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“I do have a chemical magazine in the works”: The Editorial Beginnings of the First Chemical Journal

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The academic journal is a central instrument of scholars and scientists alike, yet we know surprisingly little about its historical development. This paper focuses on the foundation of the first scientific journal devoted solely to chemistry. It introduces the editorial strategies and policies behind the periodical, and briefly describes the role it played in the process of establishing chemical knowledge during the last decades of the eighteenth century. More generally, it sheds light on the socio-cultural identity of the editor located between the two professionalising fields of science and journalism and the epistemological consequences of his editorial work.

In the Holy Roman Empire of the 1770s, inquiries into chemical processes and properties were conducted in different arenas. They took place at university lecture halls, apothecary laboratories, and even mine drifts, and were generally considered within the broader context of medicine, pharmacy, metallurgy, mining, and manufacturing. Chemical practitioners were doubly isolated from each other, not only due to the different research contexts but also due to the geographical fragmentation of the Holy Roman Empire. Yet, an unlikely actor would soon bring them together. In 1778, Lorenz Crell (1744-1816) started the first journal devoted solely to chemistry, thereby creating a new forum exclusively for chemical researchers. Because Crell dedicated his journal to a scientific specialism, scholars have recognised his periodical for its significance in creating and consolidating a new disciplinary community. According to Karl Hufbauer, thanks to Crell's journal, German chemical experimenters “began to sense their new social solidarity” with each other (94). Yet, the beginnings of Crell's editorial undertaking have received little scholarly attention. This paper will seek to redress this, by focusing on the following elements: Crell's commencement of editorship including his choice of publisher, a discussion of the readers and contributors Crell had in mind when setting out on his editorial endeavour, as well as the contents of his inaugural issue. Lastly, the paper will briefly discuss the role that Crell's journal went on to play in the production of chemical knowledge in the German territories.

Lorenz Crell's Background

In early 1777, Crell was 33 years old and a professor of medicine at the University of Helmstedt. He was not happy, however; he complained in a letter that, “the many situations in which I have found myself have hindered me from making myself known” (Crell February 7, 1777). Eager to find a way out of obscurity, he contacted Albrecht von Haller (1708-1777) and asked the renowned Swiss anatomist for feedback on his essays. Haller sent Crell favourable comments that encouraged

the professor to reveal his plans for a journal, announcing in a letter to Haller from February 7, 1777: “I do have a chemical magazine in the works” (Crell February 7, 1777).

Crell had received an introduction to chemistry during his study of medicine. But it was only later, during his time abroad, that he developed a passion for this field of inquiry. He completed his studies in 1768 and set out on a grand tour that took him to some of Europe’s primary centres of study, including Paris and London. Young Crell spent his formative months in Edinburgh: there, he attended the lectures of eminent chemists, most prominently Joseph Black (1728-1799), whose chemical theories he would defend for decades, even after most of his peers had discredited them.

Upon his return to Braunschweig-Wolfenbüttel, one of the several hundred German *Kleinstaaten* (small states), Crell invested much time in chemical experiments at his home-laboratory. His research, however, yielded no notable success and so Crell began to devise his plan for the first chemical periodical. It is perhaps not surprising that Crell chose editing and authoring considering his family background: his paternal uncle, Christoph Ludwig (1703-1758), had been a renowned author (Trieb 48), and Crell’s paternal grandfather, who went by the name Christian Ludwig (1671 - 1733) and was a professor in Leipzig, was, just like his son, passionately devoted to writing. Both Crell’s grandfather and uncle, as well as Crell’s father Johann Friedrich (1707–1747), worked on the *Acta Eruditorum* (1682 - 1782), an internationally renowned scholarly journal. Today, the *Acta* is considered one of the oldest scholarly journals in the world.

