kidney-disease with which his name is indissolubly connected; and they show that the same method by which he arrived at his great discovery—acute and careful chemical observation, combined with exactly recorded and delineated *post mortem* examination, and the whole informed by careful inductive reasoning—was applied to every part of his work. In the same work are contained an accurate description of a series of cases of enteric fever, and drawings and descriptions of the condition of the intestines, which have not, I think, been since surpassed. Indeed, he may be said to have worked out the clinical history and pathology of the disease as far as was then possible.

We have thus reached the period of the foundation of this chair, and it is interesting to consider who were then the active leaders in pathological advance. The period was one of the epochs of great activity and of rapid strides in the advance of science. It was in the same year that the British Association for the Advancement of Science was founded, and amongst its earliest members were many of the leaders in medical science of the day. And it was a period of great pathological revival and creation, whether we regard the men who were foremost in the medical world, the discoveries which were made, the works which were published, or the increased foundation of chairs for teaching the subject. In France, Cruveilhier and Andral at Paris, and Lobstein at Strasburg, were the recognised leaders. Louis, who had published his great work on *Phthisis* in 1825, his *Anatomo-Pathological Researches* in 1826, and that on *Gastro-Enteritis* in 1829, was living and active; and Rayer, known by his work on *Diseases of the Skin* (1827), was preparing for his more important work on *Renal Disease*, published in 1839.

In Germany, there was less obvious activity; but Glüge and Fick were doubtless working at those micro-pathological problems which were brought out in 1838; Rokitansky was amassing those stores of knowledge which, ten years later (1841-1846), he gave to the world; and Johannes Müller was making those researches on the structure of tumours which were to supplement his physiological studies.

In London, too, besides the men I have named, there were others who greatly contributed to the advance of pathology. Addison had just published his first work;‡ and Hodgkin, who had begun to lecture on morbid anatomy in 1827 (published in 1836-41), had just completed a catalogue of the Museum of Guy's Hospital (1830).

In Edinburgh, there were great men and great pathologists. Alison published the outlines of his lectures on physiology and pathology in 1831, and the pathology separately in 1833. Christison, who had for nine years been a professor in the University, and was already distinguished both in toxicology and pathology, had published his great work on *Poisons* (1829) two years before, and in the same year his first paper on *Dropsy in Relation to Diseased Kidney*, a subject in which he afterwards did much valuable work.§ Abercrombie, Monro, and Gregory were still in active practice.

* Hope grouped together the diseases of each organ in his illustration, but in the text followed Andral's classification of the mucous morbid changes into lesions of (1) circulation, (2) nutrition, (3) secretion, (4) the blood, and (5) innervation. Hope's great ability and faithfulness as an artist, and his mastery of clinical medicine, as shown in his work on *Diseases of the Heart*, makes his *Atlas* of especial value. I ought also to mention in this connection Richard Hooper, who for nearly thirty years was engaged in collecting materials for an *Atlas* of morbid anatomy, to illustrate the diseases of all the principal internal organs. Only two parts of his work—those on the uterus and on the brain, in 1831—ever saw the light, but I have had the good fortune to obtain possession of more than two hundred water-colour drawings, made for this purpose, dating from 1797 to 1834, many of which were made by such men as Howship, Hope, and others equally capable.

† Carswell's published work cannot be said to have done justice to his powers, and the arrangement which he adopted for illustrating the various processes of inflammation, analogous tissues, atrophy, hypertrophy, and so on, by examples of each in various organs, though valuable at the time, has produced much confusion, for he was often in error as to the nature of the process.

‡ On the *Disorders of Females connected with Uterine Irritation*, 1830.

§ On *Granular Degeneration of the Kidneys*, Edinburgh, 1839.

I have thus briefly traced the outward history of morbid anatomy to the time of the foundation of this chair, when it had successfully asserted its position as an essential basis of pathology. Everywhere attention was being devoted to it, and no case was considered complete in which the morbid appearances were not noted. But naked-eye morbid anatomy had its limits as an interpreter. The functions even of some important organs were but little understood, and the way in which visible changes were brought about, or how they were related to disease, could not, owing to imperfect means of research, be fully appreciated. We are apt to smile at the notion entertained by Laennec, that the yellow masses in cirrhosis of the liver, from which he gave it its present name, were a morbid deposit, and the belief that the morbid "granules" described by Bright in diseased kidneys were some material whose nature could be solved by chemical analysis. But it was only by the use of the microscope, and the discoveries of physiology on the structure and functions of organs, that more enlightened views became possible. This was to be the next step in advance.

The dawn of the new era may be traced to the beginning of the present century, and may be said to have begun with new ideas of structural anatomy preceding the fuller knowledge of function. For, until the primary analysis of the structure of the body had been made, until the minutest elements had been grouped into classes, and their individual functions and powers determined, it was impossible to reduce to any general expression the derangements to which they were subject. The first step to this was the rearrangement and classification of the tissues, due partly to Haller, but mainly to the genius of Bichat, who must be regarded as the founder of general morbid anatomy as well as of general anatomy. He not only classified the tissues and organic systems, but he entered into their pathology, and asserted that "each tissue has its own diseases". Apart from his own work in this direction, he rendered possible the subsequent advances in the study of diseases of systems and tissues, in which Laennec and Gendrin were the pioneers.

