SEMMELWEIS 200 YEARS

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THE BEGINNINGS OF CLINICAL OBSTETRICS FROM GÖTTINGEN TO PEST-BUDA

Lilla Krász

The idea of saving the lives of mothers and children appears not only as a humanitarian but also as a political goal in 18th century population theories, appearing as part of the mercantilist and cameralistic essays on state theory addressing the practical efforts of the government of the era: a fundamental condition for ensuring the economic and military resources of a state is to increase the population. This reasoning lays the foundation for the increasing interest—on the part of both government circles and the scientific community of the period—in birth and obstetrics, with investments directed at creating the mental and material conditions for education. By the middle of the 18th century, a European network, streaming theoretical knowledge on obstetrics and skills of a technical–practical nature had developed, comprising universities and alternative knowledge centres outside of universities, which sometimes competed and sometimes cooperated with one another.

In our study, we attempt to describe and to place in parallel the most important elements of the various knowledge management strategies and institutional patterns of the instrumentalisation of obstetrics in the 18th and early 19th century, called »*ars obstetrica*« in the curricula of the age, which could be best characterised by the concepts of »governmentalisation« (*Gouvernementalisation*),[1] »scientification« (*Verwissenschaftlichung*) and »physicianisation« (*Verärztlichung*), and how the ideas and various systems of discourse regarding physicians, surgeons, and physician–surgeons appear in this manifold process. In the scientific emancipation of obstetrics, besides the obstetric professurae founded in the medical faculties of universities, the »medicalisation« of obstetric knowledge, and publications of different genres (textbooks, catechisms, studies), it was teaching hospitals, "the forerunners" of the modern clinics of obstetrics, that played a decisive role. Our study focuses on investigating the »scientification« (*Verwissenschaftlichung*) models of the German-speaking area which had the most defining influence on the 19th century discipline of Hungarian obstetrics.

Obstetrics between »ars« and »scientia«

In 1751, the University of Göttingen,[2] offering the most innovative educational and research programme of European scholarship in the 18th century, invited a young doctor, Johann Georg Roederer (1726–1763) from Strasbourg, to teach obstetrics and to take the new extraordinary professor's post (*Professor Medicinae extraordinarius in arte obstetricali*), who at the same time received the first chairmanship of the *Accouchierhaus* belonging to the medical faculty[3] and serving—besides midwife training—the practical obstetric training of future doctors. Roederer's training trajectory—which can be regarded as paradigmatic among the leading obstetricians and surgeon obstetricians of the period—well illustrates the functioning of this European network that played a defining role in the theoretical and practical education of obstetrics, had been continuously expanding since the 17th century, and consisted of the training centres that were virtually mandatory "places of pilgrimage" for future physicians and surgeons at the time. This »*respublica obstetricia*,« functioning also as a communication network, significantly contributed to the intensive streaming of discourse on the content, material resources and infrastructural background institutions of obstetrics[4] (the establishment of departments for the practical training of obstetrics in the already functioning hospitals, the establishment of independent delivery homes and obstetric clinics) through personal encounters, »*gelehrte Reise*« study tours, correspondence, publications and bookshops.

Having completed his medical studies in his home town, Roederer joined this knowledge streaming network for a relatively long time i.e., a study tour of nearly three years (1747–1749), visiting hospitals and educational centres of key importance and the professionals working in them, such as leading midwives, surgeons and physician–obstetricians.[5] During his tour, he spent a long time in Paris, where in addition to attending lectures on various fields of medical sci-

ences he regularly visited the department of obstetrics at Hôtel-Dieu, which had been functioning since 1630, and tried to learn practical skills[6] from the leading midwives working there. In London he took part in practical obstetric courses by William Smellie and William Hunter,[7] two obstetricians renowned throughout Europe. In Leiden he joined in the everyday life of the clinic founded by Boerhaave at the beginning of the century, which was still functioning and enjoyed an excellent reputation, even in Roederer's time. At the end of his journey he returned to Strasbourg where he attended the midwife training centre founded by Johann Jacob Fried on the French model, and improved his knowledge in the delivery home, founded in 1728 as part of the city's civilian hospital. He closed his study tour in Göttingen, where he met Albrecht von Haller, who had also studied in Leiden earlier, and attracted attention by his multifaceted obstetric knowledge; after a short time this meeting resulted in him being invited to the University of Göttingen.

The uncertain position of obstetrics in contemporary science is clearly illustrated by his inaugural speech[8] entitled "*De artis obstetriciae preasesentantia quae omnio eruditum decet, quin imo requirit*" which can also be interpreted as his programme speech held in 1752. For the new professor and director of the delivery home, it was a real challenge to find adequate technical terms for the clear and correct expression of his objectives. Terminological problems were already beginning to appear as to how to name the technical area he represented. The noun "obstetrix" in the expression *ars obstetricia* was usually used as a name for a midwife; however, it is gender neutral and originally designates the person assisting in delivery. The use of the word "ars" however refers to a more complex phenomenon, as the word in the 18th century was not suitable for differentiating between the educated and refined scientific forms of knowledge and the forms based on practical skills and abilities pursued as a trade. At the same time, it is also important to keep in mind that in the middle of the 18th century, when "scientia" was still used in the everyday context to name a variety of knowledge, the use of the word "scientia" would not have solved this terminological problem, because it was not until the early 19th century in the German speaking principalities that it denoted the forms of higher knowledge, and the adjective "scientific" (*wissenschaftlich*) as well as the noun "learning" (*Wissenschaftlichkeit*)[9] were spread. The term *ars obstetricia*, therefore, meant both the abilities of the midwives obtained by experience and the state of obstetrics as an important branch of medical science. Roederer had overcome the problem of the missing concepts by defining the goals of his mission and the technical field entrusted to him by using longer, circumlocutory forms. In his speech, obstetrics was primarily characterised as "the most noble and most useful of all sciences" (*nobilissima et utilissima scientiarum*). He insists that the basic condition for the improvement of obstetrics is the complete replacement of persons: at deliveries, men of science (*ordo eruditorum*) should step in place of the ignorant midwives of the lower social strata so that this particularly important field of medicine should take its proper place in the world of *universitas litterarum*. As a legitimation of this replacement of persons, Roederer placed the male obstetricians with "thorough anatomical knowledge," and capable of "mathematical and philosophical thinking," who by the power of their knowledge are able to "overcome the old bad habits" in a short time, as a positive counterparty to the, as he said, ignorant, superstitious, greedy, immoral midwives. Along with the praise and emphasis of theoretical knowledge, Roederer — in his capacity of the director of the *Accouchierhaus* — emphasises the need for the practical utilisation of the theory, saying that "the application of knowledge can only be justified in practice." He points with sharp polemics to the many shocking birth injuries, where the midwives are incapable of "helping the women in labour, soaking in blood, with already motionless babies hanging out of their bodies." With determined consciousness, and — we must add — extraordinary optimism, he makes a promise that an experienced male obstetrician can alleviate; moreover, can prevent all that misery, because he intervenes "like a saviour angel" and with "experienced hands averts the obstacles, and helps the foetus into the world, and with his intervention he might also save two lives." Roederer's arguments turning towards and emphasising the utility of medicine in the state sciences and, through this, also demanding greater appreciation for the medical-midwifery professions, must have had a considerable effect on a wider and narrower medium of humanitarian and enlightened ideas, both within and outside the university.