Arguably the oldest learned journal still in print today is the Royal Society’s *Philosophical Transactions*. The Society’s secretary, Heinrich Oldenburg (ca. 1619 – 1677), founded the scientific periodical in 1665. While the number of transactions and proceedings from scientific academies rose across European countries during the early- and mid-eighteenth century, it was not until the late-eighteenth and early-nineteenth centuries that the scientific periodical gained notable significance. The transformation of the periodical from an anthology of experiments carried out by members of scientific societies to a central instrument for producing scientific knowledge was closely linked to the establishment of commercial science journals such as Crell’s that did not receive institutional backing but depended on sales—and provided access to scientific activities and insights for notably larger groups of experimenters than the academy transactions.

By the standards of the 1770s, Crell’s hometown of Helmstedt was a small and rather provincial town of about 4,000 inhabitants. Yet, it had a notable number of printers and publishers, due to the local university that had attracted some highly-skilled printers to the town since its founding in 1576. Between 1700 and 1750, sixteen publishing businesses existed here (Paisey 318). Despite the Seven Years’ War and the French occupation of Helmstedt, the number likely did not change dramatically until the 1770s when Crell was preparing his first issue (318). To an inexperienced editor-to-be, the numerous local publishers indicated flourishing business and were an encouraging sign.

The Helmstedian printers had various experiences with publishing pioneering periodicals and catering to the small university audience. In the early 1750s, Emilio Giordano, an Italian lecturer at the university, published a periodical on political topics, and Columba King, teaching English language and literature, followed Giordano’s footsteps by editing *The Helmstat and London Mercury*, now considered one of the first English language periodicals in Germany (Bruning 923). The ubiquity

of publishers and periodical products in his hometown, as well as Crell's exposure to periodical writing through his family, likely fuelled his editorial ambitions in three ways. Firstly, Crell had examples that learned editorship could become a success; secondly, he observed that there was a gap in the market that he could use to his advantage; and, thirdly, that even new and original periodicals could garner an audience.

Choosing a Publisher

As the publishers and Crell all lived in the same town, Crell would likely have approached them in person. This has resulted in a lack of written sources that could help establish if and how Crell tried to win over the local printers for his periodical project. It is possible that he forewent working with a local printer because he feared disadvantages for his career should his periodical be a failure and his peers at the university learn about it. Despite his family's ties to several publishers, Crell apparently did not contact any of them either. Instead, he picked the Meyersche Verlag under the management of Christian Friedrich Helwing (1725-1800) in Lemgo (County of Lippe), about 160 kilometers (and, depending on the travel route, up to six *Kleinstaaten*) away from Helmstedt.

The publishing house, which was over a century old in 1777, enjoyed renown beyond the borders of Lippe, mainly for the quality of its theological publications that included The Bible. Helwing was devoted to the Enlightenment and longed to educate the German people. He had studied at the University of Halle at a time when it was "a center of the German Enlightenment" (Burns 285). He was also close to leading men of the intellectual movement such as Christian Wilhelm von Dohm (1751-1820), the co-editor of the monthly *Deutsches Museum* on literary, cultural, and political topics. Helwing was "highly respected in the world of publishing" (Brenker 52). Several burgeoning scholars produced their early works with him and then moved on to other publishers; ones that, for example, specialized in their topic (96).

As can be expected from a traditional publishing house under a progressive management, the Meyersche Verlag offered a broad range of publications, including books on theology, natural philosophy, literature, mathematics, and jurisprudence (Weißbrodt 37, Brenker 86). Helwing also published newspapers, magazines and multi-volumes such as the *Zuverlässige Nachrichten von den vornehmsten Schriftstellern* (1756-1764) and the *Magazin der Philosophie und ihrer Geschichte* (1778-1783).

Thus, Crell found in Helwing an experienced publisher who could off-set his own inexperience. Because no sources have survived—neither business contracts nor correspondence between the editor and his publisher—it is difficult to establish whether Crell learned of Helwing by reading some of his publications or whether somebody recommended Helwing to him. In light of Helwing's reputation, it is plausible that Crell sought him out. The reason Helwing agreed to work with Crell is less apparent. The wide range of scientific publications at the Meyersche Verlag suggests that Helwing was generally interested in broadening the portfolio of his publishing house during this period and a novelty publication such as the first chemical journal would have suited such a goal.