The general application of the microscope to vegetable and animal histology was the means of the next great advance. It is true that, so early as the middle of the seventeenth century, the microscope had been employed in histological and pathological research, by Hooke, Leuwenhoeck, and Malpighi (1686), and that early in the present century many discoveries had been made in normal histology; but it is none the less true that, until after 1830, it had not been possible to apply it systematically to pathological histology. Nor was it till 1841 that the work of Schleiden on *Vegetable Histology*, and later of Schwann on the *Comparison of the Cellular Structure of Vegetables and Animals*, laid the foundation of our modern histology. Johannes Müller was the first to systematise pathological histology as applied to tumours, and was followed by Henle, Glüge, and Vogel. Nor must we omit the names of Kölliker, Bowman, Goodsir, and Sharpey, who did much good work in normal histology.

It is unquestionably to Virchow that we owe the great advance by which histology came to take a first rank as an aid to pathology; and from the date of his great work on *Cellular Pathology* (1858), we may reckon the era of modern pathology. His work, dedicated to Professor Goodsir "as one of the earliest and most acute observers of cell-life, both physiological and pathological", put a new life into pathology. Starting from the discoveries of Schleiden and Schwann on the cellular structure of vegetable and animal tissues, he showed how in the cell is the vital unit of all organised structures, how intimately its changes are associated with all the processes of organic life, both in health and in disease, with the development and maintenance of the tissues, and in all their functional reactions, whether normal or abnormal. He showed, moreover, how cell-changes are concerned in all morbid growths, and in a vast number of diseases, and how in cell-systems and cell-territories disease processes may often be localised. It would be impossible for me to do justice to the many side lights which he threw upon diseases. I do not think that all Virchow's most absolute dicta can be accepted at the present day, or that we can reduce all pathology to the simplicity of cell-reaction. But apart from this, and its great value as a study in histology and physiology, Virchow's work did incalculable service to pathology in sweeping away old fallacies, in compelling attention to the most minute changes which lie at the root of disease, and in showing how in these minute changes are to be sought both the evidence and the explanation of functional disorder. Nor must we overlook the great value of his cellular pathology as a system, taking the place to a large extent of the humoral, solidistic, and other pathological systems which had preceded him.

Had we lived in the days of Brown and Broussais, we should have better appreciated the revolution which Virchow's doctrines effected, and what solid ground was substituted for previous speculation. What the

atomic theory has been to chemistry, and the wave theory to physics, that the cell theory has been to pathology.

And I would especially notice that it is not in any mere knowledge of cellular structure and arrangement, or in the relations of cells to development, that the value of Virchow's system consists. Nothing could have been farther from the central idea of his teaching than the mere mechanical application of cellular structure to the elucidation of the phenomena of life and of disease. It is the living cell, endowed with vitality and with function, governed by laws of existence capable of self-multiplication and propagation, and arranged in organic systems, which he studies. It is the cell as the living active agent in the production of disease, or the arrest or perversion of its action by disease-producing causes, which has the highest place in his thoughts. It is by this work that the study of histology is connected with pathology, and that in turn this is joined to evolution and development—the work by which all other biological studies come to have an intimate bearing on pathology. However far we may transcend cellular pathology, we cannot neglect it in any future study.

We have thus reached a point at which the era of modern pathology may be said to begin. In the first thirty years of the century we have the awakening, the new impulse to the study of morbid anatomy both in its relations to normal anatomy and to clinical medicine, and side by side with this, though as yet separate, the renewed study of general anatomy. In the next thirty years we have the more general application of morbid anatomy to clinical medicine as an expounder of the phenomena of disease, and at the same time the fuller knowledge of structure and function of the several organs, and the working out of detached normal and pathological histology rendered possible by the improvement of the microscope. We may reckon the end of the thirty years, 1860, when Virchow's work had had time to be known, as the culminating point of this period, and the entrance of our present epoch.

During the twenty years which have passed since Virchow's great work, pathology has made immense progress. Morbid anatomy has discovered lesions and diseases before unknown, and has connected them with the symptoms and functional derangements with which they are associated. New processes of disease have been discovered, and old ones explained. Such discoveries as those of Virchow in embolism, and of Cohnheim in inflammation, and the work done on the subject of microscopic parasites, have revolutionised whole fields of pathology. Our knowledge of minute structural changes has become encyclopædic. Look which way we will, the array of facts and discoveries seems almost overwhelming, and every day new ones are added to the store.

But, gentlemen, this is not the time for me to speak to you in detail of modern pathology. These it will be my duty to unfold to you in due course. I would rather try to impress upon you the spirit in which the subject of pathology is to be approached, and how it stands related to your past and future studies.

[To be concluded.]

