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**ROKITANSKY -
A MAN OF MICROSCOPIC AND
MACROSCOPIC VISION**
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I'm going to tell you about a man of whom you may remember something. Like that of many of his contemporaries in Vienna, I suspect only the names may be known to you, often unpronounceable and from every corner of the Austro-Hungarian Empire. The man I want to enlighten you about is Freiherr Karl von Rokitansky



Figure 1: Freiherr Karl von Rokitansky

The title 'Freiherr' and 'von', with which he was ennobled, is perhaps equivalent to an English baronetcy. He was the one of the leading figures in pathology for over 40 years at a time when Viennese medicine was very influential in Europe and he was probably one

of the most important men who made it so. But his contribution to the reforms which led to the formation of what came to be known as the 'Second Viennese Medical School' is perhaps less well known today than his contributions to pathological anatomy.

The foundation of what became the Vienna General Hospital was a part military and part epidemic hospital already in existence in the centre of the city since the Middle Ages. In the 1690's, Emperor Leopold I encouraged the building of additional wards and by the 1720's the complex of buildings was extensive but disorganised and the earlier buildings were not 'fit for purpose', often housing old soldiers, their widows and families, rather than patients.

As for medical teaching, like elsewhere in Europe, renowned doctors in Vienna attracted colleagues and students and were regarded with some respect in Europe in the 15th and 16th centuries, although not of the order those in Paris, Padua and Salerno. However, with the passage of time and the undue restricting influence of the Church, particularly the Jesuits in the 17th century, the evils of patronage and nepotism soon began to affect the standard of medical teaching.

At the time of Empress Maria Theresia in the early 18th century, the scandalous situation in what had become the de facto University Faculty of Medicine attracted Van Swieten to come to Vienna from Leyden, where he had been a pupil of Boerhaave, and where he was recognised as one of the foremost clinical teachers of his time. Van Swieten quickly expunged the influence of the Jesuits and other religious orders from the hospital and established formal training and examinations for students and transformed the medical discipline into a meritocracy. Over the next 27 years, excelling as a physician and an innovative teacher, he set about improving the School, linking it more formally to the University, promoting

research and so forth. This was what came to be known as the First Viennese Medical School. Anton von Storck, van Swieten's successor as protomedicus (head physician - he treated Maria Theresia for smallpox), was regarded as a pioneer of experimental pharmacology, publishing studies on colchicine, hemlock, hyoscine and datura. Highly gifted physicians practised and taught in the imperial city, such as Leopold Auenbrugger who was the first to describe examination of the lungs by percussion.

Maria Theresa was succeeded by her son Joseph II whose younger brother succeeded him as Emperor Leopold I. Joseph II instigated the building of the first care setting specifically for the mentally ill, the 'Narrenturm' about which I last spoke to you (Figure 2).



Figure 2. The Narrenturm

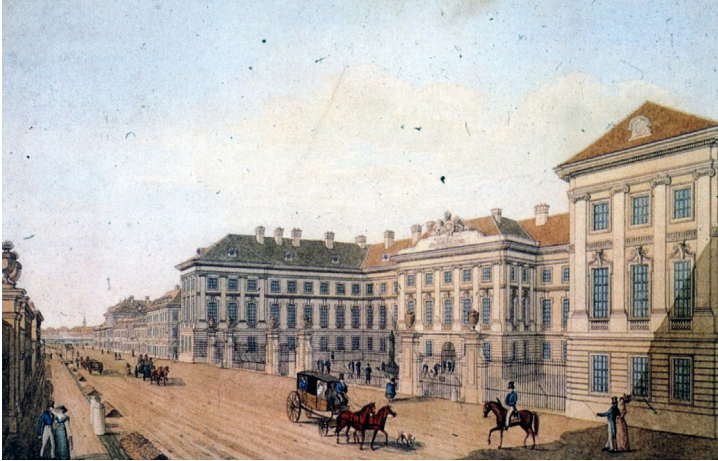


Figure 3. The Josephinum

I also described the first school of surgery in Europe which he had built, the Josephinum (Figure 3), with its fantastic anatomical models in wax (Figure 4).



Figure 4. Wax model 1790

Joseph II, like his mother, was a reformer whose enlightened views were to be brought to fruition in the building of an extensive and elegant new general hospital completed in 1784 (Figure 5), the envy of European medicine.