Gathering Readers

When writing to von Haller in 1777, Crell still lacked two crucial elements for a successful periodical: readers and contributors or, even better, contributing readers. In 1777 (and until the nineteenth century) there were essentially two professional groups devoted to chemistry on a regular basis: academics and apothecaries, yet neither profession conducted chemical research. According to Jan Frercks and Michael Markert, “[c]arrying out chemical experiments had — literally — no place” in the German lands of the eighteenth century (141). The core duty of professors was teaching, and the teaching of medicine was still the *raison d’être* for the teaching of chemistry. Professors and lecturers performed chemical demonstrations with the aim of disseminating already established knowledge. They were not paid to carry out chemical research (Frercks 2008 152). Apothecaries, in turn, focused mainly on producing remedies (Frercks 2010 68). A pharmacist’s main occupation was to produce drugs and substances, not new knowledge. If they participated in research at all, it was by contributing improvements to already known chemical procedures rather than establishing new chemical insights. Until the 1800s, “[t]here was hardly any institutionalized form of experimental chemistry in the sense of a well-directed pursuit of new chemical knowledge, carried out in dedicated research laboratories” (Frercks 2008 149). A chemical curriculum and a broad demand for chemists in industry would only evolve later, in the nineteenth century.

If chemical research had no place in the German lands, why devote a journal to it—especially considering Crell’s lack of credentials and publishing experiences in 1777? Who did the editor-to-be envision as the reader of his periodical? Crell attempted to win a wide, chemically inclined audience for his commercial undertaking. The foreword to the first issue of his *Chemisches Journal* suggests a broad array of potential addressees: it approached “every Chemyst, whether he devotes himself to the workmanship on metals, manufacturing of drugs, or to experiments just out of pure joy” (Crell 1778). The editor also did not limit who was allowed to contribute to his journal; after all, he had to stimulate and maintain a regular influx of texts for publication. Crell’s editorial policy therefore did not seek to change the incoherence and fragmentation of chemical studies carried out in the German lands: mining councillors could contribute to Crell’s pages as much as apothecaries, professors, and manufacturers. Hufbauer was correct to emphasize that Crell simply aimed to provide a *forum* (1). In 1777, Crell had neither the credentials nor the influence to set up a journal as an instrument to further a particular agenda, especially not such a ground-breaking one as unifying chemical research and placing it in the hands of, for example, academics.

Nonetheless, Crell did picture his ideal chemical reader and contributor. He mentioned it, indirectly, on the Acknowledgement Page of his inaugural issue. Here, the editor dedicated his publication to Andreas Sigismund Marggraf (1709–1782), the first salaried chemist at the Königlich-Preußische Akademie der Wissenschaften (Royal Prussian Academy of Sciences) in Berlin. Marggraf was an example of what Ursula Klein has dubbed the “hybrid expert”, one who combined practical knowledge and scientific reasoning, namely the apothecary-chemist (98). Like the leading chemical researchers of his time, Marggraf, too, was an apprenticed apothecary. Furthermore, Marggraf audited lectures and seminars at the University of Halle, but he never earned a university degree. Before taking on his post at the Akademie, he earned his living through the apothecary’s shop that he inherited from his father, the *Apotheke zum Bären* (Bear’s Pharmacy) on Spandauer Straße in Berlin.

Here, Marggraf manufactured and sold remedies as well as other commodities, which was common for apothecary shops throughout the eighteenth century to supplement their income (107).

Marggraf's honourable position at the Akademie is somewhat exemplary of the changes to chemical research in the German lands; the eighteenth century saw a growing acknowledgement of chemistry's everyday usefulness as well as its potential. Despite his lack of editorial experiences, Crell anticipated that the growing interest in chemical research would require a communication infrastructure that could reach a geographically scattered audience quickly and reliably.

