

HYGIENE AS AN ACADEMIC DISCIPLINE AT AUSTRIAN UNIVERSITIES: A SURVEY ON THE OCCASION OF THE 120th ANNIVERSARY OF THE INSTITUTE OF HYGIENE IN GRAZ

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At the end of the 18th century, one single idea dominated all strategies in the battle against the severe epidemics which were affecting all of Europe at that time and against the seemingly inevitable infections following surgical interventions. The root cause of all epidemics and infections was thought to be primarily the bad air – the so-called miasmata. The term already appears in the seven books of Hippocrates, which shows for how long these ideas, deeply rooted in the medical literature, survived.

As all hospitals towards the close of the 18th century were in a pitiable condition with regard to operation and administration, reform-oriented Austrian Emperor Joseph II resolved the establishment of so-called Allgemeine Krankenhäuser (General Hospitals) in the lands of the Habsburgs. That was 220 years ago. This incisive social reform was designed to improve the unbearable conditions in the poorhouses and hospitals system through a strict separation between welfare and health care. The foundation of the first Allgemeine Krankenhaus in Vienna in 1784 was guided by these enlightened socio-hygienic goals and it became the model for other hospitals in Brünn/Brno and Laibach/Ljubljana (1786), Olmütz/Olomouc (1787), Linz and Graz (1788), and Prag and Lemberg/Lvov (1789).

The practical implementation of the most advanced principles in the planning and administration of hospitals at that time thus started at the Allgemeine Krankenhaus in Vienna. A happy beginning was made when Johann Peter Frank (1745–1821) was appointed as the hospital's first director in 1795, probably the best-qualified specialist who had a long professional experience abroad. The new buildings were designed as a large medical center with 2000 beds. The ample clean courtyards and rooms with improved ventilation and many high windows were supposed to prevent the formation of miasmata.

Frank's six-volume work, *System einer vollständigen medicinischen Polizei* (A Complete System of Public Health), first volume published in 1779, represents the academic basis for the establishment of hygiene as a discipline, which occurred much later. From many of his writings, one basic insight emerges which has always been and remains to this day a sad truth: "Poverty breeds disease." Nevertheless, the main culprit with regard to infections and epidemics remained, and for a long time to come, the air – in the form of miasmata.

Why do I place this at the beginning of my presentation of hygiene as an academic discipline at Austrian universities? Because it marked a new era and because it demonstrates impressively that in looking at the origins of the field in Austria, we must take into consideration the larger context. History has divided this region,

but these days its regional identity has been re-established in the framework of the European Union.

Max von Pettenkofer (1818–1901) was the actual pioneer in and founder of hygiene as a medical discipline. His training as a physician, chemist and pharmacist occurred at a time, when the miasma theory was still regarded very highly and it thus significantly determined his scientific career. In 1856, he became a member of the Academy of Sciences in Munich and in that year was appointed as chair of hygiene which was newly created largely on the basis of his own scientific research. In 1875 he rejected an offer from Vienna and, starting in 1879, directed the newly established Institute of Hygiene of the Medical School of the University of Munich designed according to his own plans. Using research methods of chemistry and physics, Max von Pettenkofer investigated the impact of air, water, food, nutrition, cleanliness, and public health on the state of human health.

The revolutionary findings of Robert Koch received slow and hesitating recognition at a somewhat later time – eventually, however, they swept away the miasma theory which had endured for several millennia and received full acceptance in the field of hygiene.

For decades, von Pettenkofer's Institute of Hygiene in Munich trained many of the later chairs in the field at other universities. Von Pettenkofer himself committed suicide in 1901 at the age of 82.

In Central Europe, more and more chairs and Institutes of Hygiene were founded at universities in the last third of the 19th century. I will present the situation of the various universities on the territory of present-day Austria in chronological order of their establishment.

VIENNA

In the spring term of 1805, Johann Peter Frank initiated a lecture entitled "Medizinische Polizei" (Public Health) which was the second part of a two-semester sequence. The two fields, forensic medicine and public health, were not separated until 1875; for the latter, an offer for the now separated "Medizinische Polizei" was made to Max von Pettenkofer. However, since Munich complied fully with his requests regarding the establishment of a new Institute of Hygiene, he declined the Vienna offer.