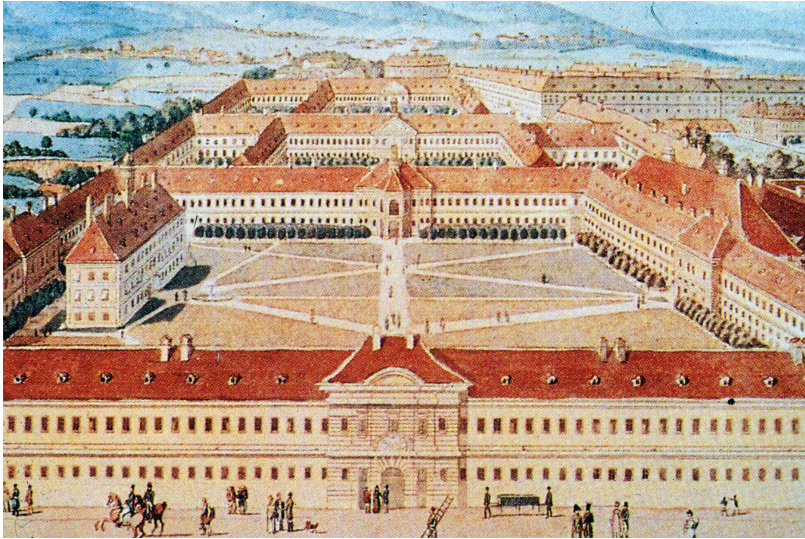


Figure 5. Vienna General Hospital 1789

But then another episode of bad influences began to stultify the quality of teaching and learning in the hospital and medical school in the early 19th century. This had mainly to do with a secretive system for clinical appointments, some inflated egos, excessive respect for status and what we would today call ‘top-down teaching methods’. But it also had to do with the influence of mediocre minds, like Josef Stiff (1760-1836), who as Dean of the Medical School said... *“I don’t want any scholars, just well-behaved citizens... Whoever works under me has to teach what I tell him to. If he can’t do that or comes to me with new ideas, he can just leave or I’ll make sure he does”*.

His textbook “Lessons in Current Therapeutics” (1790) was described by a contemporary as “...*not particularly current and of second rank*”. However, after Stiff’s death in 1836 things began to change when several brilliant young medical scientists came to work in Vienna. One was to have a great and long lasting influence on the standards of medicine in the AustroHungarian Empire. This was Karl Rokitansky (see Figure 1).

Rokitansky was born in Hradec Kralove (Koeniggraetz), in eastern Bohemia on 19th February 1804 of poor parents (his father was a minor functionary in local government). Interestingly, three contemporaries of his who also shone in the medical world of Vienna all came from the same poor Czech background - Skoda (a chest physician and uncle of the motor engineer), Kolletschka (professor of forensic medicine whose tragic early death from septicaemia after cutting his finger while performing a post-mortem on a woman with childbed fever, led directly to Semmelweiss connecting the PM room with this scourge of the delivery room) and Hebra (a dermatologist). Rokitansky went to study medicine in Prague in 1822 for two years and then in Vienna. He obtained his doctorate in 1828 and became an assistant in the pathology department.

When he later began to question his former teachers, saying things such as “*It is important to organise the facts gleaned from the purely anatomical viewpoint in such a way as to validate the diagnosis in the living body*” he was actually threatened with confiscation of his doctorate. It is a manifestation of the stifling of progress at that time that Rokitansky was only able to publish his first article, a description of intestinal strictures based on his post mortem studies, in 1836, after the death of Stiff.

Rokitansky conducted his first post-mortem dissection in 1828 (PM no. 4781) and went on to perform his last on 31 August 1875 (PM no. 64,567) - a total of some 60,000 PMs but that is not

including his other 25,000 forensic post-mortems carried out by him, for the Viennese equivalent of the Coroner. Rudolf Virchow, the Berlin pathologist of a slightly younger generation, otherwise often a stern critic of Rokitansky, later said of him:

“The anatomists from the past were assiduous describers of a variety of anatomical-pathological entities but it needed a Rokitansky to collect them together and be the great archivist of pathological knowledge to date”.

Let’s not forget that until the 1840’s, natural philosophy, as the study of science was until then called, still promoted the idea of a mysterious force or entity which caused illness, the *ens morbi*. Essentially the vitalists were still peddling their beliefs in the universities of Europe of the early 19th century; even luminaries like Broussais and Laennec in Paris still held this view, although they were both to provide interesting alternative insights, albeit only in the fields of gastroenteritis and lung disease respectively.

