Making objects move: On minerals and their dealers in 19th century Germany

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Abstract

Around 1804, the mineralogist and geognost Carl Caesar Leonhard (1779-1862) started a mineral business at Hanau (Germany), which immediately became widely known among mineral collectors. He ran the shop for about ten years before he moved, first to Munich, and then in 1818 to Heidelberg where he became a professor of mineralogy and geology. At Heidelberg, Leonhard restarted his business in the early 1820s and again, it rapidly became well known: for several decades the *Heidelberger Mineralien-Compoir* was one of Europe's leading mineral shops. The rapid growth of the company—and the foundation of further ones, such as the firm of Adam August Krantz (1808-1872)—in the first half of the 19th century might be seen as a striking example of a new need for circulating objects, for a new linking space between scientific, economic, and public/popular uses, that is, a need to make objects move. Focusing on the history of Leonhard's business, i.e., on mineral dealing in Germany, this paper outlines some of the conditions of its formation, and the strategies to promote the new space and make it work. The new private/civic culture of the Biedermeier era is set forth as a constitutive moment in the shaping of 19th century mineral dealing. At least implicitly, the paper also seeks to indicate some of the transformations of objects within that new space: this is, in one respect, an *economization of objects/nature*. In the first place, however, it seems to be a new kind of accessibility of objects. This means that objects—or rather, nature itself—became *accessible by catalogue*.

Keywords: mineral dealing, Carl Caesar Leonhard, *Heidelberger Mineralien -Comptoir*, Biedermeier era, 19th century.

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Introduction

In 1903, Lazarus Fletcher (1854-1921), curator of the mineralogical department of the British Museum of Natural History, wrote a letter to Emil Schlagintweit (1835-1904) concerning the geological collections resulting from the famous expedition to India and High Asia in 1854-1857 of his brothers Hermann (1826-1882), Adolph (1829-1857) and Robert Schlagintweit (1833-1885).[1] He had many items from their collections in his department; unfortunately, they were all unlabelled, and, thus completely useless to the museum. Among the unpublished manuscripts of the brothers, however, as he had heard from the Munich mineralogist Konrad Oebbecke (1853-1932), there should have been two volumes, which are now missing. These were volumes 31 and 32, which contained detailed descriptions, including copies of the labels of the geological collections. Fletcher might have expected them to still be with the family, or with other institutions holding further parts of the collection, and he hoped that Emil Schlagintweit might be able to help him in finding them: 'Have you or your relatives ever seen vols. 31 and 32'.[2] Actually, however, Emil (as noted by Emil's hand on Fletcher's letter) had to refer him to 'Dr. A. Krantz, Min[eralien]-Contor Bonn', the world-renowned German mineral dealer; the company had offered sets of the Schlagintweit geological collections for sale in a catalogue of 1904.[3] Emil also contacted the then owner of the firm, Friedrich Krantz (1859-1926), who, however, was similarly unable to help Fletcher in his quest.[4] Actually, all further

[1] On the Schlaginweit mission see, for instance, Bernhard Fritscher, 'Humboldtian views': Hermann and Adolf Schlagintweit's panoramas and views from India and High Asia, in: Form, Zahl, Ordnung: Studien zur Wissenschafts- und Technikgeschichte. Festschrift für Ivo Schneider zum 65. Geburtstag, ed. by Rudolf Seising, Menso Folkerts, Ulf Hashagen. (Boethius, 48) Stuttgart (2004), 603-613.

[2] 'Haben Sie oder ihre Verwandten Bde 31 u. 32 je gesehen?' Lazarus Fletcher to Emil Schlagintweit, London, 23.10.1903, Bavarian State Library, Manuscript Department, Schlagintweitiana VI.5.2. Since the Schlagintweit expedition was a British–Prussian joint enterprise, their various materials and collections were in part deposited in British and German institutions, whereas others remained with the family (such as great parts of the geological collections, which originally consisted of about 6000 rock specimens, and numerous fossils). Cf. Geoff Armitage, The Schlagintweit collections, in: Earth Sciences History 11 (1992), 2-8. The materials remaining with the family were first held by Emil Schlagintweit who deposited them at the Bavarian State Library in Munich in 1888.