Instead, chemist **Josef Nowak** (1841–1886) became the **first professorial chair of Hygiene in Vienna in 1875**. Under his chairmanship, the denomination of "Medizinische Polizei" was changed to "Sanitätspolizei" and, later, to **Institute of Hygiene**.

Koch's findings regarding pathogens were still not fully accepted in Nowak's time and his first Austrian textbook on the subject does not take a clear position on this issue as yet.

In **1887, Max von Gruber** (1853–1927) who had taught hygiene at the University of Graz since 1884, became professor extraordinary and chair of hygiene in Vienna, and was eventually promoted to full professor in 1891. Similar to his previous experiences in Graz, he found that the Institute was poorly accommodated – in several rooms of an old gun factory. Difficulties with the authorities and time- and energy-consuming administrative work reminded him of the hardships in Graz. Nevertheless, he was very successful not only in academic-theoretical, but also in practical contexts (drinking water, housing, food safety, social ills, eugenics, control of epidemics, public information campaigns). During his time in Vienna, agglutination was discovered which established his international reputation.

It was Max von Gruber, who had initially worked under very dissatisfying conditions, who designed and implemented the plan for the new Institute of Hygiene in Vienna. In 1902, he succeeded von Pettenkofer in Munich; the new Vienna Institute did not go into operation until 1908.

Von Gruber was succeeded as chair by two of his students – **Arthur Schattenfroh** (1869–1923) and in **1924 by Roland Grassberger** (1867–1956). Their main areas of research included the theory and practice of disinfection, food hygiene, toxins and antitoxins. During the chairmanship of Grassberger, the Lebensmitteluntersuchungsanstalt (food safety department) was separated from the Institute of Hygiene.

Continuing von Gruber's work in the area of social hygiene, Ludwig Teleky (1872–1957) was the first Viennese to obtain the advanced academic degree of habilitation in the area of social hygiene (1909).

From **1937** through the end of World War II in 1945, **Max Eugling** (1880–1950) served as chair of the Institute of Hygiene. His well-organized textbook was familiar to many generations of students. Beginning 1945 he was very diseased.

In the spring term of **1945, Marius Kaiser** (1877–1969) was nominated chair at the advanced age of 68. He had previously directed the Institute for Vaccine Production, the Rabies Vaccination Institute, and the Serological Institute. With his boundless energy, he managed to reconstruct the Institute which had been partially destroyed in the course of a bombing raid on the 10th September 1944.

Kaiser spent his assistant years at the Institute of Hygiene at Graz as student of Prausnitz (see Graz) where he developed his main research interests, namely questions of practical hygiene, bacteriology and serology with special consideration of vaccines and their production. In 1948, Kaiser became professor emeritus but continued to direct the Institute for years.

Richard Bieling (1888–1967) was appointed chair in **1952**. His was the difficult task to bring the Institute, reconstructed from war ruins by his predecessor Kaiser, up to date with the many different new directions in research that had emerged. He had to train a staff able to lead the Institute into a new future. Bieling retired in the fall of 1959.

The succession of Bieling was not easy. Initially, in 1959 Georg Henneberg, the chair of the Robert Koch Institute in Berlin, was placed first, but he declined the offer for personal reasons.

After a prolonged period of deliberations, an offer was made

to me in September 1961. However, I had only just received the chairship at the Institute of Hygiene in Graz in June 1961. Somehow the various searches and offers had become entangled. Given the fact that I had only just been appointed in Graz and the far-reaching offers I had been made there, I declined in October of 1961.

Eventually, **Hans Moritsch** (1923–1965) was in 1962 appointed, a broadly-based researcher with a special interest in virology, a field which was sharply rising in importance at that time. Moritsch not only expanded the Institute further but also established virology as research focus in Vienna. Unfortunately, Moritsch died already in 1965 on account of a tragic virus infection during his scientific investigations at the early age of 42 years.