RECTAL EXPLORATION AND DIAGNOSIS.—Dr. Charles B. Kelsey, of New York, (*New York Medical Journal and Obstetrical Review* for October 1881), after referring to many errors which arise in this department of surgery from the lack of care and proper examination, goes on to answer the question of how to make a rectal examination which shall be at the same time thorough and as free from pain as possible. In his own practice he uses an artificial light of his own arrangement and a forehead mirror, which enable him at all times to illuminate the rectum thoroughly, while by the side of the examining table stands an instrument-case fitted with all necessary appliances. In addition to these things, he insists strongly on the necessity of having a water-closet communicating with the office, so that injections may be administered and the bowels moved at the time of the examination. In the matter of specula, he confines himself almost exclusively to Sims's, finding this the best of all after the sphincter has been stretched, and not finding any that give a fair view of the parts until this has been done. He relies, however, much more upon the finger for a diagnosis than upon any artificial helps, and claims that with it, after the necessary skill has been acquired, the slightest pathological changes may be detected. In the matter of bougies he also has his own preference, and recommends a soft-rubber instrument, similar to that of Wales, only more flexible. For detecting strictures high up in the rectum or in the sigmoid flexure little confidence is to be placed in a bougie of any sort, and the writer relies almost entirely upon manual examination, either through the abdominal wall or by passing the hand into the rectal pouch. The latter method he holds to be free from danger, and certain in its conclusions.

ABSTRACT OF A CLINICAL LECTURE

ON

RESECTION OF THE TARSAI ARCH FOR THE PERMANENT RELIEF OF INTRACTABLE CLUB-FOOT.

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GENTLEMEN,—During the last few weeks, you have seen me operate on four cases of intractable club-foot, by the method which I have worked out in the wards of this hospital; and each case has an interest, not only in showing progress in operative detail, but also in adding confirmation to the beneficial results gained by the patients. In my own experience of hospital applicants for relief (notably amongst out-patients), no class of cases can better illustrate "love's labour lost" than those of club-foot. The careful surgeon exhausts his skill and patience by oft-repeated manipulations; effects a temporary improvement; then loses sight of the case, until it reappears as a relapsed deformity; the last state of the patient being worse than the first.

CASE I. *Talipes Varus: Double Congenital.*—R. H., aged 4, Belvidere, Kent, was admitted into Percy Ward on June 6th, 1881. When eighteen months old, he was taken by his mother to the Evelina Hospital, and there subjected to severe operation (apparently on the bones at the outer side of both feet). After some months' treatment, but little improvement ensued. Since then, tenotomy and bandages had been ineffectually employed, and the deformity had symmetrically increased. He was sent to the Westminster Hospital by Dr. Howard Cave, to be placed under my care for operation.

On admission, a large cicatrix was seen on the outer side of each foot, not far from the outer malleolus. The varus form was present in each foot (especially the left), and both soles faced each other towards the median line; and very broad, flat soles they were. The boy was spirited, and in fairly good health.

June 7th, 1881. Under the influence of chloroform, a wedge-shaped piece of the left tarsal arch was cut out by the chisel and knife, including the cuboid, fifth metatarsal, and part of the scaphoid bones; the foot was placed in position by eversion and rotation, and maintained so by a gum and chalk bandage on my talipes splint.

June 14th. Two silver sutures were removed; a firm blood-clot existed over the wound on the outer side of the foot; the child's foot was essentially in a plantigrade position.

July 4th. The child sat up to-day; the wound had healed; and in every respect he had made a good recovery, with a somewhat shortened foot.

July 22nd. He left the hospital; and his mother wished his right foot to be also operated on in the fall of the year.

CASE II. *Talipes Equino-Varus: Paralytic.*—G. II., aged 10, Alresford, Hants, was admitted into Mark Ward on June 10th, 1881. This boy was originally seen by me in Devon, and his parents were anxious that an attempt should be made for the permanent relief of his deformity, as he had submitted to various operations and worn instruments all his lifetime. His mother states that, a few hours after birth, he had a severe fit, which left his right arm and leg weak. His lameness was more noticeable at five years old, after a fall from a hay-loft. Presentation was natural.

On admission, the boy was pale, but well nourished. There was slight paralysis on the whole of the right side; and some hesitation in his speech, scarcely amounting to a stammer. He could pick up a pin from the table with his right hand with difficulty; and the temperature of the right side was two and a half degrees below that of the left. The cast shows well the deformity of the foot. The boy hobbled on the outer edge of his little toe, with the aid of a steel instrument and a stick. His sensation was equally good on both sides.

June 14th, 1881. I removed from the outer side, with a small counter-opening on the inner, a wedge of the right tarsal arch, and of such a mechanical shape as to permit reduction of the equino-varus deformity: *i.e.*, the thickest portions of bone were chiselled off from the dorsum and outer surfaces, the thinnest ends being at the inner and plantar aspects; this wedge embraced portions of the os calcis, the head of the astragalus (dislocated forwards), the greater part of the cuboid, and the whole of the scaphoid bones. The foot was set