THE CHANGES IN THE MEDICAL PROFESSION AND ADVANCES IN MEDICINE DURING THE LAST FIFTY YEARS*

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In considering the problem, always difficult when the choice is courteously left to the lecturer, of what subject to select, it seemed worth while to touch briefly on some of the changes that have taken place in the medical profession and medicine during the last half-century. This decision was made nearly a year ago, and so is not a compliment to the recent series of "Fifty Years" articles in the *Times*. Reminiscences are always tempting to those in the stage of garrulous anecdote, and should not be entirely devoid of gratification to those with a future, and it is hoped without a "past," who should thereby realize how much better placed they are in many respects than their seniors. For it is a matter of common knowledge, and not merely a complaint of the *detractor temporis acti*, that the enormous advances in medical science and art have rendered the practice of medicine far more satisfactory for the medical profession and for their patients than in the past. No doubt exactly the opposite conclusion must be drawn from a survey of some other conditions of life in this country before and after the war; in the 'eighties the times were spacious and prosperity seemed a settled attribute of the United Kingdom; the race for speed was comparatively slow, motor cars and aeroplanes were undreamt of and telephones were toys and not tormentors; the income-tax was counted in pennies and not in shillings and sixpences; and class feeling had not been accentuated by the methods of Limehouse.

Though manners now seem to be less formal and pontifical, and the authority of mere seniority to be less dominant, human nature remains much the same. The outward trappings of medical men have respectfully followed other fashions; beards or side-whiskers, almost universal among the grave and reverend seniors, have gone, as have the frock-coat and silk hat which were donned as the outward sign of qualification. A brougham was the hall-mark of the consultant, and at the hospital I knew best, the assistant physicians and assistant surgeons were drawn to the hospital by one horse, whereas the physicians and surgeons dashed into the Square in a carriage and pair. The assistant physicians and surgeons often had students living in their houses in Harley Street or Wimpole Street, and thus dispensed with the financial support now obtained from additional doorplates. Titles were exceptional in the last century, and seldom bestowed, except on the presidents of the Royal Colleges and on Court physicians. Lister, in 1897, was the first man to be made a peer for his purely medical services. During and after the war titles became comparatively frequent. The war forms a permanent wall between the past and the present conditions, both in the world at large and in that of medicine. In Victorian and Edwardian times there was a continuity, which was suddenly broken in August, 1914, never to return.

Changes in "Harley Street"

The medical quarter of London, which may be spoken of for short as "Harley Street," has undergone the change of which the City of London set the example long ago. Formerly the City magnates and merchants lived over their offices and shops, whereas now the

residential population around the Bank of England must be extremely modest, both in number and in pocket. The proportion of professional doorplates and addresses—for these are not identical, though I cannot pretend to have counted the doorplates *in situ*—to the houses in the Harley Street and Wimpole Street preserves has risen enormously. The *Medical Directory* for 1882 gives sixty-one names in Harley Street and fifty-five names in Wimpole Street, Upper Wimpole Street, and Devonshire Place (in the last one only), which run parallel to and are a little longer than Harley Street. The numbers of the addresses in the two streets, much the same then, have changed both absolutely and relatively. In the *Medical Directory* of 1932 the corresponding numbers are 750 and 375; an average of five addresses to each of the 152 houses in Harley Street. The difference between the popularity of the two great professional streets may perhaps be explained by the lure of the phrase "the Harley Street specialist." Many medical men of course still linger and live in these streets, but far more do not, and quite a considerable proportion also practise elsewhere—for example, in the country. Doorplates, like mushrooms, are always springing up with bright hopes; this was notably the case after the war, when surgical experience and a gratuity rendered the gratification of ambition in Harley Street possible, at least for a time.

London Teaching Hospitals

The teaching hospitals in London have not increased in number, otherwise they are, of course, much changed. In the last century members on the full staff of some of the larger hospitals received a considerable sum as teachers in the medical school; for then there were not any whole-time teachers of anatomy, physiology, and pathology, the lectures in which were delivered by the members of the medical staff. A surgeon and lecturer on anatomy at St. Bartholomew's told me that he used to receive as his share £1,600 a year, whereas at the time he reminisced the corresponding cheque as surgeon was under £40. The high-water mark was the £2,000 that Sir William Savory (1826-95) received when also lecturer on surgery at the same medical school. Demonstrators and registrars received an honorarium rather than a living wage, and hanging on in the hope of promotion to the permanent staff, with its promise of the further decades of "bread and butter" and of "cakes and ale," they depended for bread on fees for coaching, literary, and other forms of service. It was indeed a question of survival of the fittest, including in the definition of the fittest the possession of private means. The avenue to the surgical staff was through the anatomy department, and to the physicians' side, though less rigidly, through the physiological laboratory, and later, and very wisely, the post-mortem room. Surgeons before the advent of laparotomy were not over-busy, and acting up to the axiom, as slyly modified by my colleague at St. George's Hospital, the late Clinton Dent (1850-1912), "*Chirurgus sum! nihil medicum a me alienum puto*," were not averse to looking after cases of typhoid fever and paraplegia, and acting as the medical officers of life assurance companies. Whole-time clinical professors and "units" came into being after the war.