Again, I received an offer from Vienna. At that time, I was in the midst of my research dealing with clostridia that break up tumors. I had expanded the Institute of Hygiene in Graz and managed to hire a highly qualified staff. I was in my first year as dean of the Medical School and had just been elected next rector of the University. Following intensive contacts with the Vienna Institute and friendly and open discussions with the acting chair of the Institute, H. Flamm, we arrived at a shared vision for the field in the whole of Austria. In the end, I again declined the offer for professional and personal reasons.

After an interim period of one year, **Heinz Flamm** (born 1929) was finally appointed as new chair in **1966**. This was definitely a very fortunate choice as the Institute was completely reorganized during his chairship. A number of special fields emerged from the “one” discipline of hygiene as separate institutes, in close cooperation with the parent Institute.

The new Institutes that emerged were the Institute for Environmental Hygiene (1971), Virology (1972), Tropical Medicine and Specific Prophylaxis (1974). New departments for parasitology, drinking water hygiene and social medicine with extraordinary professorships were also added. Throughout his career, Flamm has never lost his energy for research. Until his retirement, he was a universally recognized specialist.

The Oberste Sanitätsrat (Austrian Health Council) owes him well-researched expertises regarding many questions in public health.

In this communication to the public, I want to thank him for all the years of excellent cooperation and especially for having respected the results of our discussions preceding my rejection of the second offer. Thereby, to the advantage of all, we have prevented the continuation of personal animosities of our predecessors in the field. In this way, too, a new era had arrived. In the end of September 1991, Heinz Flamm retired at his own request.

His deputy, **Manfred Rotter** (born 1940) was first appointed as interim successor and then as chair of the Institute. His research interests include virtually the whole area of bacteriology, especially problems of disinfection and sterilization, all the way to the development and definition of international standards. His personal research also includes a number of other topics including a very detailed and many-faceted interest in hospital hygiene.

GRAZ

At the **University of Graz** (founded in 1585), the Medical School was **established** in 1863, a **chair of Hygiene in 1884**. The con-

dition of the buildings of the School were still very poor. The general hospital, founded towards the close of the 18th century, had long since ceased to meet the requirements of a new time, both architecturally and in terms of equipment. In a physician's report we read: "The sickrooms were overcrowded, beds were lined up one next to the other, in the center emergency beds were placed (wooden planks). Even on the floor there were patients – on straw mattresses. [...] Lighting consisted of a few, dim gas flames [...]. There were only a few, badly furnished baths and toilets. At times, the isolation ward was so overcrowded that three children shared one bed and a large number had to be placed on the floor. [...] Patients with typhoid fever were placed with other patients. [...] Repeatedly, large epidemics swept the hospital. [...]."

Similarly, the buildings for other medical disciplines were also much too small.

Starting in 1863, Adolf Schauenstein, chair of the "Institut für Staatsarzneikunde und gerichtliche Medizin" (Public Health and Forensic Medicine) dealt with topics relevant to the field of hygiene. In 1882/83, Julius Kratter gave lectures on the new field termed "Hygiene." In 1884, **Max von Gruber** (1853–1927), a student of von Pettenkofer, became the **first chairholder in the field of hygiene**. When nominated, von Gruber was only 31 years old, a youthful age which shows that the field had really just been started by von Pettenkofer.

The Institute was housed in an emergency room separated from the Institute of Physiology and represented no more than an extremely poor interim solution. It is not surprising that von Gruber accepted an offer from Vienna only some semesters later, in 1887/88, where the material conditions were far from ideal but at least better than in Graz.

After a six-year vacancy, in 1894, another student of von Pettenkofer followed; **Wilhelm Prausnitz** (born 1861 in Glo-gau, died 1933). When he took over the position, he was only 33 years old and he directed the Institute with admirable energy and vigour. In these almost four decades, his broad research interests and his effectiveness in implementing his findings not only decisively shaped the Institute of Hygiene in Graz but also had an innovative and productive impact on many of the health problems, on health policy, and the health situation of the population at large. Starting in 1897, he was in charge of hospital hygiene and contributed decisively towards the establishment of the new university clinics.