[3] Actually, there is an advertisement to be found in a sales catalogue of 1904, offering 'rocks from the Himalayas, collected by the brothers Schlagintweit' (also the requested manuscript volumes are mentioned). [Dr. F. Krantz - Rheinisches Mineralien-Contor], Petrographie: Gesteine, Dünnschliffe, Diapositive, Petrographische Apparate. Catalogue No. 4. 5th edition, Bonn (1904), 120. Very probably, however, the Schlagintweit specimens came to the Krantz firm as early as the 1880s.

[4] Friedrich Krantz an Emil Schlagintweit, 7.11.1903, Bavarian State Library, Manuscript Department, Schlagintweitiana VI.5.2.

efforts to find the volumes 31 and 32—down the present day—have failed.[5] Thus they are still missing from the Schlagintweit manuscripts held in the Manuscript Department of the Bavarian State Library in Munich.[6]

Nevertheless, we are not concerned with this problem in the present paper. The short episode has been chosen, rather, to introduce a particular *space in-between*, which is usually mentioned only marginally—but, as the story shows, has to be kept in view—when discussing the history and the practice of geological collecting in modern times, and this is the realm of mineral dealing, and mineral dealers.[7] Concerning the common topic of the papers in the present volume, mineral dealing might be characterized as a space in-between essentially made up of moving objects, i.e. constructing a *space of circulating objects* between (geological/mineralogical) objects and the practice of (scientific) collecting, connecting science, economics, and the public, or, more generally, nature and society. In this sense the rapid growth in mineral dealing in the first half of the 19th century seems to indicate a new need of circulating objects, or of a new linking space—between scientific, economic, and public/popular uses—to make objects move. This space, to be sure, is not a one-way route. It is not constructed as a simple passage from outcrops or mines via the dealer to the collector or scientist. It is rather a space of exchange, of various demands (in particular of collecting on demand), of various ways of acquiring minerals, of sale and resale. Thus, it seems to be a true space of *circulating* objects.

The present paper seeks to outline some preliminary ideas on the conditions and the requirements of its formation, and the strategies to promote the new space and to make it work. Focusing on the best-known German mineral company of the first half of the 19th century, that is, Carl Caesar von Leonhard's (1779-1862) *Heidelberger Mineralien-Comptoir*, founded at the beginning of the century, the paper

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[5] Not least just recently by the author of this paper. I want to thank Dr. Ursula Müller-Krantz for her kind support, and in particular, for offering me a chance to look into the deposits and the family archive of the Krantz firm - a true treasury of objects!

[6] Vgl. Anne Büchler/Rolf Schumacher, Die Nachlässe von Martius, Liebig und den Brüdern Schlagintweit in der Bayerischen Staatsbibliothek, (Catalogus codicum manu scriptorum Bibliotheca Monacensis, 10) Wiesbaden (1990), 100-157, here 121.

[7] Although collecting/collectors and collections are a central topic in the recent history of earth sciences, mineral dealers and mineral dealing still seem to have been given little attention. As far as is known, there are only two more comprehensive studies, Michael P. Cooper, Robbing the sparry garniture: a 200 year history of British mineral dealers 1750-1950, Tucson/Arizona (2006). Gregor Markl, Bergbau und Mineralienhandel im fürstenbergischen Kinzigtal: Wirtschafts- und Sammlungsgeschichte unter besonderer Berücksichtigung der Zeit zwischen 1700 und 1858, (Schriftenreihe des Mineralienmuseums Oberwolfach, 2) Filderstadt (2005). Furthermore, a large quantity of very valuable information on individual dealers is to be found in Wendell E. Wilson, Mineralogical Record Label Archive & The Mineralogical Record Biographical Archive; see http://www.minrec.org/labelarchive.asp & http://www.minrec.org/sitemap.asp (last visited February 2012).

outlines some of the conditions of its formation, and the strategies to promote the new space and make it work. In this way, the new private/civic culture of the Biedermeier era is particularly highlighted as a constitutive moment in the shaping of 19th century mineral dealing in Germany—also posing the question concerning the emergence of mineral dealing as an indicator of a new civic practice of mineralogy/geology in general:, in other words, a practice less related to mining, but rather to the new civic culture. And finally, the paper intends, at least implicitly, to indicate some of the transformations of objects within that new space. This is, in the first place, what might be called a new kind of *economization of objects/nature*. More interesting, however, seems to be another transformation, which is a new kind of accessibility of objects; objects—and, thus, nature itself—became *accessible by catalogue*.