* The Bolingbroke Lecture delivered on May 25th, 1932.

Fifty years ago there were far more candidates for the medical than for the surgical side of teaching hospitals; at one time there were twenty waiting about at St. Bartholomew's Hospital, so that the physicians' side could have been at once filled up twice over at least. Conditions have much changed in this respect. The present tendency of municipal medicine is to segregate into special institutions diseases which previously were seen in general hospitals; as a result tuberculosis, venereal diseases, fevers, and other diseases, such as ophthalmia neonatorum, are no longer so available for teaching purposes in the metropolitan hospitals.

Nursing homes were very few in number in the 'eighties, and of course operations, which were comparatively infrequent, were mainly done in the patients' homes. Group medicine and diagnostic clinics, such as Duff House, now Ruthin Castle, and the New Lodge Clinic, are creations of this century. Diphtheria was treated in the general wards, and as a matter of fact very seldom spread; but tracheotomy in those pre-antitoxin days was very common, and often a prelude to death.

Specialism

During the last half-century one of the most important events has been the complete recognition of legitimate specialism. Hospitals for special diseases, such as the Royal Ophthalmic Hospital (established in 1804), the Royal Hospital for Diseases of the Chest (1814), and the Royal Ear Hospital (1814), are more than a century old. But the existence of specialism was sternly frowned upon by the leaders of the profession; in 1860 the *British Medical Journal* published a protest against the "growing evil" of special hospitals, which "will end in draining our great centres of clinical instruction of their best cases and of their funds at the same time." This protest was signed by the Presidents of the Royal College of Physicians of London and the Royal College of Surgeons of England, the President of the General Medical Council, and other prominent medical men. This prejudice lasted until late in the last century, when the special departments of the teaching hospitals in London were often in the charge of assistant physicians and assistant surgeons who looked forward to general and not special practice. The need for specialties was thus admitted, but with a compromise in order to prevent or limit the creation of whole-time specialists. Some special hospitals, such as the Royal Ophthalmic Hospital ("Moorfields" from its first site), the Brompton and other hospitals for diseases of the chest, and children's hospitals, were not regarded with displeasure by the medical powers; in fact their staffs were largely composed of general physicians and surgeons attached to teaching hospitals.

With the clear crystallization of specialism, mainly demanding not only concentrated knowledge but also expert manipulative skill, such as ophthalmology, laryngology, otology, and gynaecology, there has been a corresponding and natural tendency to *partial specialism* in medicine and surgery—for example, in children's diseases, cardiology and neurology, in orthopaedics and genito-urinary diseases, which are compatible with general medical or surgical practice. Time will show what further differentiation in this direction will occur.

Special Diplomas and Post-Graduate Teaching

A closely allied result of the vast expansion of knowledge is the overburdened condition of the present curriculum, from which each specialist loyally feels that his subject should not be omitted. It is obvious that a sound education in medicine as a whole should be assured on qualification to practise, and that specialization should be a post-graduate event, a competent knowledge being shown by the possession of a special diploma granted after further

instruction and an examination. Seven diplomas—in public health, tropical medicine and hygiene, psychological medicine, ophthalmic medicine and surgery, laryngology and otology, gynaecology and obstetrics, and radiology—are now granted jointly by the Royal College of Physicians of London and the Royal College of Surgeons of England. The Universities of Cambridge, Liverpool, and Edinburgh grant diplomas in radiology, and that of Oxford one in ophthalmology (D.O.). The British College of Obstetricians and Gynaecologists, established in 1929, has powers either alone or in co-operation with authorized teaching and examining bodies to grant to registered medical practitioners diplomas or other equivalent recognition of special knowledge in obstetrics and gynaecology.