In 1897, he founded the first Food Safety Department in Graz which was connected with the Institute of Hygiene. In 1904, he submitted the first application for the establishment of a public bacteriological laboratory, also at the Institute of Hygiene. It was authorized and eventually started operation in 1906. Those who knew him personally told me that he was a researcher fully convinced of his work, who was never afraid to speak his mind and managed to succeed to get done what he considered to be correct, even through court action if necessary. His textbook "Grundzüge der Hygiene" (Basic Hygiene) clearly focussed on environmental hygiene; by 1907, it had already appeared in eight editions. He survived his retirement in 1932 for only one year and died in Munich on 11 September 1933.

His successor, nominated in 1933, was **Heinrich Reichel** (1876–1943). He came from the Vienna school and his main goals were questions of social hygiene, alcoholism, epidemics and also

questions of genetics. He was an excellent mathematician and used this expertise to study such questions as bacterial growth. A severe illness, to which he succumbed in 1943, forced him to retire prematurely.

In 1942, Reichel was succeeded by **Walter Schmidt-Lange** (born 1902 in Schleswig, died ?). Previously, he had worked in tropical medicine, as ship's doctor, and as public health officer. Starting in 1932, he became assistant in Munich and obtained his habilitation in 1935. His work was very practically oriented and included detailed questions from throughout the whole field. Due to the special conditions of the post-war era, he submitted his resignation on August 1, 1945.

One personal detail: Shortly prior to his resignation, Schmidt-Lange hired me as unpaid volunteer at the Institute and also made available two small rooms for my personal accommodation. Strictly speaking, he made it possible for me to enter the field of hygiene.

After the chair had been filled on an interim basis by Privatdozent Franz Lieb, **Heinrich Manfred Jettmar** (1889–1971) in **May 1947** took over as director of the Institute. His fascinating biography amounts to a novel. Called to do military service in 1914, he became Russian prisoner of war in that same year and was deported to Chita (Siberia) to work in a military hospital. In 1917, he became laboratory assistant dealing with the battle against the plague. In 1920, he directed the trans-Baikal plague expedition. In 1922, he completed his medical studies in Vienna and immediately returned to Chita where directed the laboratory and worked in plague prevention in Northern Manchuria until 1930. In 1931, he became director of the central laboratory at Nanking and undertook several expeditions to fight the plague. In 1932 he was back in Vienna at the Institute of Hygiene where he received his habilitation in 1934. In 1937, he returned to China as epidemiologist in the service of the League of Nations. Later he also worked at the German Medical Academy in Shanghai. He was therefore not available to accept the offered chair of Hygiene in Innsbruck.

He did not return to Austria until 1946 and, in 1947, received the offer of the Graz chair. Given his previous international career, his research concentrated on epidemics, parasitology, entomology, and numerous problems of practical hygiene which he had to deal with as member (and vice-president) of the Oberste Sanitätsrat and in cooperation with the WHO. His enormously painstaking research and the precise documentation of his experiments were both model and challenge for me, although we never carried out any research together. The enthusiasm for his work knew neither Sundays nor vacations – and whoever came to the Institute early in the morning found that he was by no means the first to be there. As an internationally renowned expert, he directed the Institute until 1961.

In July of 1961, I received the offer to take over the chair. At that time, in-house successions were very rare. All later offers from other universities in foreign countries I have rejected following careful deliberations, mainly because the Ministry has always generously provided the means to extend and equip the Institute and has made it possible to hire the necessary staff. Also, I liked the cooperative atmosphere at the Graz Medical School and the spirit of collaboration with my colleagues. Given the fact that I am Viennese by birth and that I had the honor of having received

two offers from the University of Vienna, this is a compliment to Graz – and by no means diminishes Vienna.

In 1966, I was nominated “hospital hygienist” of all hospitals in Styria (today it is separated and directed by Prim. A. Bogiatzis) and, in 1971, I became “Landeshygieniker” (Styria’s chief officer for hygiene in charge of all environmental problems of the state). Today it is directed by my former coworker Prof. M. Köck. Starting in 1975, the Institute also received a department for the health of mother and child providing advice and laboratory tests for pregnant women and as information resource for physicians. Today, this department, which is directed by my daughter, MR Dr. Vander-Möse, screens and provides advice to more than 85% of all pregnant mothers in the state.

