



## Medicine 100 Years Ago: A Glimpse at Osler's Textbook of Medicine

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One of the prized possessions on my bookshelves is the 1903 edition of *Principles and Practice of Medicine*, by Sir William Osler, the foremost textbook of internal medicine of its time [1]. It is a fascinating exercise to flip through the pages of “Osler” in order to gain a glimpse of the face of internal medicine 100 ago. But first, who was the author of this famous book?

### Sir William Osler [2]

Osler was born in the backwoods of Canada in 1849, the youngest of nine children. His father was an Anglican missionary, and he himself thought initially of entering the church, then changed his mind and studied medicine instead. He took his medical degree at McGill University in 1872. He subsequently visited medical centers in Europe, and in 1873 while at University College in London demonstrated and named the blood platelets. He became professor of medicine at McGill in 1875, and in 1884, professor of clinical medicine at the University of Pennsylvania in Philadelphia. During this period he performed a thousand postmortems and became an expert pathologist.

The most momentous step in his career occurred in 1888, when he was invited by William H. Welch to be the first professor of medicine in the new Johns Hopkins University Medical School in Baltimore. There, together with Welch, who was head of pathology, Howard A. Kelly, chief of gynecology and obstetrics, and William S. Halstead, chief of surgery, he helped to transform the organization of clinical teaching in the United States. Medical education at that time in the U.S. was very backward compared to the best European schools. In the German-speaking countries, there was relative freedom in the universities. The best researchers were recruited and they could investigate and teach what they wanted, and students could study what they wanted as long as they passed the examinations. This was characterized as *lehrfreiheit und lernfreiheit* (freedom of teaching and freedom of learning). In addition, medical students learnt medicine from patients in the wards. Welch, Halsted and Osler were products of this system and were determined to institute similar principles in the U.S. Only highly qualified candidates were accepted. College preparation was required, with a thorough grounding in biology, chemistry and physics, and a

reading knowledge of German and French. Welch joked that it was lucky they had got in as professors, since they would not have got in as students! Students learned medicine at the bedside, presenting the results to the chief, and cases were then discussed in public teaching sessions. While this clinical “clerkship” was standard practice in the best European medical schools, it was entirely new to North America. It soon made Johns Hopkins the foremost medical school in the U.S. Osler, who was also Physician-in-Chief of the hospital, rapidly became a renowned diagnostician and teacher. During the first four years there were no students at the hospital, and Osler used this period to write his famous textbook, which appeared in 1892 [Figure]. The book achieved instant popularity, and 16 editions were published until 1947.



Figure 1. Osler writing the textbook.

In 1904, while visiting England, Osler was invited to be the next Regius Professor of Medicine in the University of Oxford, the most prestigious medical position in England, an appointment made by the crown. For years he had had an exhausting schedule of teaching and clinical practice, and was in great demand as a lecturer. The Oxford appointment enabled him to relax with a much less demanding schedule. He founded the *Quarterly Journal of Medicine* in 1908.

Although primarily a clinician and teacher and not a researcher, Osler had an enormous influence on medicine in his time. He was the first to describe subacute bacterial endocarditis, and his name is immortalized in Osler-Rendu-Weber Disease, Osler-Vaquez Disease, and "Osler's Nodes." He had an extraordinarily charismatic and optimistic personality, and undoubtedly this was important in his clinical success since his therapeutic armamentarium was extremely limited. To quote Nuland: "Witty, urbane, gifted with a flair for the nuances of the English language, warmhearted almost to a fault, devoted to the education of young physicians to an even greater degree, if it can be imagined, than Welch, he became the leading light of the Hopkins faculty" [3]. A man of his fame inevitably gave rise to many stories. For example: "Osler's interest in pathology is illustrated by the oft-quoted tale of the old and seedy individual who begged for alms on the street. He gave the man a coin, with the remark: There is only one thing of value about you, and that is your hobnailed liver, referring to the appearance of the alcoholic liver...Then, handing the beggar his overcoat, he added, 'You may drink yourself to death, but I cannot allow you to freeze to death'. The man inquired the name of his benefactor, and the reply came, 'Dr William Osler, and don't forget the liver'. When the old fellow died a fortnight later it was found he had made a will, leaving 'to my friend Dr William Osler, his overcoat and my hobnailed liver.'" [4]

Osler married late and had only one son, Revere, who was killed in World War I. This broke his heart, and he died of pneumonia in 1919.