Minerals for the Cultured Classes: Carl Caesar von Leonhard and the *Heidelberger Mineralien-Comptoir*

In March 1819, Johannes Menge (1788-1852), proprietor of the *Mineralien-Comptoir* at Hanau (Hessen, Germany), set out on a mineralogical trip to Northern Europe, in particular to Iceland, Norway, Sweden and England. Before doing so, he felt obliged to insert an advertisement on his expedition in a widely read popular magazine, the *Morgenblatt für gebildete Stände* (Morning paper for the cultured classes). *Cultured Classes* is an approximated translation of the then common German notion of *gebildete Stände*, denoting the various classes or social groups of culture, or lettered classes, namely physicians and apothecaries, lawyers, clergymen, teachers of all types of schools, scientists, state officials, writers, artists, and so on. A more common translation would have been *educated* or *learned (middle) classes*, but *gebildete Stände* is actually more than this by claiming implicitly a peculiar social position (see also below, chapter 3). In the magazine Menge announced that, notwithstanding his journey, the business at Hanau would be continued as usual. He further used the opportunity to introduce the future name of his shop, *Naturalien-Comptoir* (instead of *Mineralien-Comptoir*), and, last but not least, he did not forget to remind his potential customers of the offers and the services of his company: [8]

[8] 'Durch gegenwärtige Verbreitung unsers Instituts sind wir in den Stand gesetzt, alle Mineralien des In- und Auslandes uns anzuschaffen. Wir können deshalb leicht jede bestehende Sammlung nach und nach vervollständigen, wenn uns die Defektliste davon eingesendet wird. Ganze geordnete Sammlungen fertigen wir zu jedem beliebigen Preise, jedoch die Oryktognostischen nicht unter 11 fl und nicht über 5000 fl Rheinisch, die Geognostischen von 5 fl 30 kr bis zu 400 fl.' [Johann Menge, Naturalien-Comptoir, Hanau], in: Intelligenzblatt zum Morgenblatt für gebildete Stände, No. 14 (1819), 54 (my italics; B.F.).

Because of the present distribution of our company we are capable of procuring *all domestic and foreign minerals*. Hence, we can complete gradually every existing collection without difficulty, if a list of desiderata is sent to us. Complete and organized collections we prepare at any desired price; the oryctognostic ones, however, not for less than 11fl [Rhenisch Guilder] and not more than 5000 fl Rhenisch, the geognostical ones from 5 fl 30 kr [Kreuzer] up to 400 fl.

Neither Menge did forget to keep his customers informed about his mineralogical activities abroad. Just about two months later there was an announcement in the *Frankfurt General Post Office Magazin* (*Frankfurter Ober-Postamts-Zeitung*), where he had also announced his absence, 'that several large shipments of minerals from the North have already arrived [at Hanau; B.F.], among which several red and white cryolites from Greenland are particularly noteworthy. Hanau, June 18th 1819. Naturalien Comptoir.'[9]

With regard to particular aspects of the practice of mineral collecting in early 19th century Germany, Menge's announcement might also be of interest for the destination of his mineralogical journey, i.e. to provide minerals from Northern Europe.[10] Concerning the emergence of mineral dealing, however, attention might be drawn to two less conspicuous aspects: firstly, Menge placed his advertisements in popular journals rather than more particular scientific ones, and, secondly, he assured his customers of his ability to provide all domestic and foreign minerals. Both indicate, as early as 1819, a well-established company, and implicitly the existence of a well-organized and well-working international network of mineral collecting and mineral dealing, as well as, of course, a profound knowledge of minerals and their deposits. More generally, Menge's advertisements indicate a new—public and independent—space for the acquisition, the moving and the international exchange of minerals, a space that had been opened up by the emergence of a new civic culture since the end of the 18th century. An assessor and amateur mineralogist from Hanau, together with his employee, seems to have been, at least in Germany, the first to realize the new space, that is, to realize that there would be a particular position for mineral dealing.