Winning Contributors and Gaining Momentum

It seems that Crell worked strategically to garner the attention of leading Prussian chemical researchers in the months leading up to the publication of the journal's first issue—likely to make himself known and thereby win potential readers. Maybe the rationale went even further and Crell wished to recruit the Prussian researchers as contributors for his inaugural issue. After all, a new periodical that comprised the most recent findings and thoughts of the chemical elite would have likely sold better than one composed by a professor without a track record of scientific and chemical achievements.

Whatever Crell's plan was, Friedrich Nicolai (1733 – 1811) played a crucial role in it. Nicolai was a Prussian publisher and a main actor of the German Enlightenment. He wished to foster new ideas and talents, and thought of himself as an innovator (Murray 805). Nicolai criticized Kant and was an avid supporter of empiricism, which made him a “precursor of the natural sciences of the nineteenth century” (Becker-Cantarino 106). Like Crell, Nicolai desired to “overcome the intellectual *Kleinstaaterei*” (territorial fragmentation) that had befallen the German lands (Schneider 81). To this end, he published the *Allgemeine deutsche Bibliothek* (ADB), “the most important source of reviews and a major organ of the Berlin Aufklärung” (Printy 152). Due to the popularity of the ADB, Nicolai received numerous inquiries from strangers who wished to contribute reviews. Usually these individuals came recommended. Crell, however, seems to have been unusual in offering his services without indicating that someone else suggested he do so (Selwyn 67). Despite the absence of common acquaintances, the young professor was lucky: within roughly three months of Crell's initial contact with Nicolai, from November 1777 until February 1778, Nicolai tasked Crell with fourteen reviews of publications devoted to chemical, medical, and scientific topics.

Considering that the first issue of *Chemisches Journal* came out (belatedly) in April 1778, the timing of his contact with Nicolai, the number of reviews he wrote, as well as the speed with which Crell completed his submissions for the Prussian editor, suggest that he wanted to introduce himself in Nicolai's circles and gain some momentum before the arrival of his journal. Contributing to the ADB, Crell would be sure of garnering the attention of leading chemical researchers, most notably Johann Christian Wiegleb (1732–1800), Johann Friedrich Gmelin (1748–1804), and Johann Friedrich Götting (1753–1809). All three wrote reviews for Nicolai's periodical, but Nicolai was especially close with Wiegleb (Raabe 94). Wiegleb published several of his books with Nicolai, including his *Chemische Versuche über die alkalischen Salze* (1774), which Crell had read. Wiegleb was also a “hybrid expert”, referring to his dual role as a commercial apothecary and a chemical researcher (Klein 98), having even extended his laboratory to teach chemistry. His students lived, learned, and

researched at Wiegleb's *Privatinstitut*—and Götting had been one of them. Crell likely tried to tap into this network when he first contacted Nicolai.

Crell's concerted efforts as a contributor to the ADB and as the editor of the *Chemisches Journal* paid off, albeit a bit later than he might have hoped for: all three, Wiegleb, Gmelin, and Götting, submitted articles for the second issue of Crell's *Journal*. However, this does not only speak to Crell's hard work. The readiness with which the experimenters welcomed and contributed to a periodical devoted solely to chemical research illustrates the need and importance of a communication infrastructure for the professionalising field of chemical inquiry.

First Issue

The first issue of the *Chemisches Journal* consisted almost entirely of articles authored by Crell and Johann Christian Dehne (died 1791), a physician who lived in the neighbouring city of Schöningen, about twelve kilometers from Helmstedt. Crell's former student Carl Wilhelm Nose (1753–1835) composed an article for the issue as well, but decided to print it separately as it was time-sensitive and the publication of Crell's first issue was delayed (Quarg 31–33). Ultimately, the journal that would go on to become the first chemical forum of German researchers began as a compilation of ideas and observations of two obscure men of medicine from the countryside.