The instrumentalisation of obstetrics, similarly to other disciplines of medicine, is a manifold and long-lasting process which, on the one hand, presupposes the creation of the framework for a university level

education in this field, the creation of *docenturae*, extraordinary and regular *professurae*, and the founding and continued development (both in methods and instruments) of clinics for practical training closely related to universities. On the other hand, an important criterion for the instrumentalisation of obstetrics as a medical discipline is the intensive publication activity on the subject of *obstetricia* and its research findings in textbooks and periodicals. Finally, this multi-dimensional process can be regarded as closed when, following the initiative of a given governmental authority, obstetrics has become an independent and compulsory examination subject for medical curricula.

The universities of the German speaking countries, playing a seminal role in the institutionalisation, »scientification« and »physicianisation« of Hungarian obstetrics, were beginning to add[10] obstetric courses to their curricula from the 1720s and 1730s by taking over the knowledge organisation patterns[11] used mainly by French, sometimes Dutch and English surgical and obstetric schools (most of them outside universities), including those of the alternative training and further education institutions for midwives, surgeons and physician-obstetricians in the 17th and 18th centuries. However, at this time, the university level education of obstetrics (still on the periphery of academic medicine) did not have any independent, fixed positions. The training itself was clearly confined to the transfer of theoretical knowledge, and it was not its goal to train practising physician-obstetricians or to pass on practical skills. Typically, the instructor of anatomy and/or surgery announced a specific obstetric course or integrated it into surgery or inserted the theory[12] of obstetric operations into his lecture on the lower body, driven by his own enthusiasm. In their lectures, instructors usually relied on the obstetric textbooks of French authors or the obstetric sections of surgical textbooks.[13]

The process of obstetrics trying to find its place in the scientific life of the German language area entered a second phase from the middle of the 18th century. In the medical faculties of the universities, obstetrics became part of the education canon in that so-called "common or combined *professurae*" (*Sammelprofessuren*); these were usually headed by teachers of surgery and/or anatomy.[14] From the last third of the 18th century, independent *professurae* came about, either by the separation of combined *professurae,* or because the extraordinary *professurae* were transformed into regular departments. At the universities of Vienna and Prague, however, obstetrics was institutionalised[15] decades earlier than in the German principalities. Still, *obstetricia* was only regarded as a subdomain of surgery. Like in the rest of Europe, the founders of obstetric schools formed in the German language area at universities or in other training centres outside the universities were surgeons, or at least doctors who studied obstetrics from surgeons. This clearly reflects the period's views on knowledge and science that drew a sharp demarcation line between the areas of anatomy (built on practical application of the skills of manual and instrumental intervention), surgery and obstetrics, and merely theoretical studies called "Kathedermedicine" by the contemporaries.

From the last third of the 18th century, physicians argued with increasing regularity that *ars obstetricia* should have the same rank as other disciplines of medicine, in particular internal medicine, as an individual scientific discipline rather than only a subdomain of surgery, as — so they argued — obstetrics was not limited merely to setting up mechanical principles and refining mechanical interventions, i.e. via operations. This is because in many cases, the risks during delivery can be avoided by administration of internal agents, i.e. without surgical intervention. The struggle for the scientific emancipation of obstetrics at the turn of the 18th and 19th centuries is most characterised by emphasising the difference between the mechanical (surgical) and the dynamic (internal) procedures. While "mechanical obstetrics" averts the "barriers" caused by female pelvis or the location and size of the child by surgical interventions and tools (forceps, hooks, perforations, caesarean sections), "dynamic obstetrics" is concerned with the physiological behaviour of the uterus during delivery, and averts[16] the obstacles of a "dynamic nature" by means of medicines or diet, i.e. by using the measures of internal medicine.

In parallel with the *professurae* established in the way described above, the position of obstetrics in the canon of university education was further confirmed by its linkage with the "clinical" training at the bedside. The organisational patterns of the establishment of obstetric clinics implementing the institutional connection of theory and practice are arranged — according to the typology set up by Axel Karenberg in 1991 — into four successive types, linearly appearing in time. In the middle of the 18th century, the first obstetric departments were either established in

old hospitals (*Type A*) or old buildings, in many cases residential homes were converted to obstetric departments (*Type B*). In several places at the end of the 18th century, independent obstetric departments were established, often in buildings shared by both internal medicine and surgical clinics (*Type C*), but this solution was not sustainable in a longer term due to infections, especially because of the spread of puerperal fever, which was so perilous to women who had just given birth. The beginning of the 19th century saw obstetric clinics established in separate buildings where — besides women in labour — gynaecological patients were also treated (*Type D*).[17] In the period between 1751 and 1836, in the German language area, obstetrics clinics were established[18] as attached to each medical faculty for the practical training of students.

