Medicine, Surgery and Psychology

Health & Medicine - An Introduction

Early Victorian ideas of human physiology involved a clear understanding of anatomy, at least among experts. The populace often had only a hazy knowledge of the location and role of internal and vital organs. The medical focus was on the hematological and nervous systems that had much more in common with ancient 'humours' than present-day models. Little was known about biochemistry or endocrinology, affecting hormones, until late in the century.

Traditional ideas of the body, whereby women were regarded as smaller versions of men, and 'turned outside in,' were gradually superseded by a binary concept of sexual determinism, in which difference governed physiology, health and social behaviour. The body was defined as a closed system of energy, physical, mental and reproductive functions, all in competition.

Hence, the notions that male sexual 'excess' led to debility and female reproductive health was damaged by intellectual study with the Victorian prescription of rest for many ailments. It is small wonder so little headway was made with equality of the sexes as such views were entrenched and widespread.

In the early Victorian era, transmission of disease was understood as inherited susceptibility (today's 'genetic' component) and individual intemperance ('lifestyle'), affected by climate, location and noxious exhalations, akin to a form of environmental causation. Water-and air-borne infection was not generally accepted.

Thus Buchan's 1848 Domestic Medicine, with its coloured frontispiece showing the symptoms of smallpox, scarlet fever and measles, listed among causes of illness 'diseased parents', night air, sedentary habits, anger, wet feet and abrupt changes of temperature. Causes of fever included injury, bad air, violent emotion, irregular bowels and the extremes of heat and cold. Cholera, shortly to be an epidemic in many British cities, was said to be caused by rancid or putrid food, 'cold fruits' such as cucumbers and melons, passionate fear and even rage.

Treatments relied heavily on a 'change of air,' to the coast for example, together with emetic and laxative purgation, and bleeding by cup or leech (a traditional remedy only abandoned in mid-century) to clear 'impurities' from the body. A limited range of medication was employed, relying too on the power of prayer that was regularly invoked.

Diseases such as pulmonary tuberculosis, otherwise known as consumption, were endemic whilst others were alarmingly epidemic eg cholera. In the morbidity statistics, infectious and respiratory causes predominated, the latter owing much to sulphurous fogs known as pea-soupers. Male death rates were aggravated by occupational injury and toxic substances and those for women by childbirth and violence. Work-related conditions were often specific to an industry. Young women match-makers suffered 'phossy jaw', an incurable necrosis caused by exposure to phosphorous.

In Britain, epidemiological measuring and mapping of mortality and morbidity was one of the first fruits of the Victorian passion for taxonomy, leading to the clear association of pollution and disease, followed by appropriate environmental health measures. A major breakthrough came during the 1854 cholera outbreak, when Dr John Snow demonstrated that infection was spread not by miasmas but by contaminated water from a public pump in crowded Soho.

When the pump handle was removed, cholera subsided. This provided the impetus for public health officials, such as Sir John Simon, to promote projects to provide clean water, separate

sewage systems and rubbish removal in urban areas, as well as legislation to improve housing - one goal being to reduce overcrowding.

The number of inhabitants per house in Scotland, for example, fell from 7.6 in 1861 to 4.7 in 1901. Between 1847 and 1900 there were 50 new statutes on housing, ranging from major Public Health Acts of 1848 and 1872 to the 1866 Lodging Houses and Dwellings (Ireland) Act, Housing of the Working Classes Act 1885 and Local Government Act 1888. The indoor water-closet began to replace the traditional outdoor privy.

Scientific developments in the 19th century had a major impact on understanding health and disease, especially experimental research resulting in new knowledge in histology, pathology and microbiology. Few of these advances took place in Britain where medical practice was rarely linked to scientific work, hindered too by public hostility to animal vivisection on which many experiments relied.

The biochemical understanding of physiology began in Germany in the 1850s, together with significant work on vision and the neuromuscular system, while in France Louis Pasteur laid the basic foundations of the germ theory of disease, based on the identification of micro-bacterial organisms. It was commonly believed that creatures could appear spontaneously such as fleas growing out of dust and maggots from dead flies. Germ theory had arrived and, by the end of the century, a new understanding of biology was coming into being.

This ushered in a new emphasis on rigorous hygiene and fresh air, and a long-lasting fear of invisible contagion from toilet seats and shared utensils by the unwashed multitude. British patent applications around 1900 included devices for avoiding infection via the communion chalice and new-fangled telephone.