As Rokitansky wrote in his major work *“A Manual of General Pathological Anatomy”* (1846), that he was driven *“to research into the character of the disease process, to achieve a factual and unchanging basis of knowledge”*. Further, he said: *“Every physical appearance is defined by its material description and only those forces which we know about through our sensory perception, by virtue of changes in the material substance of tissue.. .So it is therefore only in respect of the material that we can deduce any information about these forces”*. These words perhaps encapsulate his vision of what medical study had to achieve, if it was going to develop a better understanding of disease. Virchow, on reading this book, initially wrote mockingly: *“What are these unusual philosophical tones suddenly coming out of Vienna?”*

Nothing demonstrated Rokitansky’s attachment to the

here-and-now, the material, the visible effect of disease as much as his descriptions of some appearances of diseased tissue - "raspberry jelly...pea soup...coffee grounds", which startled his student audience with its hitherto unexpected immediacy but brought every-day reality to his teaching and therefore made it all the more memorable. He was one of the first doctors to see the quantitative and qualitative changes in organs that gave rise to repetitions and similarities which led to quite distinct disease characteristics, and which he described as sharply defined individual entities. Even Virchow had to admit that in the categorisation of the disease process, Rokitansky was ahead of his time, "*the Linnaeus of pathological anatomy*", he called him.

Interestingly, while Rokitansky was considered a master of the morphological and macroscopic, Rokitansky also published microscopic descriptions of disease, but did not begin to use a microscope until after two volumes of his first major work, "*A Manual of Special Pathology*" had been published in 1842. In that year, he had saved up enough from a travel bursary, which took him and Skoda to England and France, to be able to purchase a microscope in Paris. When he got home he had to use the instrument on a high window ledge at the General Hospital, to which he only had access by a stepladder. He never actually experimented, unlike Virchow. That is not to say that Rokitansky did not do some important microscopic work, it was just that while clearly the master of the macroscopic, he never really developed beyond the descriptive in microscopy.

It was the link between pathological findings and a more accurate diagnosis in life that intrigued Rokitansky, who always believed in the need to keep a clinical perspective in the post-mortem room. He was able to exercise his theory with the unstinted help of his

compatriot Skoda, the chest physician. Skoda began his career as assistant physician and lecturer at the Vienna Hospital but his superiors failed to understand his course and in 1837, despite that stick-in-the-mud Dean of Medicine Stiff's death the year before, the powers that be, by way of punishment, transferred him to the ward for the insane, as it was claimed that the patients were annoyed by his examinations, especially by the method of percussion, published in 1838.

In 1846, thanks to the energetic measures of Rokitansky Skoda was appointed professor of medicine against the wishes of the rest of the medical faculty. It was this association between the physical findings on examination of the patient and the pathological findings post mortem, which had not been previously recognised as an essential process in diagnosis, which led the two, pathologist and physician, to join forces and set up a new way of teaching. In 1848 he bravely began to lecture in German instead of Latin, being the first professor to do so - another demonstration of the previous rigidity of teaching methods of the First Viennese Medical School. It was not only Skoda to whom Rokitansky gave his support against fierce opposition from colleagues in the Hospital, he also backed Semmelweiss in 1848, the year after he first published his statistical proof of the dramatic effect on reduced mortality from puerperal fever of chlorinate of lime hand washing for students coming to the delivery rooms from the mortuary. Semmelweiss tried to apply for a renewal of his assistant post in the Obstetric Dept at the hospital but the current professor Johann Klein rejected Semmelweiss for Carl Braun, a man without any obstetric experience, because he disapproved on Semmelweiss's views.

These new ideas about disease and its origins, on which Rokitansky and Skoda collaborated, led to their gradually evolving a new teaching method with more hands-on learning, rather than just

lecture room demonstrations by the professor, as had been the case since time immemorial. This new method became known as the Second Viennese Medical School. It was no coincidence that these innovations were introduced in 1848, because that was a very significant year generally in Europe. The Emperor in Austria was the severely epileptic and simple-minded Ferdinand I, with a Regency of very conservative politicians. It was the Year of Revolutions in Europe which created, if less bloodily than the French Revolution some 50 years earlier, pressure for changes which affected every aspect of the Empire. The old guard, with their out-of-date thinking and teaching had to go, it was time for the new science and new thinking and a change of Emperor (Franz Joseph I, who reigned even longer than Queen Victoria).