The contents of Crell's first issue demonstrate that the editor was well aware of trending research. The first article, for example, focuses on experiments with phosphorus, which played a role in the transnational discussion of the phlogiston theory. The improvement of chemical procedures such as distillation as well as manufacturing remedies received attention in Crell's first issue, too, and not only spoke to the interests of the well-informed chemical experimenters but also hinted at the journal's broad range of topics, ensuring that every reader—from the apothecary mainly interested in remedies to the experimental researcher—would be catered to. In the second part of his first issue, the editor presented excerpts from the proceedings of two science academies: the Preußische Akademie der Wissenschaften and the Royal Society of London. Here, Crell included his own article, published in the Royal Society's *Philosophical Transactions*. This piece on *Some Experiments on Putrefaction* had appeared in January 1771—seven years before Crell reprinted it in his journal. Judging from Crell's editorial goal to provide his audience with “important, new observations” (Crell 13), this piece should have been left out. Yet, Crell made efficient use of what little resources he had, presumably, to strengthen his editorial credibility: his audience would learn right away, in the inaugural issue, that the editor had received the high honour of publishing his observations in one of the most renowned society-based periodicals in Europe. The high esteem in which German men of science held the *Philosophical Transactions* worked in Crell's favour. The general assumption that the Royal Society only published works of the highest quality likely led them to believe that Crell was no obscure experimenter. Whether the editor re-printed his own piece after careful, strategic consideration or simply out of the desire for fame, as Hufbauer has suggested, is not clear (Karl Hufbauer 82). In any case, by establishing the link between himself and the Royal Society, Crell was somewhat able to appease readers who were sceptical of his reputation. This is especially true for the years 1777 and

1778 when the editor did not have any notable publications (such as monographs) to his name and was not yet a member of any science academy.¹

In the foreword to his first issue, Crell commented on his decision to include articles from academy proceedings, wondering who had the time to go through the society-based periodicals “for the sake of but a few experiments in each volume of such writings?” (Crell 16) Thereby, Crell illustrated the service he offered to his readers: he did not only provide articles from several foreign journals but, more importantly, accumulated the relevant articles on chemical investigations.

Christoph Meinel has theorised that excerpting and translating articles from academy proceedings was one of the crucial reasons for the growing popularity of commercial science journals such as Crell’s (Meinel 48), because some of the foreign periodicals - most prominently the *Philosophical Transactions* - could not be bought from the Royal Society and were difficult to acquire. However, Kai Torsten Kanz suggests that the value that historians ascribe to this particular editorial service could be exaggerated. Kanz argues that throughout the eighteenth century, the German lands witnessed an influx of translations of foreign scientific news (Kanz 55-81). A couple of examples include the *Physische Abhandlungen* (1748-1759), successfully edited by Wolf Balthasar Adolph von Steinwehr (1704 – 1771) and his *Anatomische, chemische und botanische Abhandlungen der Königl. Academie der Wissenschaften in Paris* (1749-1760), both of which presumably folded due to infrastructural difficulties caused by the Seven Years' War. Another example of such translations is the *Abhandlungen der Königlichen Parisischen Akademie der Chirurgie* (1754 – 1776), which could have sparked the interest of Lorenz Heister, Crell’s famous grandfather who pioneered surgery throughout the German lands. The editor of this publication was the physician and mathematician Johann Ernst Zeiher (1725 – 1784), a professor at the University of Wittenberg. Zeiher not only translated and published French journals but was also one of a group of academics at his home university who, between 1768 and 1774, re-printed complete issues of the *Philosophical Transactions* (without translating them).