Post-graduate teaching has had an uphill fight in London; in 1899 the Medical Graduates' College and Polyclinic was started in Chenies Street, with its great pillar of support in Sir Jonathan Hutchinson, but it suffered from the absence of beds. Continuous, as apart from short courses of, post-graduate teaching at hospitals with medical schools has never been a success. The West London Hospital did a large amount of teaching, and after the war the Fellowship of Medicine was formed. The problem of a post-graduate school worthy of London will, it is hoped, be solved by the new Post-Graduate Hospital and Medical School at Hammersmith, which starts with very strong Governmental and professional backing.

Some Other Changes

In 1891 the medical curriculum was lengthened from four to five years; and until 1886 one qualification only, most commonly the M.R.C.S. or the L.S.A., was obligatory. The combined M.R.C.S., L.R.C.P. of the Conjoint Examining Board in England dates from this time. Until 1897 there was a medically legal, or at any rate not illegal, class of unqualified assistants who worked under general practitioners for a meagre wage and took charge of the poorer strata of the practices; some of these men eventually gained a medical qualification, but others went on for years and acquired a fair rule-of-thumb knowledge of treatment. Their legal existence was terminated in 1897, when to employ them rendered the practitioner liable to be called before the General Medical Council for the offence of "covering."

The London School of Medicine for Women was opened in October, 1872, and since then, and especially during and immediately after the war, a large number of women have entered on "the physic line." Their struggle for recognition is over now; the universities and the licensing bodies have opened their degrees and diplomas to them.

As a result of the National Insurance Act of 1911 the position of medical men who had previously been connected with "clubs" or contract practice under the Friendly Societies was changed; they became panel practitioners, and there are now nearly 16,000 at the call of more than seventeen million insured persons. This change, which at first aroused great opposition, has, though not free from adverse criticism, been a source of financial gain to the practitioners on the panel. The number of registered medical men has more than doubled in the last half-century: in 1881 there were 22,936; at the end of last year there were 55,604.

A noticeable feature of this century has been the endowed organization of scientific medical research by State and private benefaction. Apart from investigations carried out in special directions by the Local Government Board, which in 1919 was merged in the Ministry of Health, the establishment in 1913 of the Medical Research Fund—also an offspring of the National Insurance Act—was the first effective step of the Government in this country to

support scientific medical research. The munificent Rockefeller Foundation for Medical Research in New York has on a large scale lived up to its motto, "The Well-being of Mankind throughout the World."

In 1907 the Royal Medical and Chirurgical Society, which in 1887 had 745 Fellows, was transformed by amalgamation with seventeen other previously separate societies into the Royal Society of Medicine, which now has 4,160 Fellows, 37 honorary Fellows, 191 corresponding members, and 60 associates. It consists of twenty-four separate Sections, and has an admirably organized library containing 150,000 volumes. Further, it has social activities, and combines with its educational benefits some of the amenities of a club. Great expansion of the work and membership of the British Medical Association has been one of the notable features of the medical life in this country; in 1882 it had 9,563 members, now it has 35,000, a three-and-a-half-fold growth.

Great changes have taken place in the nursing profession. The Nurses' Registration Act was passed after considerable delay and discussion in 1919, and there are now 25,440 nurses registered by examination on the different parts of the State Register. Organization has improved the material circumstances and the standard of efficiency among these hard-worked and badly paid workers. Fifty years ago there were few careers except nursing open to women; now there are many avenues of activity, and the candidates for entrance into the nursing profession are not so numerous as they were. Further, they are younger, and the average age at entry, formerly over 21 years, has unfortunately been lowered, as it is difficult to fill in the years after school education has ceased. The Central Midwives Board, established by the Midwives Act, 1902, has greatly improved the education, has regulated practice, and keeps the roll of certified midwives. In 1926 the course of training for midwives was lengthened to six months for trained nurses, and to a year for other candidates.

ADVANCES IN MEDICINE

The advances in medicine, meaning by that word "physic" or what was once correctly described as internal medicine, if less dramatic, have been wider in scope than those of surgery. Thus tropical medicine, with the help of bacteriology and protozoology under the leadership of Sir Patrick Manson (1844-1922), the "Father of Modern Tropical Medicine," has developed enormously. Sir Ronald Ross's proof of the mosquito-borne infection of malaria in 1897 is an outstanding example of the part played by insect vectors and human carriers of infection.

The growth of public health activities and so of preventive medicine by the State has greatly increased since the establishment in 1919 of the Ministry of Health. Maternity and child welfare clinics, the school medical service, and clinics for dental, tuberculous, and venereal diseases are now active in preserving the health of the nation. The health of industrial workers supervised by the Home Office is becoming a special branch of medicine—industrial medicine—in which prevention plays a prominent part.