Obstetric institutions of different space use patterns and organisational structures (with various names, in German often referring to their primary functions, too, such as *Gebäranstalt*, *Gebärhaus*, *Accouchierhaus*, *Entbindungshospital*, *Geburtungshospital* and *Geburtsklinik*) were created based on the idea of general care, fitting into the concept developed by medical law enforcement driven by cameralist theories and aimed at bringing about the conditions of a better and more modern obstetrics. However, there are also differences in terms of the focal points of their objectives: there were institutions where the training of qualified obstetricians was considered to be the primary issue, while others regarded providing assistance to women in labour and in need as their primary goal. However, in the majority of cases they sought to achieve both objectives. While in continental Europe these institutions (in the case of a home and/or a hospital/clinic function) were, in most instances, created by the governments or at the initiative of a given city, and their operations were financed by public authorities, in Great Britain similar institutions were generally founded at the initiative of wealthy philanthropists and were run by public charity donations. These different practices of establishment and maintenance can explain the varying nature of the objectives set as part of the mission of the institutions, which manifested in their services and the social status of their patients. In the obstetric departments of English hospitals maintained by private sponsorship, a significant proportion of the patients were made up of married women from supporting families, who brought their children from illegitimate relations into the world in these institutions, and new-borns were then taken care of by the organisations concerned with the poor.[19] On the continent, however, the circle of patients was almost exclusively damsels (unmarried young women), mostly from lower social classes. In many cases, the attractiveness of these institutions was also increased by the fact that hospitals were associated with a foundlings' home, where they could leave the new-borns while keeping their anonymity (e. g., Paris, Vienna, Kassel, Milan and Turin).[20]

In the second half of the 18th century, there were also several patterns in the teaching-hospital functions of obstetric institutions: 1) hospitals, usually belonging to the infrastructural background institutions (e. g., botanical gardens, laboratories, various collections) of medical faculties, mainly serving the practical obstetrical training of physicians. The *Accouchierhaus* in Göttingen is considered to be their prototype. 2) The type of hospitals operating as non-university alternative education centres could be found mainly in France; here, exclusively midwife training was carried out and male obstetricians were admitted only exceptionally (e. g. Hôtel-Dieu, Maternité/Port-Royal, Paris).[21] 3) In the majority of cases, however, the obstetrician training centres of medical faculties, as well as those operating outside of universities, trained both of the above groups i. e. male obstetricians (doctors and surgeons) and midwives as well; however, in separate courses (e. g., Strasbourg, Berlin, Vienna).

Communication, reception and flow of knowledge through the printed media constituted an important component of the »scientification« of *ars obstetrica* in the development of the scientific (and non-scientific) public media of the era. The reception, the amount and speed of knowledge flow were largely determined by the language of the given publication. Although in the 18th century the language of international scientific communication was clearly Latin, out of the obstetric manuals and textbooks (423 editions under 245 titles) published between 1668 and 1815, only five per cent were written in Latin. However, it is also important for us to see that many authors published their works in several vernacular languages: considering the textbooks themselves, no less than 94 different translations[22] are available. While in the first half of the 18th century, the "market" for obstetric publications (mainly for publishing textbooks) was dominated by works published in France and England, in the second half of the century the number of printed publications in the German language area showed that they were completely

catching up with the rival English and French figures. Friedrich B. Osiander, in his obstetric textbook published in 1799, reports the publication of 100 German-language textbooks between 1750 and 1795, of which the number of copies of the works by several authors reached 1,500 or even 4,000 copies.[23] At the same time, besides publication activity, personal encounters, mostly in the form of shorter or longer study tours aimed at the acquisition of practical skills, played an equivalent—if not greater—role in obstetric knowledge flow. Besides the most characteristic publications of obstetric manuals written for midwives, surgeons and physicians, the volumes of collected case studies, descriptions of obstetrician instruments and other popular publications can also be found in the medical literature. All this was supplemented by specialised journals[24] appearing from the last third of the 18th century, among which the most eminent are the so-called "review journals"[25] serving and promoting information reception and international communication.

Competition and cooperation: »Ars obstetricia« from Göttingen to Vienna, from Vienna to Pest-Buda

The pioneering role of the University of Göttingen is indisputable in the 18th and 19th century history of the »scientification« of obstetrics. Its model role is demonstrated partly by the fact that it was the first in contemporary Europe to interlink the theoretical and practical training of future medical doctors within the university system by founding an extraordinary obstetric *professura* and an obstetric clinic (*Accouchierhaus*, financed by the Elector of Hanover and initiated by Albrecht von Haller). On the other hand, it was also exemplary that these two functions were performed by a single person—at the beginning by Johann G. Roederer and then, from 1792, by Friedrich B. Osiander. All this required special qualifications, which were acquired through long and expensive European study tours, in European hospitals and at the training centres outside universities. Finally, the openness—already acknowledged by the contemporaries as an important feature of the Göttingen culture of knowledge organisation—towards adapting the practices of other institutions to develop the functions of the *Accouchierhaus* is also evident (primarily the obstetric unit headed by Johann Jacob Fried functioning from 1728 in the civilian hospital and founded on the model of the Paris Hôtel-Dieu's midwife school also serving educational purposes, and the midwife and surgeon-obstetrician training programmes introduced from 1751 in the Collegium Medico-Chirurgicum founded in 1725 in Berlin, were considered as benchmarks).

The beginnings were extremely modest: the *Accouchierhaus*, serving exclusively as an "obstetrician clinic," was placed in the medieval building of Göttingen—functioning as a poorhouse hospital where altogether two rooms were at the disposal of Roederer, the medical students and midwife candidates, where 20–30 deliveries were conducted yearly. Patients were almost exclusively pregnant young mothers living in poverty. The humble beginnings of this "clinic" can also be indicated in figures: Roederer—during his work for over a decade—performed 292 deliveries, with the participation of medical students in only 162 cases, and only with a very limited number of midwives.[26] This situation changed only decades later when in 1791 a new building was erected, specially planned to function as an obstetric clinic, and Professor Friedrich B. Osiander—the regular professor of obstetrics of the University—became the director of the unit. In the clinic called *Accouchierpalast* ("birthing palace") by the professor of physics at Göttingen, the polymath Lichtenberg, seven rooms were dedicated to pregnant women and mothers in labour, with two beds in each room, and the technical and auxiliary staff were placed separately. The interior design was tailored to the purposes of the building, with a focus on ensuring enough air, light and large spaces to avoid the harmful miasmas believed to be so dangerous for the patients. In these circumstances, the number of births increased from 80 to 100 per year, which, of course, is still far behind the average of 1,000 births registered at the end of the century in the large obstetrics institutions of Dublin, Paris and Vienna.[27]