The availability of translations of scientific news from foreign academies might explain why Crell emphasised the aspect of time in his foreword. It was not necessarily the access to foreign science that Crell offered his audience, but presumably the time he saved them which they would have spent on finding chemical news in the flood of translations of foreign proceedings. More generally, Crell decided which of the many foreign experiments should count as (important) chemical news and were of use to his German readers. Thereby—and despite his lack of credentials—Crell functioned as a gatekeeper and delineated the field of chemical inquiry from his earliest issue.

Crell’s Journal’s Role in the Production of Chemical Knowledge

For a printed work (be it a journal, a pre-print, or a book) to become an instrument for developing scientific knowledge, it necessarily needs to synchronise with the communication infrastructure of the respective field of inquiry. Crell’s publication quickly became one of several acts of communication that led to the establishing of chemical knowledge. More precisely, Crell’s journal developed into an important source of chemical news and observations.

¹ Crell was elected Foreign Fellow to the Royal Society a decade after his journal commenced, in 1788.

As mentioned earlier, professors and lecturers were expected to *teach* chemistry rather than to *research* it. Thus, at the time when Crell issued his journal, the textbook was the leading type of publication on chemistry. At the beginning of their teaching careers, professors and apothecary-chemists usually relied on textbooks written by more established peers, but in the course of their work they wrote their own in order to include their own observations and avoid rebutted theories. Frercks and Markert argue that “it was in textbooks that chemists tried hardest to establish an appropriate order” of chemical raw data and novel observations (147).

It is important to note that there was another interrelation between the journal and the textbook: when authoring the latter, chemical researchers regularly came across lacunas, and formulated new inquiries as well as points of departures for experiments. This not only stimulated new research and further articles, but, more generally, also maintained Crell’s chemical journal. In short, the periodical and the textbook came to complement each other.

They were, however, not the only forms of print devoted to chemistry. Monographs also played a role. This can be observed in the case of Crell’s journal and a chemical book by Johann Friedrich Westrumb (1751-1819). At the height of the so-called phlogiston debate, the apothecary and mining councillor Westrumb repeated some experiments that when originally carried out seemed to have verified the phlogiston theory. When Westrumb did not arrive at the same findings, he announced this important fact in a note in Crell’s sixth and most famous journal, *Chemische Annalen* (1784-1804). After this initial step, a few months later, Westrumb went on to publish *Geschichte der neu entdeckten Metallisirung der einfachen Erdaten nebst Versuchen und Beobachtungen* [sic] (1791) in which he elaborated on the experiments in detail. The book and Crell’s journal allowed Westrumb to communicate with his peers in two different ways, by providing chemical news and chemical knowledge. On the one hand, Westrumb was able to quickly announce his observations and briefly inform his peers of his forthcoming work; on the other hand, he took the time to work on a careful composition of these observations and present them in a high-quality manner. Generally speaking, Crell’s journal allowed the German experimenters to accelerate their communication and make it more efficient in other ways, too—for example, by allowing them to address researchers purely interested in chemistry rather than audiences devoted to several different fields of scientific inquiry.

Closing Remarks

Crell devoted decades of his life to his journals. Over almost 27 years he published nine periodicals, the longest-running of which was the monthly *Chemische Annalen*. During busier years, such as 1785, the Helmstedian editor published over 2,000 pages of chemical facts and findings,

The editor extended the infrastructure of chemical communication, persuading his peers that a periodical publication was a worthy means of communication and a trustworthy venue for circulating chemical observations. His success is underpinned by nearly twenty foreign imitations of his journal (Meinel 49). He facilitated the collective management of new discoveries—and, more generally, fostered a new public readership.