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[9] '... dass bereits mehrere starke Transporte Mineralien aus dem Norden eingetroffen sind, unter welchen sich mehrere rothe und weisse Kryolithe aus Grönland vorzugsweise auszeichnen. Hanau, den 18. Juni 1819.' [Johann Menge, Naturalien Comptoir], in: Frankfurter Ober-Postamts-Zeitung, No. 184, Saturday, July 3rd (1819).

[10] See Benigna Kasztner, Mineraliengeschenke in Weimar-Jena um 1800. Ein mikrohistorischer Beitrag zum Wechselspiel von Kolonialismus und Wissenschaft, in: Wissenschaft und Kolonialismus, hrsg. von Marianne Klemun, Wiener Zeitschrift zur Geschichte der Neuzeit 9, No. 2 (2009), 23-39, here 32-38.

Mineral dealing—or better the acquisition and exchange of minerals—was well established around 1800. Initially, it began in the mining areas of Freiberg and the Harz Mountains, where mining officials procured an additional income by offering minerals for sale. Their customers were aristocratic houses in particular, and more and more also private collectors (who often ordered minerals for resale).[11] Thus, in the second half of the 18th century numerous private collections were built up, which today are known mainly or only from the literature.[12] A usual practice of international mineral exchange was furthermore princely gifts—the exchange of minerals among the nobility.[13]

In the entry on 'trading in natural history specimens' (*Naturalienhandel*) in the 101st volume of Johann Georg Krünitz's (1728-1796) *Economical Encyclopaedia* (published in 1806) a new interest of scholars in natural history is quoted as being the essential cause of the emergence of this new branch of trade. Its origins are seen in the Netherlands where, for instance, complete warehouses holding seashells had been established to meet the requirements of the fanciers of conchological studies. Ships were bringing various highly diverse natural produces from the East Indies and other remote parts of the world to be sold to collectors for high or sometimes also modest prices, depending on the scarcity of the specimens. It might be wished, the author continued, that this kind trade should become more widespread, so that not only the Netherlands, England, Denmark and other seafaring nations would be able to deal in natural products, but that also in Germany, at least in bigger cities, trading houses would be established to deal in indigenous natural products. Thus, foreigners would be able to buy (German) domestic natural specimens at lower costs as well as those from overseas. By this means one would be able to acquire a great number of specimens without difficulty, whereas currently it was necessary to spend a lot of money and time to assemble even a small number of inferior natural products.[14]

[11] For a detailed discussion of the practice of mineral dealing in this sense (for the area of the cobalt mining in the Kinzig Valley, Black Forest, Germany) see Markl, Bergbau und Mineralienhandel (see note 7), 241-258.

[12] As an example one might see the (incomplete) list of mineral collections/collectors given by Ch. Keferstein in his Zeitung für Geognosie, Geologie und Naturgeschichte des Innern der Erde (1826), No. 2, 107-139.

[13] See Markl, Bergbau und Mineralienhandel (see note 7), 258-263; cf. also Kasztner, Mineraliengeschenke (see note 10), 31-32.

[14] [Johann Georg Krünitz], Naturalienhandel, in: Oeconomische Encyclopädie, oder allgemeines System der Staats- Stadt- Haus- u. Landwirthschaft 101 (1806), 491-493, here 491.

In spite of this, however, in the German countries there were also a number of possibilities for buying minerals: [15]

... in particular various people are dealing in domestic and foreign natural history specimens, and therefore they are travelling from one district to another to provide themselves with a considerable number of mineral specimens, rocks and so on. Indeed, by this time, at Hanau there had even been established a regular *Mineral-Exchange and Trade-Store* (*Mineralien-Tausch- und Handlungs-Comptoir*), where one could get complete collections of 700 or more items, partly of a size of 5–6 inches (*zoll*) for 400 Thaler, as well as smaller collections of 200 small items for 6 Thaler.