The professors representing obstetrics at Göttingen—which, by that time, had formed into a school under the circumstances and personal conditions described above—successfully joined the international discussions of increasing intensity along the polarities of male–female, intervention–waiting, natural–artificial, passivity–activity, illegitimate–authoritative dichotomies concerning obstetrics. In brief, the main point of discussion was how to exclude the midwives—thought to be ignorant—from obstetrics, or at least to limit their activity to simple and complication-free

deliveries, and along with this—by increasing the number of male obstetricians—the scientific emancipation of obstetrics. While, for decades, the opposing parties in this controversy were the French obstetrician school represented by Levret, promoting the use of instruments, and the English obstetric school, representing a conservative opinion against the use of devices (organised around the Scottish-born Hunter and following a Brownian view of natural philosophy), from the last third of the 18th century the so-called "Francoman–Angloman" opposition was replaced by the opposing views represented (with content similar to the above) by the obstetric school of Göttingen on the one hand and that of the university of Vienna on the other (the latter had be-come an important factor in obstetrics at international level in barely half a century).

It was Friedrich B. Osiander and Lukas Johann Boër who were the most active figures behind the controversy reaching its climax by the turn of the 18th and 19th century, although both of them had a practically similar status and position: Boër—like Osiander—was the professor of obstetrics and the physician leader of the free-of-charge obstetric unit of the Vienna General Hospital's *Gebärhaus*. The contention between the two of them—in many cases going to extremes and reaching a personal level—illustrates the fact that, even at the turn of the century, the direction of the »scientification« of obstetrics was still an open and controversial issue. In addition to their common professional background, they also represented the same platform regarding their views on the evolution of sciences: new scientific truths could only be the results of observation and experience, and not pseudo-systems lacking any foundations. They also agreed that ignorant and superstitious midwives must be replaced by talented men, and in this process the scientification of obstetrics had a decisive role through systematic theoretical education and clinical practice. However, there was one issue where the obstetric programmes they represented showed a substantial difference: the interpretation of the concepts of the natural and artificial or, in other words, natural waiting or instrumental intervention (*Natur* and *Kunst*). While Osiander, opposing anything against the "the order of nature", insisted on the rather narrow definition of natural delivery, urged prompt intervention and use of forceps, Boër left not only those delivery cases with cranial presentation to nature but "all the ones with face, breech, leg and knee presentation."[28]

The beginning of the evolution of the Vienna »obstetric school« roughly coincides with the Göttingen foundation of *ars obstetricia*. The Dutch-born court physician of Maria Theresa, Gerard van Swieten, the author of Habsburg comprehensive healthcare reforms, first wanted to create the right framework[29] for the theoretical and practical obstetric training of surgeons and midwives as part of his programme of educational reform at the medical faculty, before transforming the whole organisational system of the University of Vienna in 1749. The faculty had been examining healers working at the lower levels of the medical community since the first half of the 17th century; they acquired the knowledge needed to complete the exam in a number of ways and of varying quality. To standardise the heterogeneous forms of knowledge, and to pass on the theory and practical skills in a modern and supervised way, in 1748 Maria Theresa ordered the establishment of the *Collegium obstetricum*[30] according to van Swieten's proposal, primarily for the education of midwives and the obstetrics training of surgeons. The obstetrician "institute" that came into being as part of the university also meant that the obstetrician discipline was included in the curriculum of medical education, the completion of which was prescribed by the emperor's regulations as the condition for obtaining doctors' licences. The issuing of regulations[31] prescribing an ever-increasing range of obligations to attend organised training courses, the associated examinations, the persons of the professors teaching obstetrics and the textbook canons completed by them clearly show how obstetrics had been incorporated into the university training system over nearly half a century with differentiated training programmes for midwives, surgeons and physicians but fitted into one and the same organisational structure, in the form of joint and/or divided theoretical and practical courses.

The development of the educational structure was performed clearly according to van Swieten's views. The training of midwife candidates from all over the Monarchy started in 1749 by Christoph Joseph Molinari, Imperial chief surgeon (*kaiserlicher Leibchirurg*), giving lectures twice a week on female anatomy (position of the pelvis and other organs, foetus positions) and the related demonstrations (of technical skill on models) and with autopsy exercises. By maintaining the existing, proven method,[32] in the first years the practical training of midwife candidates was performed by the older experienced Viennese midwives, who took their students with them to mothers

in labour and instructed them on the spot. From 1754 onwards the practical education of practising doctors, surgeons, and midwives probably took place at the St. Marx Hospital (*Spital zu St. Marx*),[33] as contemporary medical writers consistently associate theoretical (*theoretisch*) training with lectures (*Vorlesung*), and "practice" (*praktisch*) with "clinical" education *(klinischer Unterricht*); what the "practical education" mentioned in a number of plans and curricula of the medical faculty really meant is illustrated by the description of Johann Peter Frank nearly half a century later, dating back to 1798. Frank convincingly demonstrates this and argues that the common practical training of doctors, surgeons and midwives in St. Marx Hospital can be interpreted essentially as the "*Theorie der Praxis*;" that is to say, the professor demonstrated the different delivery cases on models. Live cases were demonstrated only by the midwife and the surgeon-obstetrician[34] of the hospital. It is certain that the most important elements of hospital practice, which proved decisive for the following decades, were introduced by Johann Nepomuk Crantz who followed Molinari in the teaching of obstetrics. On van Swieten's proposal, Maria Theresa—at her own expense—sent Crantz to Paris for a longer study tour, from where he imported the teachings of the André Levret school, focusing on the use of instruments, which prevailed in the theoretical and practical education of obstetric operation studies and in the related textbook programmes.[35] In 1752, an extraordinary *professura* was founded for the education of obstetrics differentiated by students, headed—as was typical in Europe—usually by surgeon professors in the following decades.[36]