Works Cited

- Anderson, Robert and Jean Jones. *The Correspondence of Joseph Black*. Farnham: Ashgate, 2012. Print.
- Baldwin, Melinda. *Making Nature: The History of a Scientific Journal*. Chicago, London: University of Chicago Press, 2015. Print.
- Becker-Cantarino, Barbara. "Nicolais Vertraute Briefe von Adelheid B** an ihre Freundin Julie S**, Fichte und Schlegel." *Friedrich Nicolai im Kontext der kritischen Kultur der Aufklärung*. Ed. Stefanie Stockhorst. Göttingen: V&R unipress, 2013, 95-110. Print.
- Brenker, Anne Margarete. *Die Meyersche Hofbuchhandlung in Lemgo in der zweiten Hälfte des 18. Jahrhunderts*. Bielefeld: Westfalen Verlag, 1996. Print.
- Berg, Britta and Peter Albrecht, "Presse der Regionen Braunschweig/Wolfenbüttel, Hildesheim, Goslar: kommentierte Bibliographie der Zeitungen, Zeitschriften, Intelligenzblätter, Kalender und Almanache sowie biographische Hinweise zu Herausgebern, Verlegern, Druckern und Beiträgern periodischer Schriften bis zum Jahre 1815." *Deutsche Presse*. Volume 3. Stuttgart: Frommann-Holzboog, 2003. Print.
- Bruning, Jens. "Helmstedt." *Städte und Residenzen im alten deutschen Sprachraum*. Ed. Wolfgang Adam, Siegrid Westphal. Berlin, New York: De Gruyter, 2012, 901-934. Print.
- Brohm, Ulrich. *Die Handwerkspolitik Herzog Augusts des Jüngeren von Braunschweig*. Stuttgart: Franz Steiner Verlag, 1999. Print
- Burns, William. *Science in the Enlightenment: An Encyclopedia*. Santa Barbara, California, Denver, Colorado, Oxford, London: ABC-Clio, 2003. Print.
- Clark, William. *Academic charisma and the origins of the research university*. Chicago and London: University of Chicago Press, 2006. Print.
- Court, Susan. "The Annales de Chimie, 1789-1815." *Ambix* 19:2 (1972): 113-128. Web: Ambix.
- Crell, Lorenz. *Chemisches Journal, Vorrede*. Lemgo: Meyerscher Verlag, 1778. Print.
- _____. "Some Experiments on Putrefaction." *Phil. Trans.* 61:1 (1771): 332-344. Web: Philosophical Transactions Archive.
- Csiszar, Alex. "Seriality and the Search for Order: Scientific Print and its Problems during the Late Nineteenth Century." *History of Science* 48:3/4 (2010): 399-434. Web: Harvard University.
- Ellis, Harold. *A History of Surgery*. London: Greenwich Medical Media Ltd, 2001. Print.
- Frercks, Jan. "Demonstrating the Facticity of Facts: University Lectures and Chemistry as a Science in Germany around 1800." *Ambix* 57:1 (2010): 64-83. Web: Ambix.
- _____. "The Interplay of Chemical Teaching with Work and with Research: A Case Study from Germany around 1800, Johann Friedrich August Göttling at Jena." *Neighbours and Territories: The Evolving Identity of Chemistry*. Ed. JR Bertomeu-Sánchez. Louvain-la-neuve: Mémosciences, 2008, 149-155.
- _____ and Michael Markert. "The Invention of Theoretische Chemie: Forms and Uses of German Chemistry Textbooks, 1775-1820." *Ambix* 54:2 (2007): 130-155. Web: Ambix.
- Fuchs, Georg Friedrich Christian. *Repertorium der chemischen Litteratur*. Volume 1. Jena, Leipzig: Christian Ernst Gabler, 1806. Print.
- Gmelin, Johann Friedrich. *Geschichte der Chemie: Seit dem Wiederaufleben der Wissenschaften bis an das Ende des achtzehnten Jahrhunderts*. Volume 3. Göttingen: Johann Georg Rosenbusch, 1799. Print.
- Hufbauer, Karl. *The Formation of the German Chemical Community, 1720-1795*. Berkeley, Los Angeles, London: California University Press, 1982. Print.
-

Kanz, Kai Torsten. "Deutsch-französischer Wissenstransfer in der zweiten Hälfte des 18. Jahrhunderts: Das Beispiel der medizinischnaturwissenschaftlichen Periodika." *Philosophia Scientiae. Travaux d'histoire et de philosophie des sciences/Studien zur Wissenschaftsgeschichte und -philosophie, Cahier Spécial 2.* (1999): 55-81. Print.