Rokitansky had begun his career as assistant dissector and administrator in the pathology department in 1834, aged just 30, to two rather ineffectual but honest and diligent professors - Lorenz Biermayer who burnt out after dreadful personal tragedies and died in 1828, followed by Johann Wagner who also died prematurely in 1834. It is true Rokitansky had little real competition at the time and pathology was still a dearth specialty with few practitioners. In 1844 he was made full professor, after it was acknowledged by the University that "*his published papers in journals* (7 papers on a variety of subjects in the 2 years 1836-8, probably only waiting to be published once Stiff was dead!) *contrasted strikingly, with those of his contemporaries and even predecessors*".

Rokitansky's view that many illnesses were related to diseased organs was clearly being more generally accepted, as he had identified and described the specific pathological changes that occurred and which were expressed in physical signs which could lead to a more accurate diagnosis in life and offered increased chances of more

focussed treatment. But he began to think about diseases that were not localised to organs but seemed to occur all over the body, as it were. The one physical element that was present throughout the body and in every organ was of course blood. Rokitansky thought that the blood constituents of albumen and white blood cells were important carriers of disease and he followed the Berlin neurologist Theodor Schwann in calling plasma and its solute albumen, "*the blasteme*" or '*primal brew*', from which diseased cells were produced, in the manner of crystals precipitating from a solution. Virchow disagreed with this and concentrated his efforts at cellular level, and was in the end successful in developing the 'cellular pathology' for which he is famous. In the fourth volume of Rokitansky's Handbook, published in 1857, Rokitansky pursued the '*blasteme*' theory as an anatomically-based system to try to explain a new 'humoral pathology' based on exudates. Virchow, who was only 26 years old at the time, demolished his theory with the criticism that Rokitansky wanted to explain the anatomical with chemistry. As he put it: "*Rokitansky makes many claims for his exudates, when he does not demonstrate how they might be produced*". By the next edition of his work in 1865, now renamed Textbook of Pathological Anatomy, the exudate and blasteme theory had vanished and he dropped his hypothesis of inflammation. Rokitansky had realised that he was in error. The pioneering work of Florian Heller who founded the Institute of Chemical Pathology in 1844 and Karl Lehmann in Leipzig had not yet yielded the chemical basis of diseases and Virchow was to demonstrate the cellular basis of pathological processes by his microscopic work.

Rokitansky was active in so many fields. His energy and application were prodigious and his workload enormous. From the 1850's Rokitansky's energies were increasingly involved in the administration and development of teaching methods. Elected as a

member of the Austrian Parliament, he was instrumental in setting up more liberal educational laws and wresting the control of schools from the Church, as well as improving the standards in University teaching. His writings and speeches, both in Parliament and in the University, were increasingly more philosophical and aimed at giving science a more important role in the world. His publications in the later period of his life demonstrated this: *"The Freedom to Research into Nature"* in 1862, *"The Autonomous Value of Science"* 1867, and *"Commonality in the Life of all Animals"* 1869 and at his retirement from academic teaching in 1875, three years before his death: *"The Direction of Intellectual Thought in our Time"*.

Almost all the leading pathologists and clinicians of the second half of the 19th century were pupils of Rokitansky. Apart from his duties as university professor and hospital pathologist, he had his appointment as Coroner's pathologist, which he held from 1832 and grimly held on to until 1875, perhaps not necessarily to the advantage of forensic pathology. His many papers on neoplasms, ductus arteriosus and hermaphroditism demonstrated his interest in developmental pathology as did his last clinical paper "Interventricular heart wall defects" in 1875. Inevitably he also held positions on influential national medical bodies and was the medical adviser in the Ministry of Education and used his position to make the necessary reforms in science teaching throughout the Empire.

In summary, therefore, Rokitansky was a man of his time, energetically forging a new world of science and thought engendered by the liberalising ideas of 1848. Fascinated by the theories to explain the human condition of suffering and disease, he tried to promote his own ideas but was great enough to recognise when he had taken a false path. Perhaps more important than his major works on the macroscopic description of disease in the dead body, was his insight into the link that this had with diagnosis in the living. That and his unswerving insistence on the need for hands-on learning in medicine, and which led to the formation of the Second School of Medicine in Vienna, were his greatest contributions to European medicine.