From 1961 until 1990, I was member of the Oberste Sanitätsrat, for 20 years I also served as vice-president; similarly, I served as president of the Landessanitätsrat of Styria. Several WHO conferences on topics relating to the research at the Institute took place at the Institute. Also, I attempted not to lose contact with my patients and for quite a while I also worked on the side as a general practitioner.

Due to the support of the Federal Ministry, the Institute came to be substantially increased both in size and personnel. My excellent staff also organized emergency and epidemiological programs in developing countries and other areas of need. **Wolf Sixl**, who **chaired the research department for geomedicine and tropical hygiene** deserves special mention.

In 1990, I retired as Institute chair one year prior to the official retirement age in order to assume the responsibilities as chairman of the board of the Styrian state hospitals which included the university clinics.

My student **Egon Marth** (born 1948), who had come to the Institute with a broad-based training both as a medical doctor and a Ph.D. in Biology, took over the chairship, first on a provisional basis, then, in **1992**, as permanent chair.

Already in previous years, he had dealt with the impact of the environment on health and with new approaches to the immunology of infectious diseases. His main research as chair thus became the exploration of environmental pollutants and strategies for effective counter-measures such as documentation of the effects of noise pollution. In the area of infection, his basic research leads to practical applications, for example in the area of optimization of vaccinations.

The fight against the global threat of new infections and epidemics continues to be a research focus of the Institute. The Center for Environmental Protection and the bacteriological-serological, virological and water laboratories are still part of the Institute and meeting places of researchers and practitioners.

Under Egon Marth’s leadership, both staff and instruments have been yet further extended in order to do justice to the new diagnostic methods. Since he took over the chair, he has also been member of the Oberste Sanitätsrat and presently also chairs the Sanitätsrat of Styria.

Under his leadership, the Graz Hygiene Institute has remained a recognized center of research and practical applications in the entire field of Hygiene, also because of the excellently trained staff in specialized areas and the productive atmosphere in the Institute at large.

INNSBRUCK

The complex history of the Innsbruck medical school transcends the topic at hand by far. Thus I will skip the foundation of the first (1673–1782) and second (1792–1810) medical schools and start with the establishment of the third medical school in 1869.

From the very beginning, there was a chair for “Staatsarzneykunde” (forensic medicine and public health) chaired by Eduard von Hofmann. In **1897**, the school decided to establish a **chair for Hygiene** and, **in the same year, Alois Lode** (1866–1950) was **nominated** in spite of great space constraints.

Given the fact that hygiene, as an independent field, was very young, it is not surprising that the chairholder was very young as well. At that time, Lode was only 31 years old – and he directed the Institute with an abundance of energy for a full 40 years. The similarities with the development of the Graz Institute are obvious.

In 1894 he started his training in hygiene in Vienna under Max von Gruber and received his habilitation there in 1897.

Epidemiology and food hygiene were his special interests. His research on bacteria-inhibiting substances and microorganisms anticipated in interesting ways the later antibiotics.

He became a member of the Oberster Sanitätsrat in 1912 and served as its vice-president for a long time. He participated and initiated key developments in virtually all areas of practical hygiene. In 1904, he was able to move into a new building; in 1912, the bacteriological and serological laboratories were continued in a separate government-administered agency.

Following his retirement in 1937, the later chair of the Graz Institute, H.M. Jettmar, was on the short list; however, Jettmar had again returned to China. Eventually a student of Prausnitz was nominated, Johann Hammerschmied, who had previously directed the Bacteriological-Serological Laboratory in Graz. However, he had not officially been appointed by 13 March 1938, the day the Anschluss was formalized, and a new list was produced with Jettmar in first place. However, Jettmar was still in East Asia and thus the ministry in Berlin offered the position in **July 1938** to **Friedrich Weigmann** (born 1890 in Kiel, died ?). War times and especially staff shortages greatly hindered his scientific research. In 1945, the French occupation authorities did not renew Weigmann’s contract.

In October 1945, the Medical School nominated **Walter Hauptmann** (1898–1952) and he was appointed to the **chair in 1946**. He had received his habilitation in Innsbruck under Lode and became director of the Bacteriological-Serological Laboratory in Graz.