For the acquisition of the material of German-language theoretical and practical courses, the textbooks written by the successive professors in a comprehensible and simple language, republished in a reviewed, amended and supplemented form several times even in the 19th century, were used. During van Swieten's directorship, the selection of the textbooks used was not up to the teacher but was rather a power issue. The key question was whether the knowledge conveyed by the textbook was compatible with governmental interests. Until the 1770s, Crantz's textbook, which did not discuss obstetric operations, was used. In his compendium, he devoted a whole chapter to a detailed discussion of the various cases of "unnatural deliveries," but he discussed only those cases where there was no need for instruments for the solution. In this context, as Crantz himself emphasised, the task of the midwife was limited to recognising a particular case, and when she came to facing a situation that seemed to be dangerous, she had to call immediately for a male surgeon-obstetrician or medical doctor.[37] For doctors and surgeons, he published a separate commentary[38] on the use of equipment in the year of the edition of his textbook in German. In the 1770s, Crantz's educational programme was replaced by Raphael Steidele's midwife book; he, like Crantz, treated "surgical obstetrics"—as he called—(*chirurgische Geburtshilfe*) as an independent area belonging exclusively to surgeons or physicians. The demarcation line between "male" and "female" knowledge was also strengthened by the fact that, in the year of publishing his book on midwifery, in 1774, he issued a special treatise for doctors and surgeon-obstetricians on obstetric surgery.[39] In essence, this approach and selection practice explains why the compendium—first edited in 1768, originally written for midwife education, treating surgical interventions as natural procedures—of Joseph Jacob Plenck (1735–1807), Professor of Surgery and Obstetrics at the University of Nagyszombat and also the professor of chemistry and medical material at the *Josephinum* in Vienna in 1785, was not included in the textbook canon used in midwifery.[40] The content conveyed through the obstetric education and contained in the textbooks contributed significantly to the extension of the competence area and the authority of surgeon-obstetricians developing as a new profession in the Monarchy in the second half of the 18th century.

From the 1770s, a differentiated training system was introduced for midwives and surgeon-obstetricians from Vienna or the countryside, from Hungary or even abroad. As to the method of obstetric education, the course of the examination and its elements, we have reliable data only from the period after van Swieten's death. The Academic Syllabus (*Instituta Facultatis*) of his successor, Anton Störck (1775) gives a precise description of the two-level, one-semester training form which was prepared for surgeons and midwives intending to work in Vienna. In the first phase, anatomical knowledge relevant to obstetrics—with demonstrations on models or corpses—, studies of obstetric instruments, diseases characteristic of the puerperal period, and knowledge of a legal character (detection of pregnancy and neonate murder, abortion) constituted the curriculum. When the first theoretical part was completed, the second, practical phase of the training began, which took place in St. Marx Hospital until 1784 and then in 1784 at the *Ge-*

bärhaus part of the *Allgemeines Krankenhaus*. While midwives were mainly asked about cases of normal delivery, doctors and surgeons had to report on the use of equipment, surgery, and complicated deliveries —in theory and by demonstrating it on models, sometimes on corpses—before a committee comprising the current dean, van Swieten, the study director, then later Störck and the current professor of surgery and obstetrics.[41] From the beginning of the 1770s—probably after the death of van Swieten, on the initiative of Störck—a separate training scheme was established at the *Uniertes Spital* ("United Hospital") —where six patient beds were at the disposal of the students—to integrate midwives and surgeons from the countryside and other parts of the Monarchy. The primary goal here was to prepare the students for the exam as soon as possible, even within a few weeks.[42]

From 1784, however, the practice of all forms of parallel training was transferred to the *Allgemeines Krankenhaus*, and the midwives and surgeons from the countryside received theoretical instruction here. There were three departments in the *Gebärhaus*: two for those women paying for the services and one for the poorest unmarried women receiving medical care for free. The practical training of doctors, surgeons and midwives was conducted in the latter "gratis" section. The interior layout and space of the *Gebärhaus* also gave very positive impressions to the contemporaries coming from abroad for study purposes: spacious, high-ceilinged, airy rooms, large windows with lots of light, but also special attention was paid to both order and tidiness. In one of the higher-priced departments, 12 heated rooms, while in the rooms available for a lower amount, six heated rooms, each with 4–6 beds, were at the disposal of the patients. Women (unmarried or married) arriving here could give birth to their children anonymously, and then, after paying a certain amount, could leave the child in the neighbouring foundlings' home. In the gratis section, poor damsels were placed in six enormous, 14–16 bedded rooms; in addition there were some rooms available for the women currently in labour, for dying persons and puerperae. Women could leave their children in a foundlings' house after undertaking auxiliary services for a certain time. Annually an average of 700 and 130 deliveries were recorded, respectively, in the first two paying departments that had their own special medical director, and 45 in the gratis section. According to common practice, it was the leading midwife in each department who accompanied woman in labour and called a doctor only in the event of complications. As for the course of training in the free section, while Boër headed the department, theoretical lectures were usually held— for three months, i.e. one semester—by Steidele in the university building for doctors, surgeons and midwives, but doctors and surgeons were also given an extra introduction into the study of instruments and performing operations. Boër led the joint practical training of these three healing groups, which was accompanied by a two-month stay within the hospital. A practitioner could only be a student if he had matriculated at the University of Vienna. At any given time, from six to eight doctors and surgeons and the same number of midwife candidates could take part in hospital practice. The practitioners participated in Boër's two daily (morning and evening) visits, and they were usually given an introduction to learning about operations at practical exercises on fresh women's and children's corpses, as the use of models was not very common in Boër's time.[43]

The operation of the *Collegium Obstetricum*, as well as rendering obstetric studies obligatory (from the 1750s) for physicians and surgeons and the organisation of clinical practice significantly contributed to the development of obstetrics into an independent discipline at the faculty of medicine in Vienna, which, later in the 1780s, was given a regular *professura*.[44] In the second half of the 18th century, the differentiated (obstetrician, physician, surgeon and midwives) training programme was introduced in all the universities of the Monarchy and in education centres belonging to hospitals on the basis of the training programmes organised in Vienna.[45] From the middle of the 18th century, theoretical and practical obstetrician courses organised for physicians, surgeons and midwives appear in the educational programmes of all the universities in the Monarchy, such as Prague, Freiburg am Breisgau, Innsbruck, and, after 1770, Nagyszombat.