Technological advances underpinned this from the opthalmoscope and improved microscopes that revealed micro-organisms, to instruments like the kymograph, to measure blood pressure and muscular contraction. By mid-century, the stethoscope, invented in France in 1817 to aid diagnosis of respiratory and cardiac disorders, became a highly symbolic icon of the medical profession. The most famous British visual image, Luke Fildes's *The Doctor*, exhibited at the Royal Academy in 1891, shows a medical man with virtually no 'modern' equipment.

Surgery advanced - or at least increased – thanks largely to the development of anaesthesia in the late 1840s. Significant events included a public demonstration of the effects of ether in London in October 1846. Anaesthetics enabled surgeons to perform more sophisticated operations in addition to the traditional amputations, and in far greater numbers. Specialised surgical instruments and techniques followed, but with mixed results for a while as unsterile equipment frequently led to fatal infection.

Antiseptic surgical procedures, based on the practical application of Pasteur's laboratory work, were developed in Edinburgh by Joseph Lister (1827-1912), using carbolic acid (phenol) from 1869 and in London from 1877. Aseptic procedures followed, involving sterilisation of whole environments. Successful outcomes, such as Edward VII's appendicitis operation on the eve of his coronation, helped pave the way for a 20th-century era of pioneering surgery.

In 1895, at the end of the Victorian era, came Wilhelm Roentgen's discovery of X-rays. In due course the photo of Roentgen's wife's hand became a potent sign of medical advance through scientific instruments. But, overall, the 19th century is notable more for systematic monitoring of disease causation than for curative treatment, at least in Britain.

A Growing Medical Industry

Like other learned professions, medicine grew in size and regulation. In the early Victorian era it was dominated by gentlemen physicians of the Royal College, founded in 1518, with surgeons and apothecaries occupying lower positions. The British Medical Association was established in 1856 and, from 1858, the General Medical Council (GMC) controlled entry with central registration. The profession resisted the admission of women who struggled to have their qualifications recognised.

Partly in response to population growth, professional numbers rose; for example, from a total of 14,415 physicians and surgeons in England and Wales in 1861, to 22,698, of whom 212 were female in 1901 (about 1%). By 1900 the GMC register held 35,650 names, including 6,580 in military and imperial service. The number of dentists rose from 1,584 in 1861 to 5,309 in 1901, including 140 women. A growing proportion of qualified personnel worked in public institutions and a new hierarchy arose, headed by hospital consultants. This reflected the rise of hospital-based practice, for this was also the era of major hospital building in cities, accompanied by municipal and Poor Law infirmaries elsewhere. These were for working-class patients, whilst those in higher economic groups received treatment at home.

A secondary aspect of growth and regulation was a steady medicalisation of childbirth, so that over this period traditional female midwives were superseded by male obstetricians, with all their 'modern' ideas and instruments. Under prevailing conditions, intervention through use of forceps, for example, often caused puerperal fever. High maternal mortality remained of real concern throughout the century.

Largely through the endeavours and energy of Florence Nightingale, whose nursing team at Scutari captured the public imagination amid military deficiencies in the Crimean War, hospital and home nursing was reformed, mainly along sanitary lines. Rigorous nurse training raised the social status of the profession and created a career structure largely occupied by women.

Despite these and other improvements, death rates remained relatively steady. Roughly one quarter of all children died in the first year at the end of Victoria's reign as at the beginning, and maternal mortality showed no decline. In some fields, survival rates did improve and mortality statistics slowly declined. The rather crude measure of death rates showed a fall from 21.6 per thousand in 1841 to 14.6 in 1901. The main factors were public hygiene and better nutrition which proved the adage, prevention is better than cure.

Although doctors made much of their own medicines, with Latin names and measured doses, effective remedies were few. Chemical pharmacology as it is known today only began at the end of the Victorian century. From the 1870s, animal thyroid extract was used for various complaints, including constipation and depression, while from 1889 animal testicular extracts were deployed in pursuit of rejuvenation and miracle cures. At the same time aspirin was developed to replace traditional opiate painkillers.