Furthermore, Krünitz stated, while there was a more or less flourishing trade in minerals, there was nothing comparable for other natural history subjects; in particular, zoological specimens were hard to acquire (although there was some trade in insects). Moreover, trading in natural history specimens was limited by the small demand. And, since most of the fanciers who wished to buy something had very limited means, they usually preferred to collect themselves. Finally, Krünitz noted, that for a dealer of natural history specimens some learning was required; persons who have relevant knowledge, however, might be unwilling merely to do the work of a tradesman.[16]

Krünitz's article provides a contemporary statement on the emergence of mineral dealing. He is surely right to emphasize the growing scientific interest in natural history as an essential background for dealing in minerals. This interest increased further in the 19th century together with the emerging sciences of mineralogy and geology, and furthermore this is indicated by the founding of the great natural history museums all over the world (for instance, to name just one, the *Joanneum* at Graz, Austria, founded in 1811). Concerning Krünitz's statement that mineral dealing is ultimately also limited by the resources of the customers and

[15] '...besonders handeln verschiedene Leute mit Mineralien, und reisen deshalb immer von einer Gegend zur andern, um sich mit einer gehörigen Anzahl von Stufen, Steinen etc. zu versehen. Ja, jetzt hat man in Hanau auch ein förmliches Mineralien-Tausch- und Handlungs-Comptoir errichtet, wo man ganze Sammlungen von 700 und mehr Stücken zum Theil von 5-6 Zoll Grösse für 400 Thaler, so wie auch kleine Sammlungen von 200 kleinen Stücken zu 6 Thaler bekommen kann.' [Krünitz], Naturalienhandel (see note 14), 492. It is also noted that the Hanau company at this time already had a kind of agent in Berlin, a student named Backofen, who would take orders for the Hanau firm. Similar shops were established at Freiberg/Saxony, in the Harz Mountains and in Thuringia, where, for instance, 'Herr Bergrath Voigt' [Johann Carl Wilhelm Voigt, 1752-1821] at Ilmenau would supply mineral specimens from the mines of that place to fanciers.

[16] [Krünitz], Naturalienhandel (see note 14), 492-493.

collectors, and for the 19th century the new class of industrial and business men has to be kept in mind.[17]

We might now take particular note of Krünitz's mention of the *Hanau Mineralien-Comptoir* as the first regular German mineral firm, the shop quoted at the beginning of this section. There, Johannes Menge was named as its owner in 1819; actually, however, the shop is much more associated with the name of its founder, Carl Caesar von Leonhard, one of the central figures of mineral dealing in the first decades of the 19th century.[18]

Leonhard was born near Hanau in Hessen, where his father Johann Konrad Leonhard served as an administrator in the service of the Landgrave Karl of Hesse-Kassel (1744-1836). In 1797, he entered the University of Marburg to study cameralistics. A year later he moved to the University of Göttingen where he became more and more interested in mineralogy, influenced particularly by the well-known professor of zoology and anthropology, Johann Friedrich Blumenbach (1752-1840). Not least, however, the mineral dealers also increased his interest in the subject: in his autobiography, published in 1854, Leonhard remembered clearly the pleasure and delight he felt when he had bought his first excellent mineral specimens from dealers in the Harz Mountains.[19]

An intended study of mineralogy under Abraham Gottlob Werner (1749-1817) in Freiberg/Saxony was unsuccessful,[20] owing to an early betrothal in 1801 (to Marie Louise Wilhelmine Blum, eldest daughter of a financier in Hanau, whom he married one year later). Instead he took a job as an assessor in the Bureau of Land Taxes at Hanau.[21] Nevertheless, the following years were a time of various activities in the field of mineralogy. Leonhard corresponded and became acquainted with some of the leading mineralogists of his time: Werner in Freiberg, Friedrich Mohs (1773-

[17] The collection of the Saxon entrepreneur Richard Baldauf (1848-1931) might be named, at least, as one particular example. See Mareen Czekalla; Klaus Thalheim, Die Sammlung Richard Baldauf (1848-1931) und ihr Bezug zu Österreich, in: Geo-Alp, Sonderband 1 (2007), 11-22.