While many advances have taken place in the last half-century and many new suggestions have had their day, especially in treatment, some old views and methods of treatment tried and discarded have been revived, improved, and approved. The doctrines of the iatrochemists, Paracelsus, van Helmont, and F. Sylvius of Leyden, in the sixteenth and seventeenth centuries, have now assumed a different character in biochemistry and metabolism. Blood transfusion, practised in the seventeenth century by Jean Denys of Montpellier and Richard Lower of Oxford, was practically abandoned until in this century when the technique was rendered comparatively safe by the discovery of blood groups (Jansky, 1907;

Moss, 1910), and during and since the war has been extensively employed.

In the last quarter of the last century the keen study of morbid anatomy was succeeded by the investigation of the causes of infective diseases in the light of bacteriology, and as a result the importance previously ascribed to constitution and diathesis practically disappeared, though recently it has revived with the realization that an appropriate condition of the "soil" is necessary in addition to the "seed" of disease. The present century has been noteworthy for the special attention paid to the functional disorders of disease, and for the introduction of functional tests of various kinds, such as test meals of gastric secretion, examination of the blood-urea in renal disease, of the blood-sugar in diabetes mellitus, of the blood-bilirubin (Hijmans van den Bergh reaction) in jaundice, and of the basal metabolic rate which has been of special value in diseases of the thyroid gland. The antecedents and early stages of disease, in which prevention is more especially effective as structural change may not yet have resulted, have attracted attention, particularly from Sir James Mackenzie.

The discovery of vitamins or accessory food factors, which have been called "extraneous hormones," and the recognition of the avitaminoses or diseases due to their absence, such as rickets and beri-beri (a special form of endemic neuritis), were due to the exertions of a number of investigators, among whom C. Eijkman and Sir Gowland Hopkins, the Nobel prizemen of 1929, are prominent. Morbid states due to their excess—hypervitaminoses—have been induced in experimental animals.

The Rise of Bacteriology

Bacteriology, due to the genius of Louis Pasteur (1822-95), and Robert Koch (1843-1910), made its way slowly in medical London, and in the early 'eighties was often referred to with a condescending smile as "the germ theory," thus intimating that it was the obsession of a crank. Well on in the 'nineties I remember a shrewd general practitioner recommending an investigation by a bacteriologist whom he described as being "as clever as a monkey." The word "bacteriology," imported from Germany, appears from the *Oxford Dictionary* to have been first used in this country in August, 1884, in the pages of the *Academy*. In the autumn of 1889 I attended one of the early practical courses of bacteriology available in London; it was given by E. E. Klein (1844-1925) at the College of State Medicine, 102, Great Russell Street, W.C. There were about half a dozen men in all, including Sir F. W. Andrewes (1859-1932) who was house-physician with me, Sir William Hamer, also house-physician in the previous year at St. Bartholomew's, and G. I. Schorstein (1863-1906) of the London Hospital. Klein was then much interested in the grouse disease and the bacillus he found in it, afterwards shown to be *B. coli*. Spontaneous generation of micro-organisms, long before discredited by Spallanzani in 1777, was finally disproved by Pasteur in 1862; but the tenet died hard in medical London, where H. C. Bastian (1837-1915) revived it in 1876, and as late as 1906 had a paper accepted by the Royal Medical and Chirurgical Society "On the *de novo* origin of bacteria, bacilli, vibriones, micrococci, torulae and moulds in certain previously superheated saline solutions, within hermetically sealed vessels." Probably his senior and eminent position in the profession weighed with the committee, for the referees were not so considerate.

In the 'eighties bacteriology rapidly went ahead; Koch discovered the tubercle bacillus (1882), the cholera vibrio (1883), and through his pupils Gaffky, the typhoid bacillus (1884), Loeffler, the diphtheria bacillus (1884), Kitasato, the bacilli of tetanus (1889) and of plague (1894). The discovery

of bacterial poisons led to the production of antitoxic serums, especially successful in diphtheria and tetanus. Immunology followed with serological tests, such as the agglutination reactions for enteric, undulant and other fevers, complement-deviation tests, such as the Wassermann reaction for syphilis (1906), and cutaneous tests for sensitizations. The recognition of ultra-microscopic or filter-passing viruses, which are pathogenic for plants, animals, and man, dates from 1898, and a large number of diseases have been ascribed to their influence.