The programme of the medical faculty of the university in Nagyszombat and the education of obstetrics in Nagyszombat, then in Buda and Pest, essentially followed the Viennese example, in terms of both content and organisational structure (doctors, surgeons, midwives, and their parallel training). The teachers themselves were also educated in Vienna: until 1784, Joseph Jacob Plenck was the instructor of surgery and obstetrics, and, after he left for the *Josephinum*, his place was taken by György Stáhly who, in addition to obstetrics, also taught surgery, anatomy, surgery-

pathology and practical surgery. As for the curriculum, adapting to the Viennese textbook canon, Crantz's work was used in the theoretical introduction, and Plenck's and Steidele's compendia in the practical introduction. However, in contrast to the European trends of the Viennese and the European era, the hospital system as a condition of practical training was absent for a long time and later it proved to be inadequate and scarce: after the university moved to Pest in 1784 the "clinic of obstetrics" was placed in the Jesuit house at the corner of the former Hatvani and Újvilág Street with a total of seven beds, and, on average, 80 deliveries a year. The situation was not improved either by the development of the obstetrics "department" in the St. Rókus Hospital, where much more patient material was available. Nevertheless, even Jakab Frankenburg, a physician and surgeon, pathologist and the first professor of the independent obstetrics department founded in 1812, failed to succeed in convincing the competent authorities in 1813 to have the clinical education moved to this hospital with a total of 23 obstetrics beds.[46]

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By the decades around the turn of the 18th and 19th centuries, the instrumentalisation of obstetrics at the faculties of medical universities, following different organisational and structural patterns, had made a considerable progress all over Europe. In this process full of lively controversies, conflicts, competitive squabbles or cooperation at international level since the first half of the 18th century, institutions called "obstetric clinics" by contemporaries and serving as a background for the »*praxis clinica*« and mostly working as units of a major hospital obtained a decisive function. Despite the fact that at the end of the period concerned available statistical data demonstrated that perinatal deaths, in many cases due to puerperal fever, occured in much higher proportions in comparison to home deliveries, government officials and the competent authorities did not consider closing hospitals, but were discussing as to how the conditions of the obstetric departments of hospitals could be improved, e.g. by moving them into the supposedly healthier suburban parts of cities, ensuring more spacious rooms or just providing heating facilities in winter.

Notes

[1] *Governmentalisation*, used by M. Foucault, contrary to the concept of *sovereignty* (earlier imperium) characterised by its self-serving nature, specifically refers to the process having continued since early modern times when the developing state was seeking to obtain information on its population and territory by gathering specific data, thereby trying to serve the common weal through controlling and improving conditions for the benefit of the subjects. More about the concept see Foucault (1998 [1978]): 106–123. *Verwissenschaftlichung* and *Verarztlichung* have become common in German writing on the history of science, mostly in the two recent decades.

[2] *Georgia Augusta* was founded in 1734/1737 as a symbiosis of German and British traditions and was referred to as the first "research university" of Europe. For the idea of knowledge based on the holistic approach mediated by the university, the scientific educational research program placing the "Wissenschaft vom Menschen" in the centre, and the development of the certain modern disciplines see Bödeker, Büttgen & Espagne (2008). As to the disciplinarization model of branches of specifically natural philosophy and medicine, see Rupke (2002), Steinke & Boschung (2008) and Elsner & Rupke (2009).

[3] After Albrecht von Haller had left the University of Göttingen in 1753, Roederer was also awarded the professorship of anatomy and surgery, too; see Bueltzingsloewen (2004): 15–31.

[4] As to the significance for knowledge and the history of science of »*gelehrte Reise*« type study tours as part of the ideal "Man of Science" training programme in Europe, generally see Bödeker (2002): 505–532. In general, for doctors, see Broman (1996): 16. In the 17th and 18th centuries, specifically, the co-operation between training centres related to obstetrics, see Gélis (1988): 291–293.

[5] On the specific stations of Roederer's study tours see Schlumbohm (2012): 13–15.

[6] The city of Paris had been a must-see station in the *peregrinatio medica* for the mainly English and Scottish doctors and surgeon-doctors since the 17th century: those coming from the German-speaking countries would visit the theoretical and practical training centres of Europe. The Paris Medical School (*l'École de Paris*) had become famous throughout Europe in the second half of the 18th century for the opportunities to offer an emerging new approach in pathological anatomy, practical surgery and obstetrics. Visitors could take part in open or private, free or paid courses offered by alternative educational centres outside the university, or chose private anatomical or chemical cabinets; furthermore, of the 22 hospitals in Paris, several also served as educational centres (e.g., Hôtel-Dieu, Charité, Hôpital militaire des Invalides, Salpêtrière), where they received practical and surgical education at patients' bedsides; Gelfand (1980): 94–106, 131–135, 174–171; (2010): 221–245; Brockliss (1998): 71–116.

[7] In London, where Europe's first independent (non-university) obstetric homes were established, the theoretical and practical obstetric training of doctors was conducted on a market basis as an optional course. For more details see Bynum & Porter (1985): spec. passages 218–236.

[8] The Latin text of Roederer's inaugural address, see Roederer (1752). In the German translation published by Ebel (1978): 33–43. Furthermore see Schlumbohm (1999): 277–284 and (2004): 32–33.

[9] The word "science" in English and French, similarly to the German term "*Wissenschaft*," has for a long time been used to designate a wide variety of forms of knowledge, but the adjectival "scientific" form was used much earlier than the German "*wissenschaftlich*" in the sense of scientific knowledge. For more on this see Ross (1991): 1–16 and Shapin (2006): 179–191.

[10] The first universities announcing obstetric courses were Halle (1728/29), Tübingen (1734), Göttingen (1739), and Erlangen (1743); see Seidel (1998): 133.

[11] As to the French and English models, see footnotes no. 5., 6. and 31 in this study. In the Netherlands, a *Collegium Obstetricum* as part of the *Collegium Medicum* was first founded in Amsterdam (1668) then in Leiden, following the previous example, where, in addition to the basic theoretical anatomical studies, trainee midwives could also learn pharmacy skills and major surgical interventions required in difficult cases of deliveries. The generally four year practical training of midwives was conducted by an older, experienced midwife. While at this time, in the universities of Europe, obstetrics were taught as part of surgery, in the second half of the 17th century in the Netherlands, a doctoral degree in obstetrics (*doctor obstetricae*) could be obtained at the University of Leiden and the male obstetrician masters (staadsvroedmeester) also appeared. Marland (1994): 196–197, 209.