Hauptmann was a very “correct, diligent, exact and economical person” – so it says in the Centennial Report of the Medical School. He managed to establish a well-respected teaching program and under his leadership, the destroyed pre-war buildings were at least partially reconstructed. After the Food Safety Agency had been lost under Lode, the Bacteriological-Serological Laboratory now also became an independent entity. Hauptmann died in 1952.

He was **succeeded by Alfred Schinzel** (1904–1981). In 1952/53 Schinzel became provisional chair and in 1953 professor extraordinary and director of the Institute; in 1958 he received the chair position. He had been trained in Reichel’s department at the

Vienna Hygiene Institute, went to Graz with Reichel where he received his habilitation in 1935, and served as director of the Vienna Hygienic-Bacteriological Laboratory from 1935 to 1953.

His research focussed especially on the hygiene of use and drinking water, bacteriology, serology, disinfection, and vaccinations. In his function as member of the Oberste Sanitätsrat, I have come to know him as a very accurate expert for a number of specific issues in hygiene. In 1972, he convinced the Medical School of the necessity of the foundation of a **second Institute of Hygiene**. One for General Hygiene, one for Medical Microbiology. This **new “Hygiene 2” institute was directed by Johannes Benger** (1922–1980) who unfortunately died unexpectedly in 1980. With his death, the affiliation of this recent foundation came into question. At that point, both chair positions were vacant and, until the directorships of both institutions were filled, Erich Semenz served as provisional chair.

In February 1983, **Manfred Dierich** took over the directorship. Born in Erfurt in 1941, he received his habilitation at the Institute of Microbiology at Mainz. With him, new research areas and exciting plans were brought to the Institute. From the very beginning, he concentrated on problems of viral diseases which have undergone such dramatic changes in the past decades. The focus, of course, was on AIDS. As member of the Oberste Sanitätsrat, he has suggested new approaches which by far transcended the control of this specific infection. In 1986, he founded a “Ludwig Boltzmann Institute for AIDS research”. In 1988 he became the director of the Bacteriological-Serological Laboratory and reintegrated it into the Institute. Under his chairship, he and his well-trained staff of course also dealt with the current problems of environmental hygiene both in research and in practical applications. Thus, the Institute of Hygiene in Innsbruck has become a recognized center for the work in the field of hygiene as a whole.

HOW WILL THE FIELD OF HYGIENE DEVELOP IN THE FUTURE?

In 2004, the medical schools, which had so far been part of their respective universities in Vienna, Graz, and Innsbruck, have become independent “**medical universities**”. The modern plans for administration and organization whose implementation will be one of the main tasks of the near future call for the abandonment of the traditional institute structure and the creation of larger multi-disciplinary areas. Given the traditional status of the Institutes which have developed over such a long time, this will not be easy – I am choosing my words carefully.

With regard to Hygiene, quite a number of independent spe-

cial institutes were established in Vienna quite some time ago. However, there have always been personal contacts to what was acknowledged to be the “parent” Institute of Hygiene. With each new appointment, the various fields may either grow more closely together, or, as I, having a practical mindset, would suggest, lead to greater separation.

Institutes incorporating the complete range of hygiene, which presently still exist in Graz and Innsbruck, will only continue to survive if chairholders have a broadly-based training and conduct a large range of scientific and practical projects. Given the emergence of larger and smaller specialized disciplines, this will prove to be more and more difficult. My textbook on **Hygiene und Mikrobiologie** initially published in 1948 and republished in its 13th edition in 2000, may well have been the last work in the German language covering the whole field.

A prediction of the future development of the field is very difficult, if not impossible, today. I am not referring to the next few years but to the development of the field in the more distant future. However, this does not amount to a negative conclusion of my sketch of the development of the field in Austria. Without a doubt, the basic direction of the field, regardless of what its denomination will be and of however many specialties it will consist, will remain the search for the best-possible maintenance of the health of the population, of providing protection in cases of danger. This basic goal cannot be regarded as antiquated or outdated.

Indeed, Hygiene is modern in a very exciting way and, given the manifold old and new threats to public health in our time, more relevant and important than ever before.

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Erratum

The editors apologize for misspelling the name of Demosthenes B. Panagiotakos in Eur J Publ Health 2004 Dec;12(4):228–30. The correct name initials are D.B.