The Surgical Revolution

Every period is one of transition, but it may be safely said that the last fifty years have seen far greater changes than any similar period in the history of medicine. First and foremost is the transformation and enormous expansion of surgery due to Lister's teaching, and the resulting revolution in technique which made safe the operative procedures rendered painless by the introduction of anaesthetics about the middle of last century. Lister came to London in 1877, by invitation, to succeed Sir William Fergusson (1808-77) as surgeon and joint professor of clinical surgery at King's College Hospital. He gave up a large school and plenty of beds in Edinburgh in order to accelerate the adoption of his methods in London; but it is doubtful if he converted more than a very few of his metropolitan contemporaries, and he might, like William Harvey, have said that no man over 40 years of age accepted his teaching. Lister's visitors in the operating theatre and the wards at King's College Hospital were mainly curious foreigners, and he was even openly derided by at least one of his colleagues. But the really influential opposition came from Sir William Savory, surgeon to St. Bartholomew's Hospital, who carried on the tradition of oratory of his surgical seniors at that great hospital—Sir William Lawrence and Sir James Paget. At the meeting of the British Medical Association at Cork in 1879 his address in surgery dealt with "The Prevention of Blood Poisoning in the Practice of Surgery," and its adverse verdict was described by Sir Rickman Godlee as "the swan-song of the already dwindling race of pre-antiseptic surgeons." I dressed for Savory in 1884, and so saw the routine treatment of operation and other wounds by poultices, much "laudable" pus, and the discarded frock-coats in which surgeons of that now distant day operated.

Surgery, which previously had been mainly concerned with the extremities, was enabled to invade the abdomen, the head, and the chest with safety to the patient. The development of abdominal surgery has been phenomenal; it was largely initiated by the pioneer example of Sir Spencer Wells, the ovariologist, before the period now under consideration, and by Lawson Tait. The word "appendicitis," much criticized as a barbarous hybrid of Latin and the Greek termination *itis*, was constructed by R. H. Fitz of Boston, Mass., in 1886. It does not appear in the first volume of the *Oxford Dictionary*; the editor, Sir James A. H. Murray, told me that when that volume of the *Dictionary* was in course of preparation (1888) he consulted a regius professor of medicine, and was informed that it was not necessary to include it, as the disease was very rare. Although it had been described many years before, by James Parkinson in 1812, by John Burne in 1836, by Thomas Hodgkin in the same year, and by Thomas Addison in 1839, appendicitis was not generally recognized until influenza reappeared in this country in 1889; it was then called "perityphlitis," a term dating from 1843, and entered in a subsequent volume (1905) of the *Oxford Dictionary* with a reference to appendicitis. Nothnagel suggested the now forgotten name of *scolecoiditis* (Σκώληξ = a worm). Its operative treatment was largely due to the influence of Sir Frederick Treves in

1889 and after; the recognition of "surgical dyspepsia," due to diseases of the appendix (1910) and of the gall-bladder (1908), and the diagnosis of duodenal ulcer (1910) were mainly due to Lord Moynihan's advocacy.

The penetration of surgery into the body cavities, including the skull, with the evolution of the neurological surgeon, has tended to break down the artificial distinction between surgeons and physicians; at least it has resulted in the surgeon doing more and the physician doing less abdominal work. This is also shown in the change of title of those who specialize in diseases of women: formerly obstetric and gynaecological physicians, they have become surgeons both in name and in deed. Antiseptic surgery was later succeeded by aseptic surgery.

Tuberculosis: Syphilis

Koch's discovery of the tubercle bacillus in 1882, though prophesied by Villemin in 1865, is one of the milestones in the history of medicine. I remember seeing Samuel Gee (1839-1911) sitting down to stain it, with the house-physician, clerks, and nurses in attendance, in a ward at St. Bartholomew's, for there were no clinical laboratories or official clinical pathologists for many years after the early 'eighties. Laboratory medicine, now so dominant in diagnosis, did not exist, and diagnosis depended on physical examination and on experience with its product, clinical instinct, of which, though a very real acquisition, there have been rather mocking definitions, such as "that property you but nobody else possesses," and more concisely as "blind man's bluff."