As a result, many conditions remained chronic or incurable. These limitations, together with the relatively high cost of medical attendance, led to the rise and extension of alternative therapies including homeopathy, naturopathy ('herbal remedies'), hydropathy (water cures), mesmerism (hypnotism) and galvanism (electric therapy), as well as blatant fraud through the promotion of useless pills, powders and coloured potions. From 1866 notions that diseases were caused and cured by mental or spiritual power alone were circulated by the Christian Science movement.

Pioneers in Anaesthetics, Surgery and Research

In 1840 William Morton enrolled at Baltimore College of Dentistry, the world's first, but he left without graduating. In 1844 he enrolled at Harvard Medical School but did not complete his degree. At Harvard, he attended the chemistry lectures of Professor Charles Jackson where he learned about the properties of ether. Fascinating Morton was the potential application for surgery as sulphuric ether caused loss of consciousness. Continuing his dental practice he experimented with opium stimulants and mesmerism when extracting old and diseased roots. He felt neither these nor nitrous oxide were entirely suitable.

Morton consulted Jackson. In 1846, to a sceptical and spellbound audience, he extracted the tooth of a comatose patient. Two weeks later he demonstrated the use of diethyl ether as a general anaesthetic and few weeks later John Collins removed a tumour from a patient's neck. A couple of months later in December, Robert Liston performed the first amputation using ether as an anaesthetic. He had studied medicine at the University of Edinburgh under the eminent anatomist, Dr John Barclay.

Before anaesthetics, surgery was both difficult and dangerous. Speed was essential to help minimise pain and increase the chances of survival. It is claimed Liston could amputate a limb in 28 seconds. His surgical skills were matched by his arrogance. There were grisly tales of removing an assistant's fingers during an operation and a patient's testicles on amputating a leg, such was his intent on swift clinical efficiency.

Scottish obstetrician James Young Simpson was the first to use chloroform the next year, but its use was gradually abandoned because of it toxicity and potentially fatal cardiac effects. So the story goes, Simpson used a decanter at a dinner party for experimentation purposes with his saying guests ended up "under the mahogany in a trice." Within weeks chloroform was being used in surgery and childbirth in Britain, and then in Europe. In1853 Queen Victoria permitted the use of chloroform during delivery of her son Prince Leopold.

A young Joseph Lister observed Liston operate, awestruck by his speed. Lister realised pain was only one of the terrors of surgery. Sepsis killed patients as did infected ulcers, gangrene and septicemia. In experimenting on frogs, he came to understand causes of blood infection, coagulation and inflammation. Drawing on Pasteur's discovery of 1864, he felt a danger was micro-organisms. The key to his destroying bacteria was antiseptics, first used in 1867.

After countless experiments Lister concluded that carbolic acid had basic properties required. He made a concoction out of carbolic acid, carbonate of lime and linseed oil. Soaking a piece of lint he placed this on the wound, covering it with putty. He experimented with sterilising instruments and sprayed carbolic acid in the theatre, whilst operating to limit infection. Lister published his reports in the Lancet but, whilst accepted in Germany, his work was denigrated in London. Lister was (hopefully) empathic to the needs of patients, saying to his students, "Shall we charge for the blood which is drawn, or the pain which we cause?"

In the early 1850s the French veterinary surgeon Charles Gabriel Pravaz, and Scottish doctor Alexander Wood, separately developed a hypodermic syringe. Dr Wood injected a patient with morphine in 1853, describing his innovation in a paper entitled, "A New Method for Treating Neuralgia by the Direct Application of Opiates to Painful Points."

The first recorded fatality from a hypodermic syringe was unfortunately Dr Wood's wife who injected morphine to excess. Syringes had a hollow needle, fine enough to pierce the skin, but barrels were made initially of metal. A glass barrel was in use by 1866, enabling doctors

to see what medication remained. By the late 1800s syringes were widely available, though even by 1905 less than 2% of drugs were injected.

The history of appendix removal goes back at least to 1736. The breakthrough came in 1880 with anaesthesia and antisepsis when Lawson Tait removed an inflamed but intact appendix. Ulrich Kronlein did so in 1884, publishing an account in 1886. Frederick Treves operated on a chronically affected appendix in 1887 and George Thomas Morton the following year. Credit for evidence-based practice goes to Kronlein as "any claim to priority in medicine always rests by consent of the profession, not upon the date of performance but upon date of publication."