[12] In 1734, a Professor of Anatomy and Surgery at Tübingen University, Burchard David Mauchart in the course of his surgery lecture discussed the theory of cutting operations. Nevertheless, in the first half of the 18th century, Mauchart was one of the university professors who spent longer time in Paris during his medical studies and received some obstetric practical training in the hospitals of the French capital; see Stübler (1952): 6–7. Eduard C.J. von Siebold, from 1832 at the University of Göttingen, the successor of Friedrich B. Osiander, in his great two-volume, work on the history of obstetrics; he represents obstetrical education as a kind of surgical operation; see Siebold (1839–1845, Bd. 2): 399–400.

[13] In the first half of the 18th century, obstetric surgery was part of the standard repertoire of surgical textbooks. During this period, Lorenz Heister's most widely used German language textbook was published in 1719, in which he dedicated a separate sub-chapter on "Operations of the fellow members of non-delivering women;" see ibid. 304-440.

[14] In the middle of the 18th century, Anatomy/Surgery/Obstetrics "combined *professurae*" founded in the middle and in the the second half of the 18th century: Halle (1741—P.A. Böhmer), Göttingen (1751—J.G. Roederer), Würzburg (1769—C.C. von Siebold), Jena (1778—J.C. Loder), Mainz (1783—J.P. Weidmann). Seidel (1998): 135. However, there are examples where —besides the usual combination of anatomy/surgery/obstetrics, obstetric training was performed in different combinations: J.D. Busch, professor of Marburg University, and Fritze, the teacher at Herborn high school, also taught veterinary medicine in addition to obstetrics; see Busch (1817), Spengler (1858): 250.

[15] Independent obstetric *professurae*: Prague (1762), Göttingen (1786), in the 1780s Vienna, Marburg and Würzburg (1799), Kiel, Heidelberg, Leipzig, Berlin, Breslau, Munich, Halle (1827). In England, however, the male model of the obstetrician had spread by the 17th century; the establishment of obstetrics in English universities did not take place until the 19th century; see Loudon (1986): 190–190.

[16] Jodocus Ehrhart as the physician of the city of Memmingen, then from 1775 as the professor of Göttingen University published his observations on obstetrics and dedicated the work to Albrecht von Haller. On the complex nature of the science of obstetrics as combining the sciences of mechanics, physics, surgery and physiology see Ehrhart (1773): XXVII.

[17] Karenberg (1991): 899–912.

[18] German universities—in this respect—generally followed the Göttingen pattern; the process became obvious and more rapid in the 1790s: Göttingen (1751), Vienna (1752), Jena (1779), Prague (1789), Marburg (1791), Königsberg (1793), Tübingen (1797), Freiburg (1799), Kiel, Würzburg, Heidelberg (1805), Leipzig (1810), Halle, Breslau (1811), Giessen (1814), Berlin (1817), Bonn (1819); see Eulner (1970): 293.

[19] Wilson (1995): 146–147.

[20] Pawlovsky (2001) and Vanja (2004): 96–126.

[21] Gélis (1988): 32–33.

[22] As for the international comparison of editions of books on obstetrics see Gélis (1980): 279–299, spec. 282.

[23] Osiander (1799): 758–768.

[24] As to obstetric periodicals in German (overview) see Fasbender (1906): 368–373 and Ludwig (1986): 358–364.

[25] *Respublica litteraria*, and within the "*respublica obstetrician*", the genre of reviewing has become—to a spectacular extent—an important printed instrument for promoting the organisation of knowledge and flow of knowledge. (In this regard, one of the most prestigious journals of international scientific communication was the *Göttingische Gelehrte Anzeigen*, founded in 1739 by Albrecht von Haller, which reviewed the volumes published in various fields of science.) For more information, see Gierl (2001): 63–94 and Broman (2000): 225–238.

[26] He refers to the statistical tables compiled and published (1795) by Friedrich B. Osiander based on Roederer's medical diary; Schlumbohm (1999): 283.

[27] In terms of the architectural-space use concepts, the construction works between 1785 and 1791, the functioning of the clinic and the role of F. B.Osiander in the Göttingen Obstetrics Clinic, see the latest, large monograph Schlumbohm (2012): spec. 10–13, 27–51.

[28] During the three decades of his activity, Osiander had more than 2,500 births and he used forceps in 40% of them. According to the available data, the perinatal mortality rate of mothers and children was approximately the same, 13.2% and 12.8%; see Schlumbohm (2012): 435. Regarding Boër's obstetrics practice, there are important data: from 1803 to 1805, in three years, under his leadership, in the *Gebärhaus* gratis section, a total of 2,398 births were registered, out of which five cases were completed by rotation, 11 with forceps and three with perforation; see Osiander (1817): 172–237, spec. 211.

[29] Records of van Swieten in French on the educational programme of surgeons and midwives, see ÖStA AVA Akten der StHK Karton 1, fol. 111.

[30] As to the background to the introduction of an organised and compulsory education of midwives—considered normal in Europe—the rather simplistic (even from the point of view of 19th century medicine) reasoning could be found that it was exclusively the ignorance of midwives that was responsible for the high mortality rate experienced everywhere. Maria Theresa's Order of 24 July 1748, was first extended to Bohemia, then to all the hereditary lands; this contained prerequisites for the official operation of the midwives, i.e. they had to pass an exam at the university faculty of medicine (here the University of Prague is mentioned) or—in the countryside, far from the main town—, before the physician-doctor of the district. In the reasoning for the decree, the above-outlined, figurative arguments seem to appear: "*Bei der Erfahrung, das Unwissenheit der nicht ordentlich angenommenen Hebammen die gebährenden Weiber öfters van der Frucht in die Todesgefahr gesetzt, ist zuweilen gar um das leben selbst gebracht werden* (…)" The regulation is reported by Kropatschek (1786, Bd. 1): 46. This decree was passed verbatim into the *Medizinalordnung* of 1753, placing the exam at the Vienna, Prague and other provincial faculties of medicine; see John (1790–1790, Bd. 2): 245–246.

[31] After the issue of the above regulations in 1748 and 1753, the circle of persons obliged to pass the obstetric exam was extended. The decree issued on 6 July 1754 made surgeons obliged to pass the obstetric examination; see Rosas (1847, Bd. II/2): 300. In 1773, the Supplement to the Health Regulations of 1770 makes it obligatory for a doctor, surgeon, pharmacist and midwife to be officially employed in all perpetual provinces to have passed the obstetrician exam at a provincial university; Kropatschek (1786, Bd. 6): 581.