The open-air treatment of tuberculosis was originally advocated and carried out by George Bodington of Sutton Coldfield, Warwickshire, in 1840, and by Henry MacCormack of Belfast in 1855, but was not seriously adopted in this country till 1895, after it had been practised by H. Brehmer at Göbersdorf in Silesia from 1854, E. L. Trudeau in 1884 in the Adirondacks, and by Otto Walther at Nordrach in the Baden Black Forest. Tuberculosis sanatoriums became common at the end of the century, and since the war tuberculosis colonies, such as Papworth, have been established as the result of the energy of Sir Penderill Varrier-Jones. The treatment of surgical tuberculosis by carefully regulated exposure to the rays of the sun has been practised by A. Rollier at Leysin in Switzerland, and by Sir Henry Gauvain at Alton in Hampshire; artificial heliotherapy or actinotherapy has since come into vogue. Treatment by tuberculin, first brought out by Koch in 1890, has been extremely disappointing. The most valuable recent addition to the treatment of pulmonary tuberculosis has been artificial pneumothorax.

The *Treponema pallidum* was discovered by Max Schaudinn in 1905, the Wassermann reaction followed in 1906, in 1910 Ehrlich introduced the salvarsan treatment, and in 1917 Wagner von Jauregg of Vienna originated the treatment of general paralysis of the insane by induced malaria.

Cardiovascular Disease

During the era of morbid anatomy—the later half of the nineteenth century—physical signs of the underlying structural changes were enthusiastically cultivated, and in the case of the heart, murmurs were the data on which diagnosis depended. Attention has now been transferred from the condition of the valves to the functional efficiency of the cardiac muscle. The use of the polygraph and the electrocardiograph has so greatly added to the knowledge of heart disease that a new cardiology has resulted from the work of Sir James Mackenzie and Sir Thomas Lewis. New forms of cardiac disease, such as auricular fibrillation and flutter, have been discovered; and coronary thrombosis has been separated from angina

pectoris, in which it had previously been included. The routine use of the sphygmomanometer has led to the general recognition of the importance of a raised blood pressure and of its existence, at any rate for many years, without renal disease—the hyperpiesia of Clifford Allbutt, the essential hypertension of American writers.

Diseases of the Blood

The knowledge of diseases of the blood-forming organs and of the morphology of the blood corpuscles has advanced enormously, largely as the result of Ehrlich's introduction of special staining methods. Just as histological examination enables the nature of a tumour to be determined, so can the blood diseases be classified. It may be noticed that one of the most familiar diseases fifty years ago—chlorosis—has now become extremely rare, a change of type of disease which has been ascribed to improved hygienic conditions in exercise, dress—especially the disappearance of tight-lacing—and a better diet. Simple achlorhydric anaemia, however, in middle-aged women has now been recognized. Addisonian anaemia has been dutifully investigated at Guy's by A. F. Hurst and his colleagues, who have proved the almost constant association with achlorhydria and its close relation to subacute combined degeneration of the spinal cord. Its successful treatment by liver extract and by hog's stomach has rendered the title "pernicious" no longer so applicable as formerly.

Endocrinology

The only diseases of the ductless, endocrine, or glands of internal secretion commonly recognized fifty years ago were Addison's disease of the suprarenals (1855) and affections of the thyroid—goitre, exophthalmic goitre, myxoedema, and cretinism. The conditions of excessive and abnormal secretion were not then realized, exophthalmic goitre being regarded as a disease of the nervous system. The treatment of myxoedema by thyroid was introduced by G. R. Murray, by hypodermic injection, in 1891, and by F. Howitz, Hector Mackenzie, and E. L. Fox, by oral administration, in 1892. The thyroid origin of exophthalmic goitre was established by W. S. Greenfield in 1893, and the prevention of simple goitre by the administration of iodine became widely adopted, largely as the result of the work of D. Marine in North America during this century, although as a method of curing goitre it was employed as long ago as 1820 by C. W. Coindet, but dropped out of fashion to be reintroduced in 1922 by H. S. Plummer of the Mayo Clinic. The operative treatment of exophthalmic goitre and toxic adenoma has become established; thyroxine has been isolated and synthesized.