Klein, Ursula. "The Laboratory Challenge: Some Revisions of the Standard View of Early Modern Experimentation." *Isis* 99:4 (2008): 769-782. Web: JSTOR.

_____. "Klaproth's Discovery of Uranium." *Objects of Chemical Inquiry*. Ed. Ursula Klein, Carsten Reinhardt. Leiden: Brill, 2014, 21-46. Print.

_____. "Apothecary-chemists in eighteenth-century Germany." *New Narratives in Eighteenth-Century Chemistry*. Ed. Lawrence Principe. Volume 18. 'Archimedes New Studies In The History And Philosophy Of Science and Technology', Dordrecht: Springer Netherlands, 2007, 97-137. Web: Springer Link.

Murray, Christopher John. *Encyclopedia of the Romantic Era, 1760-1850*. New York, London: Fitzroy Dearborn, 2004. Print.

Meinel, Christoph. "Structural Changes in International Scientific Communication: The Case of Chemistry." *Proceedings of the «Storia e Fondamenti della Chimica»*. (Perugia, 27-30 Ottobre 1993): 47- 61. Web: Researchgate.

Paisey, David. "Deutsche Buchdrucker, Buchhändler und Verleger, 1701-1750." *Beiträge zum Buch- und Bibliothekswesen*. Volume 26. Wiesbaden: Harrassowitz, 1988. Print.

Quarg, Gunther. "Carl Wilhelm Noses Handexemplar seines Versuchs einiger Beyträge zur Chemie." *Berichte zur Wissenschaftsgeschichte* 14:1 (1991): 31-33. Web: Wiley Online Library.

Raabe, Paul. *Friedrich Nicolai 1733-1811: die Verlagswerke eines preussischen Buchhändlers der Aufklärung 1759-1811*. Ausstellungskatalog der Herzog August Bibliothek. Berlin: Verlag Berlin, 1986. Print.

Rammer, Gerhard. "Was und wie lernen wir aus alten wissenschaftlichen Lehrbüchern? Wissenschaftshistorische Überlegungen zum Genre." *Der Lehrbuchdiskurs über das Bauen*. Ed. Uta Hassler. Zürich: vdf Hochschulverlag, 2015, 26-39. Print.

Schmidt-Glintzer, Helwig. *Die Reformuniversität Helmstedt 1576-1810. Vorträge zur Ausstellung "Das Athen der Welfen"*. Wiesbaden: Harrassowitz Verlag, 2011. Print.

Schneider, Ute. *Friedrich Nicolais Allgemeine Deutsche Bibliothek als Integrationsmedium der Gelehrtenrepublik*. Wiesbaden: Harrassowitz, 1995. Print.

Scherer, Alexander Nicolaus. *Allgemeines Journal der Chemie, Vorrede*. Leipzig: Breitkopf und Härtel, 1798. Print.

Selwyn, Pamela. *Everyday Life in the German Book Trade: Friedrich Nicolai as Bookseller and Publisher in the Age of Enlightenment, 1750-1810*. University Park Pennsylvania: The Pennsylvania State University Press, 2000. Print.

Toftlund, Hans. "Lorenz Crell und das erste chemische Periodicum 1778." *Chemie in unserer Zeit* 12:6 (1978): 199-200. Web: Wiley Online Library.

Triebes, Michaela. *Die Medizinische Fakultät der Universität Helmstedt (1576-1810)*. Wiesbaden: Harrassowitz, 1995. Print.

Weißbrodt, Ernst. *Die Meyersche Buchhandlung in Lemgo und Detmold und ihre Vorläufer: Festschrift zum 250-jährigen Bestehen der Firma am 12. Juni 1914*. Detmold: Meyer, 1914. Print.

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