### **The state of medicine 100 years ago [5,6]**

The therapeutic paucity of medicine as compared to surgery at the end of the 19th century was striking. Surgery had undergone two earthshaking innovations in that century. The first was the introduction of anesthesia, first used in Massachusetts General Hospital in Boston in 1846. While still primitive and confined to ether and chloroform, it at least banished the horrific pain that had characterized surgery until then and allowed operations to be lengthened and become more sophisticated. The second advance was the bacterial theory of infection discovered by Pasteur, and applied to wound infections by Joseph Lister in 1867. The antiseptic technique of Lister, using carbolic acid, was cumbersome and slow to be accepted, but it brought about an amazing reduction in postoperative infections, and enabled surgery of the abdominal and chest cavities, and subsequently neurosurgery, to become more than a mere dice with death.

In contrast, medicine had not advanced at all from the therapeutic aspect. In the first half of the 19th century, the basis of physical diagnosis was established. Auscultation using the

stethoscope was introduced by Laennec in 1816, and the science of physical diagnosis was developed and brought to a high level of skill by physicians such as Louis of Paris and Skoda of Vienna. The discoveries in the latter half of the 19th century were to form the scientific foundation of modern medicine. Virchow in Germany laid the foundations of the science of microscopic pathology. With the introduction of bacteriology by Pasteur and Koch infectious diseases could be accurately diagnosed and their modes of transmission established. This was of enormous importance, since, long before the advent of antibiotics, simple public health measures such as isolation of infected patients, good nutrition and improved ventilation of buildings would begin to have a slow but sure effect on death rates, which began to fall slightly between 1850 and 1900 [7]. However, there was as yet no specific treatment for these conditions. There were few truly useful drugs. Digitalis was available for heart failure, quinine for malaria, mercury for syphilis and ringworm, amyl nitrate for angina pectoris, colchicum for gout, and morphine for pain [8]. This therapeutic vacuum was filled with myriad folk and quack remedies, most of which were useless or actually harmful.

X-rays were just being introduced by Roentgen at the end of the century, but the electrocardiogram was still in the future, and antibiotics were a distant dream. Thyroid extract was first used to treat hypothyroidism in 1891, but insulin would only be discovered many years later.

### **The textbook**

Osler's textbook was immediately recognized as a masterful survey of the entire field of internal medicine, the best review of medicine of its time. It is didactic, clearly written in superb English by a master teacher, and could be, and was, read by laymen. One such was F.T. Gates, a Baptist minister who was adviser to John D. Rockefeller. On reading the book, he was shocked to learn how few were the diseases that could be treated, and convinced Rockefeller to invest in medical research. This resulted in the founding of the Rockefeller Institute [9].

The contents of the book immediately give an idea of the major medical problems of the day. Of its 1,150 pages, 348 are devoted to infectious diseases (including 80 pages on tuberculosis), 41 to "constitutional" or metabolic diseases (including 14 pages on diabetes mellitus), only 100 pages to cardiology, and 147 pages to neurology. It is clear throughout that the author is an expert pathologist and very familiar with the new science of microbiology. A striking feature to the modern medical reader is the thorough description of the natural course of infectious diseases. Nowadays of course (with the notable exception of AIDS), with the use of vaccines and modern antibiotic treatment, these diseases have either been wiped out entirely or are immediately treated after presentation and diagnosis of the patient, and thus the natural course is hopefully cut short. The description of disease in the textbook is far more exhaustive than the discussion of treatment. The various therapeutic options are discussed critically, most of them often being dismissed. Also discussed are the ways of making the patient comfortable while the disease runs its natural course. The book opens with a comprehensive description of typhoid fever,

then the most important acute infectious disease. Osler was well known for therapeutic nihilism, or to put it more accurately, a healthy disbelief in most of the unproven remedies in vogue at the time. Thus, in the section on typhoid fever, he remarks: "Fortunately for the patients, a majority of these medicines meet one of the two objects which Hippocrates says the physician should always have in view – they do no harm."