Acromegaly, first described clinically in 1886 by Pierre Marie, may be instanced as an example of the way in which knowledge of the endocrine glands has been elaborated. At first regarded as due to inadequacy of the pituitary, it was then correlated with overactivity of the anterior lobe of that gland. Harvey Cushing, who initiated the operative treatment of acromegaly, has recently pointed out that enlargement of the anterior lobe and hyperpituitarism may be due to adenomas of two kinds: (1) an acidophil-celled adenoma of the anterior lobe of the pituitary which causes acromegaly in the adult; (2) a basophil-celled adenoma of the anterior lobe, often small and so prone to be overlooked, which gives rise to a group of symptoms of a different character—namely, rapid and painful obesity, amenorrhoea in females and impotence in males, hypertrichosis of the face and trunk in adolescents, a dusky appearance of the skin with lineae atrophicae, and high blood pressure, which Parkes Weber has recently suggested should be called "Cushing's syndrome." Alfred Fröhlich's adiposo-genital dystrophy

(1901), commonly associated with hypophyseal duct tumours (Cushing), is now well known. The extract of the posterior lobe of the pituitary has been successful in temporarily alleviating the polyuria of diabetes insipidus, its action thus resembling that of insulin in diabetes mellitus. Pituitary extract has been largely used for its action in intestinal atony.

The parathyroids were first described anatomically in 1880 by Ivar Sandström, who regarded them as embryonic rests of the thyroids. In 1896 Vassale and Generali showed that their removal caused tetany, and in 1908–9 W. G. MacCallum and C. Voegtlin proved that they controlled calcium metabolism. The causal relation of parathyroid adenomas to mobilization of calcium from the skeleton and the production of osteitis fibrosa cystica dates from 1907, and has been much discussed recently. The isolation in a crystalline form (Takamine, 1901) and synthetic production of adrenaline, secreted by the medulla of the adrenals, have proved to be useful in asthma and some forms of minor surgery. The recent preparation ("cortin") from the adrenal cortex promises to be of real value in Addison's disease.

Neurology and Psychiatry

Neurology was the favourite branch of medicine for the keen spirits of the latter half of the last century, and especially centred at Queen Square has continued its course, but now has more rivals—for example, in metabolism. Psychiatry is no longer such a close preserve for physicians in charge of asylums or, as they are now preferably called, mental hospitals. It has undergone great changes; it is more closely correlated with general medicine—for example, the causal influence of toxæmias and local infections; and the classification of mental diseases has been fundamentally altered. The work of Sigmund Freud of Vienna on the causation of psychoses and psychoneuroses by a process of active forgetting or repression of an unpleasant experience, and the treatment by psycho-analysis, have suffered from the assumption that the sexual instinct is stronger than those of self-preservation and the herd, but must be recognized as a valuable advance. The prevention of mental disorder has been taken in hand by the establishment of psychiatric clinics attached to general hospitals.

Radiology

Apart from bacteriology, which, like medicine, is a biological science, no discovery in pure science has been of such signal service to the practice of surgery and medicine as that of x rays in November, 1895, by W. K. von Roentgen (1845–1923), professor of physics at Würzburg. Utilized with such success in diagnosis that failure to appeal to skiagraphy in some surgical conditions, such as fractures, may constitute professional neglect, x rays were later employed therapeutically in many conditions; but its help in diagnosis is both more successful and more widespread than in treatment. An invaluable addition to physical examination, it is to some extent more effective than the older methods of auscultation and percussion. Radium, discovered by the Curies in 1898, has been most successful in the treatment of accessible malignant disease.

Therapeutics

In the third quarter of the last century devotion to morbid anatomy—the inspection of, and meditation on, the end-results of disease—had bred an honestly pessimistic attitude of therapeutic nihilism, which lasted into the 'eighties and 'nineties. Scepticism about the value of interference with the *vis medicatrix naturae* had been stimulated by the excesses of the two-edged weapon of

treatment, for in the earlier part of the nineteenth century bleeding and mercurial salivation had run riot. The main advances in treatment have almost all been comparatively recent and the outcome of laboratory investigation, such as serums, especially diphtheria antitoxin, various vaccines, particularly the prophylactic antityphoid vaccine (Almroth Wright, 1897) used in the South African war, and as "T.A.B." (typhoid and paratyphoid A and B) vaccine in the European war. Insulin (Banting, Best, and Macleod, 1922) has transformed the treatment and outlook of diabetes mellitus. The same result has followed the dietetic treatment, by liver (Minot and Murphy, 1927) and gastric mucous membrane, of pernicious anaemia; the substitution treatment, by thyroid preparations, of myxoedema and cretinism is an outstanding success of organotherapy; and the use of salvarsan preparations (1910) in syphilis is a notable example of Ehrlich's chemotherapy.