Treves, who gave a scholarly account of his own surgical experience, was not too concerned. He is widely regarded as especially gifted in anatomical surgery, was a witty writer and lover of precision in language. By 1901 he had removed a thousand appendices but the previous year Treves was unaware his daughter Hetty had developed an aggravated appendix. This then progressed to peritonitis that resulted in death, despite belated surgical intervention by her father.

His most famous surgery is undoubtedly treatment of the appendiceal abscess of King Edward VII who experienced intense pain just two weeks before his intended coronation on 26 June 1902. The King told Treves, "I must keep faith with my people and go to the Abbey for the coronation." Frederick Treves replied, "Then Sir, you will go as a corpse." The King agreed to submit to surgery after prompting from Joseph Lister too

Robert Koch studied medicine at the University of Gotttingen under Professor Jacob Henie. He was greatly influenced by his view, published in 1840, that infectious diseases were caused by living, parasitic organisms. In 1880, whilst District Medical Officer for Wollstein, Koch became interested in the anthrax bacillus, discovered earlier. Intent on proving the cause, his studies confirmed transmission from blood animals suffering from anthrax. The next challenge was to see if anthrax could be caused if no contact was made with animals. His findings, published in 1876, showed this could be so under certain conditions.

Koch then studied diseases caused by bacterial infection of wounds. His findings, published in 1878, showed that pathogenic bacteria could be obtained in a pure culture form, free from other organisms. He then illustrated how they might be detected. In 1882 Koch published a classical work on the tubercle bacillus and in 1884 discovered the cause of cholera, having studied this in Egypt and India where outbreaks had occurred.

In 1885 Koch was appointed Professor of Hygiene at the University of Berlin. Here he joined forces with Erlich, von Behring and Kitasanto who published their ground-breaking work on the immunology of diphtheria. In 1890 they developed the first serum against this and also a serum against tetanus. The following year a child received the first successful treatment from diphtheria. Up to then over 50,000 children in Germany died each year from this disease.

In testing his theories, Robert Koch developed four rules to identify whether an organism was the cause of a particular disease. First, it had to be found in every affected animal. Then he would isolate the organism and develop it in the laboratory. Next was to check whether this organism caused the disease when it was implanted in a healthy animal. Last, was checking the organism was present in the diseased animal once symptoms appeared. By 1900 he had inspired many other researchers, identifying 21 germs causing diseases in just 21 years. Koch was ecstatic and wrote. "As soon as the right method was found, discoveries came as easily as ripe apples from a tree."

Meanwhile, Louis Pasteur and colleagues had developed a viral preparation against rabies, administered by injections. His first patient was 9 years old Joseph Meister who had been bitten by an apparently rabid dog. The virus incubation was one month and, following this treatment, no signs appeared. Sceptics argued that only if the disease became evident could the vaccine's efficacy be confirmed. Pasteur was criticised for producing only skeletal notes, and discrepancies emerged later between his research and claims, leaving some to suspect that Pasteur had used educated guesswork. If so, he was invariably proved correct!

Yorkshire born Sir Almroth Wright received his medical degree from Trinity College, Dublin in 1883, continuing his education at Leipzig, Marburg and Strasbourg. Appointed Professor of Pathology at Netley Hospital in 1892 he developed a vaccine against typhoid. This was tested on 3,000 soldiers in India and was used successfully during the Boer War. He was one of the pioneers of immunisation and immunology but is perhaps best remembered for declaring that bringing women into scientific society would cause it to become a "cock and hen show."

The Powers of Rejuvenation

In the 19th century there was a belief that rejuvenation remedies could make people feel and stay young with greater energy, positive well-being and exuberance. Such thoughts about the fountain and elixir of youth were hardly new as the Greeks, especially, referred to mystical and magical powers, such as certain water sources.

An age of pioneering medical discoveries, coupled with hope for a much enriched quality of life, spawned a vibrant market for anti-aging devices, creams, pills and potions and the use of electrotherapy devices from corsets and electric belts to hairbrushes and even toothbrushes. The cult of youth fascinated G. Stanley Hall who, in 1904, coined the word adolescence that he insisted was between the ages of 14 and 24. This characterised a love of excitement, the stirring of strong feelings and cravings, linked to overwhelming sensations when "monotony, routine and detail are intolerable."