There is a very long, exhaustive section on tuberculosis, which was the number one killer of that era: "Tuberculosis is the most universal scourge of the human race." As many as 1 in 60 of the population was estimated to be infected with the disease. A groundbreaking advance in knowledge of the disease was the description of the acid-fast bacillus by Koch in 1882, and his demonstration that TB was *always* the result of a specific infection. It is interesting that a remarkable fall in the incidence of TB was already occurring in the last decades of the 19th century. In Massachusetts for example, the death rate had fallen from 42 per 10,000 inhabitants in 1853 to 21.8 per 10,000 in 1895; similar reductions were occurring in New York and London. This was due to "the diffusion of the knowledge that the existence and distribution of the tubercle bacillus are the first conditions of infection, and also to the successful administrative efforts in securing ventilation, especially of houses and byres...the abolition of dark spaces and enclosures; the dissemination of direct sunlight." He gives a complete description of modes of infection in TB, with emphasis on inhalation of the bacterium. As far as treatment is concerned: "The cure of tuberculosis is a question of nutrition; digestion and assimilation control the situation; make the patient grow fat, and the local disease may be left to take care of itself."

In the section on lobar pneumonia, Osler writes: "Pneumonia is the most fatal of all acute diseases... Hospital statistics show that the mortality ranges from 20–40%...The old are likely to die, the young to recover. At about sixty the death rate is very high, *amounting to 60 or 80%*." (author's italics). The main accent is on non-medical, supportive measures, which were at least innocuous, and waiting for the "crisis" to pass. Osler's therapeutic skepticism is evident throughout the book, and since he had great influence may have played an important role in reducing the use of worthless or even harmful medications. Since the infectious diseases that constituted the bulk of the doctor's work 100 years ago have largely disappeared or are readily amenable to antibiotic treatment, it is perhaps more relevant to our times to look at the chronic diseases which are the main problem today, such as atherosclerotic cardiovascular disease, type 2 diabetes mellitus and cancer.

In the section on angina pectoris, the difficulty in understanding pathophysiology in the absence of diagnostic aids such as the ECG becomes apparent. He opens with a superb clinical description: "In only rare instances do the patients have attacks when quiet. They come on during exertion most frequently, as in walking uphill or doing something entailing sudden muscular effort...Mental emotion is a second very potent cause...Usually during exertion or intense mental emotion the patient is seized with an agonizing pain in the region of the heart and a sense of constriction, as if the heart had been seized in a vice. The pains radiate up the neck and down the arm, and there may be a numbness of the fingers or in the cardiac

region." There follows a discussion of the possible etiology of this condition. Angina pectoris may be "a neuralgia of the cardiac nerves," a "cramp of the heart muscle itself," "due to extreme tension of the ventricular walls," or "transient ischemia of the heart-muscle in consequence of disease or spasm of the coronary arteries." He compares the condition to intermittent claudication, where a state of "relative ischemia" is induced. However, a clear association with coronary disease is noted: in fatal cases there is always narrowing of the coronary arteries. Regarding treatment, patients are advised to lead a quiet life, and to use amyl nitrate in the case of an attack. It would require the advent of the ECG and the description of the characteristic ECG changes of myocardial infarction in the 1920s in order to rationalize the pathophysiology of ischemic heart disease.

Diabetes mellitus, a major scourge in the modern western world, was uncommon in Osler's time. The modern distinction between juvenile onset and adult onset diabetes did not exist then, and the majority of cases occurred between the third and sixth decades. This may be because, in the pre-insulin era, when the disease presented in the young as ketoacidosis, the mortality was incredibly high and most patients simply did not survive. As Osler says of diabetes in the young: "The course of the disease is, as a rule, much more rapid than in adults. The shortest duration was two days. In 7 cases it did not last a month...Of the fatal cases in the London Hospital, all under the age of twenty-five, with but one exception, had died in coma." Diabetic coma was known to be due to a severe acidosis, and the acidic agent was correctly identified as  $\beta$ -hydroxybutyric acid. As regards treatment: "The coma is an almost hopeless complication... The use of bicarbonate of soda in very large doses is recommended to neutralize the acid intoxication. It may be used intravenously."