A CENTURY OF BRITISH SURGERY

BY

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Surgery in 1832 was based wholly on anatomy; surgery in 1932 has the additional support of bacteriology. In this hundred years brilliant surgery reached its zenith, waned, and finally died. Operating surgeons in 1832 were only to be found in London, Edinburgh, Glasgow, Leeds, Hull, Birmingham, Bristol, and Exeter. Except in London, Dublin, and Edinburgh surgeons combined general practice with their operating work, and there were only one or two men in each capital who would now be called pure consultants. These men made large incomes, but were correspondingly hard-worked. Distances were great; locomotion was slow and difficult. In Canada, Australasia, the Cape, and India there were no great operating surgeons. Anaesthesia had still to come, and the practice of surgery was a sore trial to all but men of iron nerve who had become inured to the scenes in the operating theatre. Abernethy frequently vomited before he entered the theatre to perform a major operation. John Flint South, surgeon to St. Thomas's Hospital, wrote in his diary before he tied the aorta: "I prayed earnestly for help last night, and constantly during the morning, and was most graciously heard." Operations, therefore, were not undertaken lightly, and they were performed as rapidly as was consistent with safety. A perfect knowledge of anatomy was essential. Every hospital surgeon had graduated through the dissecting room, and each considered it necessary to practise dissection as assiduously as Joachim used to practise his violin exercises, saying, "If I do not do them one day I know it myself, and if I do not do them for two days the public does know." It was Astley Cooper's custom, we are told,

"to rise every morning at six o'clock, even during the winter. As soon as he was dressed he went into his private dissecting room, where he worked till half-past seven or eight. Searle then dressed his hair, and by half-past eight he began to see patients, who came in large numbers, even at this early hour."

The subjects upon which Sir Astley worked were obtained by resurrectionist methods, in which, at any rate in his early days, he had taken an active part. It was this union of the dissection of uninjected bodies in the morning and dirty operations in the afternoon which enabled Lister to say he remembered the time when, after an operation, "One shiver by the patient made the surgeon suspicious; two filled him with alarm, and three was a forerunner of

death." The crimes of Burke and Hare in Edinburgh in 1828, and of Bishop and Williams in London three years later, led to the passing of the Anatomy Act in 1832, after which it was possible to obtain a supply of bodies which were less tainted, both physically and morally.

Introduction of Anaesthesia

The age of brilliant surgeons like Astley Cooper, Robert Liston, and James Syme ended with the advent of anaesthesia. The last survivor of the brilliant band of teachers and showy operators was Christopher Heath, who resigned his post of surgeon to University College in 1900. The ligation of large arteries, the removal of tumours from inaccessible places, lithotomy, and the invention of modified forms of amputation had been their delight. Their successors enlarged the sphere of surgery, and found their pleasure in operating upon the abdomen, the head, and the chest—regions which had never been invaded by their masters. They looked to cure their patients where the older surgeons hoped only to save life. By the aid of anaesthesia they could afford to work slowly, deliberately, and with a feeling of security which had been previously unknown. Spencer Wells, Victor Horsley, and Rickman J. Godlee were of this band who owed much to anaesthesia, a great deal to the principles inculcated by Lister, and something to improved nursing and hospital accommodation.

Surgical Pathology

The older surgeons continued the tradition set by John Hunter and the Hunterian school—personal dissection of the human body, and the collection, comparison, and study of pathological processes so far as could be done by naked-eye dissection, injection and the preservation of specimens. Every hospital surgeon had his own museum, the nucleus of which he bought from his predecessor and sold again on his retirement from active practice and teaching. So constant was the custom that it sometimes led to abuse, and at St. Bartholomew's Hospital there was a rule that

"No surgeon shall form a private museum, but all specimens removed in the hospital shall be the property of the governors of the institution."

The result has been the formation of a collection which is second only to that preserved by the Royal College of Surgeons of England. Benjamin Travers, surgeon to St. Thomas's Hospital, was the last exponent of the system. He tried to build a rational system of surgical pathology upon a philosophic basis. His two books, known to many generations of students as *Travers on Irritation*, were classics in their day, but the science of bacteriology swept away their entire structure. Improvements in the microscope and in the preparation of tissues for histological examination developed surgical pathology along new lines. Speculation gave place once more to experiment and observation. In 1859 Sir James Paget published the lectures on surgical pathology which he had delivered during the years 1847-52. They were inspired by the work of Rathke, Retzius, Schleiden, Schwann, and, above all, by Johannes Müller. They mark a period in English scientific surgery which is not yet ended.

Antisepsis and Bacteriology

The year 1864 may be looked upon as the *annus mirabilis* of modern surgery, for in that year Lister began the campaign which conquered septic disease. Working always by experiment he hardly comprehended at first the principles he was trying to discover. Little was known of ferments, less of micro-organisms. The path gradu-