[32] Before the establishment of the *Collegium Obstetricum*, the midwife candidates for several years (training duration varied by area, generally four years in Vienna) were usually taught by an experienced head (*Meisterin der Hebammenkunst*) midwife. In the 18th century, the training of Viennese midwives also involved taking part in an autopsy on one or two occasions, and at least from the beginning of the 18th century they already possessed relevant textbook knowledge. It was then the head midwife instructing the candidates who—many times risking her/his good reputation—took responsibility for the knowledge and practical abilities of his/her students. It was her that, when he considered it was time, enrolled her/his students for exams at the faculty. Following the successful examination, the Viennese midwives practised—for a shorter or longer period after 1721—at the St. Marx Hospital's obstetrics department, and they became independent only after this practice. The most thorough work so far on the process of the midwife training before and after the reforms by van Swieten has been written by Horn 2001; *Ibid.*(2003): 35–102, spec. 82–86.

[33] The obstetrics ward operating in St. Marx Hospital since 1706, had initially 16, then, in the second half of the century 66 beds, which meant 300–400 births per year, but since the 1770s, the number of deliveries was 500. In 1784 the obstetric section was transferred into the *Gebärhaus* department of the *Allgemeines Krankenhaus*; Grois (1965): 27–76.

[34] "*Der Professor der Geburtshülfe an hiesiger Universität lehrte bisher die bloße Theorie der Entbindungskunst, und machte diese Theorie seinen Schülern blos damit begreiflich, daß er sich anstatt eines lebendigen Kindes, einer bloßen Puppe, und anstatt eines gebärenden Weibes, eines todten Phantoms* (…) *bediente, und jener in diesem alle mögliche Lagen zu geben, sofort aber derselben Wendung und Hervorziehung vorzuzeigen versuchte*." Frank (1825, Bd. 2): 64-70 ("*Gutachten Franks vom 17 Mai 1798*"). See quotation, *ibid.*: 66. Frank has a similar opinion to the description of Simon Zeller von Zellenberg, the first director of *Gebärhaus* of the *Allgemeines Krankenhaus* founded in 1784; see Zeller (1789): XX–XXI.

[35] Maria Theresa also sent Giuseppe Vespa and Pietro Moscati—besides Crantz—to Lavret's Paris School at her own expense to promote the medicalisation initiated and directed from Vienna, and also those from other areas of the Monarchy such as Tuscany and Lombardy. Vespa led the midwifery school founded in Florence in 1758, where the training was started at the Santa Maria Nuova Hospital (*Scuola ostetrica*) in 1758, where the midwife candidates came from Florence and all areas of Tuscany; Bellinazzi (1994): 509–537, spec. 512–513 and Krász (2003): 68–74. In 1772, Moscati initiated the midwife and surgeon-midwife training in connection with the Santa Caterina alla Ruota Hospital in Milan in 1772; Pancino (1984): 113–125.

[36] Christoph Joseph Molinari was followed by the excellent doctors of the Viennese medical school, who—in addition to teaching obstetrics and surgery in the usual way at the medical faculties of Europe, also reached considerable academic results in other areas of medicine: later, Heinrich Johann Nepomuk Crantz from 1754, Valentin Ferdinand Lebmacher from 1756, and Raphael Johann Steidele from 1774; he was professor of obstetrics until 1817; Schwab (1792): 9, 14–15, 56–57.

[37] Crantz's book, first published in 1756, was edited several times (1768, 1770) in review form during the century. Crantz (1756a); part on unnatural deliveries see *ibid.*: 109–151.

[38] Crantz (1756b).

[39] Steidele's midwifery textbook; see Steidele (1774). His dissertation on delivery surgeries and the use of instruments—similarly to his midwifery textbook—was published in several editions (for our the present study, the second edition was used); see Steidele (1785 [1774]).

[40] See Plenck's textbook Plenck (1774 [1768]). He dedicated the longest part, the full second chapter, to deliveries "against the order of nature" with complications; see *ibid.*: 124–452.

[41] Störck (1775): 49–53.

[42] *Uniertes Spital* was established in 1754 by combining *Spanisches Hospital* and *Dreifaltigkeits-Spital*. The name *Uniertes Spital* was used to describe it from 1760, and the hospital was phased out in the 1780s. For Vienna's eighteenth-century hospital system see Grois (1965): spec. 73 and Karenberg (1997): 50. According to *Handbillet*, issued on 19 March 1776 by Maria Theresa, the site of the obstetric training of surgeons and midwives coming from the countryside and the Monarchy outside Vienna was the *Uniertes Spital*. For more information see Probst (1973a): 202–203 and Karenberg (1997): 51.

[43] Johann Friedrich Osiander and Friedrich B. Osiander, also a professor at Göttingen, gave a detailed description of the obstetric education and material conditions in the *Gebärhaus* department of the *Allgemeines Krankenhaus*; after the latter's study tours in Göttingen and Tübingen and Paris (1814–1815), he spent eight months in Viennese medical education institutions and hospitals. He published his travel journal in 1817, and summarised his travel experiences and observations in a detailed description of a scientific level. Osiander (1817): 172–237 ("*Das Gebärhaus und der geburtshülfliche Unterricht in Wien*").

[44] Ferro (1785): 22, 97. Lebmacher was enrolled into the professors' collegium founded (1790) at the medical faculty of Vienna University as an ordinary professor of obstetrics; see Schwab (1792): 53–54.

[45] Following the issue of the Imperial Health Regulations, medical-surgical colleges (often belonging to hospitals) were established all over the Monarchy in its major centres, where instructors of surgery and obstetrics trained in Vienna were employed to help the surgeons, surgeon-obstetricians and midwives in the areas far from the capital, such as in Linz (1774), Kolozsvár and Nagyszeben (1775), Graz and Klagenfurt (1776) and Trieste (1778); Lesky (1959): 85.

[46] Cf. *Merkur von Ungarn*, 1786, Heft 10: 909–913; Győry (1936): spec. 293–295; Krász (2003): 92–106; Lampé *et al.* (2009): 32–33.

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