In 1905 Sir William Maddock Bayliss and Ernest Starling used the term hormones, deriving from a Greek word meaning set in motion, arouse or excite. Hormones are the chemical messengers affecting growth, sleep, appetite, mood and reproduction. In Vienna, Eugen Steinach took the burgeoning science of endocrinology a controversial step further in 1912. He transplanted the testes of a castrated male guinea pig into a female. The testes secretion resulted in the female guinea pig imitating male sexual behaviour. Steinach then developed a technique to reduce fatigue, slow the aging process, increase male vigour and enhance sexual potency. In a later discredited procedure this involved a semi-vasectomy.

Treating Mental Illness

A popular fashion was phrenology, which claimed to identify temperamental characteristics such as aggression or lust ('amativeness') by means of lumps and bumps on the individual skull, and facial physiognomy. In 1846 the term 'psychiatry' was adopted to denote medical treatment of disabling mental conditions which were generally held to have hereditary causes.

The Victorian century witnessed an impressive growth in the classification and isolation (or strictly the concentration) of the insane and mentally impaired. They were contained in large, strictly regulated lunatic asylums outside major cities, where women and men were legally incarcerated, usually for life. Opened in 1851, the Colney Hatch Asylum in Middlesex housed 1,250 patients whilst wealthier families made use of private care, in smaller establishments.

Two major figures in the mental health field were James Conolly, author of The Construction and Government of Lunatic Asylums (1847) and Henry Maudsley, whose influential books included The Physiology and Pathology of Mind (1867).

Regarded at the time as progressive and humane, mental policies and asylum practices now seem almost as cruel as earlier punitive regimes. Men and women were housed in separate wards and put to different work, most devoted to supply and service within the asylum. The use of mechanical restraints such as manacles and muzzles was steadily phased out in favour of 'moral management', although solitary confinement and straitjackets continued to be used.

By the end of the era, therapeutic hopes of restoring patients to sanity were largely replaced by programmes of control, where best practice was judged by the docility of inmates. As part of the passion for measurement and classification, patient records with photographs were kept in order to 'illustrate' the physical evidence or effects of different types of derangement.

Particular attention was paid to female patients, whose lack of approved feminine qualities was tautologically taken to 'prove' their madness. Over the period, sexualised theories of insanity were steadily imposed on mad women, in ways that were unmistakably manipulative. Towards the end of the 19th century, the term 'neurasthenia' was used to describe milder or temporary nervous conditions, especially among educated classes. Throughout the era, since disorders of both body and mind were believed to be heritable conditions, the chronic sick, mentally impaired and deranged were vigorously urged against marriage and parenthood.

Developments in Psychology

The word psychology derives from two Greek words: psyche (mind, soul or spirit) and logos (knowledge, discourse or study). Its emergence as a separate discipline is dated at 1879 when Wilhelm Wundt opened the first psychological laboratory at the University of Leipzig. The aim was to investigate the mind through introspection, in observing and analysing own conscious mental processes. By doing so it was felt the basic constituent emotions might be identified, much in the way chemists analyse elements. This process was given the name structuralism.

Recording and measurement of activity and results were under controlled conditions using the same physical surroundings, stimulus (such as a clicking metronome), instructions, methods of analysis and so on. This marked the separation of psychology from its previously parent discipline of philosophy. For thousands of years philosophers had discussed the mind but now psychology was regarded as a science that required measurement and proof.

In 1890 the philosopher William James defined psychology as The Science of Mental Life, both of its phenomena and of conditions. By this he meant "feelings, desires, cognition, reasoning, decisions and the like." By the turn of the century introspection was questioned, especially by American psychologist John B. Watson who believed results could not be proved or disproved as introspection is a subjective activity.

The emphasis of psychology at this time was concerned with curing mental disorders, such as schizophrenia and human complexes. Whilst worthy subjects, these tended to have negative connotations with a disease focus that explored the deep recesses of the mind. One problem was a tendency to overlook attempts at improving lives, the abilities and desires of a patient, aspirations towards self-fulfilment and, not least, simply to be happy.

In Europe the Vienna Psychoanalytical Society had already been formed. Prominent members included Sigmund Freud, Carl Jung and Alfred Adler. These and other psychology schools had a profound influence on the British Psychological Society, formed in 1901. Psychology was to become an integral part of healthcare, underpinning the notion of a holistic approach.

In 1913 John B. Watson stated psychologists should confine their studies to behaviour as this is observable. If measured by more than one person, this may lead to better outcomes for the patient. In the USA especially, behaviourism remained the dominant force in psychology for 40 years.

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