The etiology of the disease was not known but a connection with the pancreas was clear. It was known that pancreatectomy in dogs gave rise to the disease, and that many cases at autopsy showed disease of the pancreas, usually a chronic interstitial inflammation. There was evidence that the islets of Langerhans were involved in the disease and may "furnish the internal secretion of the gland...". In 1922, three years after Osler's death, Frederick Banting and Charles Best, two fellow Canadians, would publish their great discovery that pancreatic extract produced after pancreatic duct ligation in dogs was capable of reducing blood glucose levels [10].

As for cancer, this is conspicuous by its paucity in the book. Take lung cancer, for example, the most common type of malignancy today: "While primary tumors are rare, secondary growths are not uncommon." There is no recognition of a link with smoking, which is hardly surprising since firm epidemiologic evidence of the connection would only be made more than 50 years later. It seems likely that at a time when life expectancy was so much shorter than today, most people would succumb before they developed malignant disease.

## Conclusion

Osler's textbook can be regarded as the first modern medical textbook. It represents a magnificent summary of internal medicine at the beginning of the 20th century. At that time, one man could

still master the entire field of internal medicine. The textbook was modern in the sense that it was firmly based on the scientific knowledge of the time. The emphasis was on diagnosis and patient management and less on treatment, although Osler's critical attitude to accepted treatments of the day has a modern ring to it. The major scourge of his time, the infectious diseases, would slowly come under control through improvements in hygiene, public health, nutrition and vaccination. The advent of antibiotics would provide effective treatment for bacteriologic diseases, so that the major medical problems in the western world 100 later, with the exception of the special case of AIDS, would be cardiovascular disease, obesity and diabetes, cancer and the degenerative diseases.

If Osler could see us now, he would perhaps have been dismayed by the lessening of our clinical skills and our increasing reliance on sophisticated laboratory tests and imaging, but he would surely have been thrilled by the enormous advances in the scientific knowledge of disease and by our considerable ability to *cure* disease.

Does his book have any relevance to us today? The book is still a fascinating read, because of its brilliant clinical descriptions of the natural courses of diseases such as lobar pneumonia, subacute bacterial endocarditis, and tuberculosis. But there is also something else. It seems to me that one of the most worrying features of modern medicine is the increasing dissatisfaction of the public with healthcare, despite the incredible medical advances of the last century. This may be because we have to some extent lost contact with the original *caring* function of the physician, which was the main thrust of Osler's treatment sections, since actual *cures* did not exist. We, on the other hand, tend to define "quality of care" in terms of our technical ability to diagnose and cure disease, and not

in terms of traditional caring for patients' pain, distress and anxiety [11]. Physicians were once supposed to cure occasionally, relieve often, and comfort always. Perhaps, together with our remarkable ability to *cure* and to *relieve*, we have to relearn how to *comfort*.

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*I would rather take a twenty-mile hike than crawl through a book*

*Jack L. Warner (1892-1978) (original name Jack Leonard Eichelbaum), American film producer who joined his three brothers in Warner Brothers, the first production company to introduce sound to moving pictures*

## Capsule

### Mapping virus history

Southeast Asia is attracting attention as a source of potentially dangerous emerging infections, not least influenza, but also dengue, Nipah, and possibly the causative agent of severe acute respiratory syndrome (SARS). The most important cause of epidemic encephalitis worldwide is the mosquito-borne Japanese encephalitis virus (JEV), a flavivirus allied to West Nile virus. Solomon et al. have probed the geographic distribution of JEV strains across Asia since the first reported outbreak in Japan in the 1870s. All five genotypes identified occur simultaneously in

Indonesia and Malaysia, whereas only evolutionarily more recent strains have spread out of this region. The Japanese epidemic was devastating and affected people of all ages, as flaviviruses do when they reach an immunologically naïve population. By contrast, in Malaysia, it is rarely epidemic, suggesting a long-standing association with humans here and pointing to the Indonesia-Malaysia region as the nidus of JEV.

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