[18] On Leonhard as collector and mineral dealer see Wendell E. Wilson, The history of mineral collecting: 1530-1799; with notes on twelve hundred early mineral collectors, (The Mineralogical Record, 26, No.6) Tucson/Ariz. (1994), 180. See also Wendell E. Wilson: The Heidelberger Mineralien-Comptoir: One of Europe's earliest mineral dealerships, in: The Mineralogical Record 41 (2010), No. 6, 513-526. (Both articles are also to be found on www.mineralogicalrecord.com; last visited February 2012).

[19] Carl Caesar Leonhard, Aus unserer Zeit in meinem Leben, 2 vols., Stuttgart (1854), here 1:82-83. Leonhard named 'Tapperten' and 'Müggе' as his providers, but on these persons no further information could be found.

[20] Leonhard was an admirer of Werner since he is supposed to have been the first one to discuss minerals as scientific objects (i.e. not as merely materials for metals). Leonhard, Aus unserer Zeit (see note 19) 1:105.

[21] Ibid., 1:94.

1839) in Vienna, and Karl Maria Ehrenbert von Moll (1760-1838), Austrian naturalist, mineral collector, politician, and after 1804 a member of the Bavarian Academy of Sciences in Munich. Moreover, Leonhard travelled extensively—throughout Thuringia and Saxony in 1803, to Vienna, Salzburg, and the Austrian Alps in 1805, and so on—collecting and building up his own mineral collection.[22] As early as 1803, when he had just finished his studies at Göttingen, Leonhard established a small laboratory at Hanau, and together with his friend Johann Heinrich Kopp (1777-1858), a physician and naturalist, he held popular lectures on chemistry for the cultured classes (*gebildete Stände*), thus also improving his own knowledge of chemistry: 'We learned by teaching', he later noted in his autobiography.[23]

Nevertheless, the lack of any formal training in mineralogy was to remain a problem throughout Leonhard's life. As a mineral collector he acquired an extensive practical knowledge of the physical properties of minerals and fossils, and he also occasionally referred to some acquaintance with mining in Hessen.[24] Nevertheless, his later works have been frequently criticized for neglecting the chemical and mathematical aspects of mineralogy. And in his later university lectures at Heidelberg, as it is reported, he is said to have used a 'barbaric terminology'.[25]

Around 1804, Leonhard began to sell minerals,[26] and by 1806 at the latest, his business was firmly established: in this year it was mentioned in Krünitz's *Encyclopedia*. And it was also 1806 when Johannes Menge became an employee in Leonhard's shop. He ran it together with Leonhard for about ten years. An essential

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[22] With regard to his travels in 1803, Leonhard later noted in his autobiography that it was at that time when his private collection began to increase substantially. Leonhard, Aus unserer Zeit (see note 19), 1:107.

[23] Ibid., 1:93.

[24] From the mining area of the *Biebergrund* (mining on copper, silver, and lead) in the valley of the Kinzig River near Hanau (not to be confused with the mining area in the Black Forest, mentioned above; see note 7), which was quite important for the Landgraviate of Hesse-Kassel. Leonhard, Aus unserer Zeit (see note 19), 1:95.

[25] Wilson, Leonhard (see note 18).

[26] When Leonhard actually started his mineral business seems to be uncertain. The year of its foundation is usually given as 1804, but 1803 and 1802 are also occasionally mentioned. See Karl Peter Buttler; Walter Klein, *Oekonomisch-technische Flora der Wetterau von G. Gaertner, Dr. B. Meyer und Dr. J. Scherbius. Taxonomie, Nomenklatur und Floristik: eine Auswertung des Gefässpflanzenteils*, (Jahresberichte der Wetterauischen Gesellschaft für die Gesamte Naturkunde, Sonderband 149/151) Hanau (2000), 63. The earliest product of the Hanau shop that I have found is a small booklet on the use of the blowpipe for the study of minerals (published anonymously, but most likely written by Leonhard) where the *Mineralien-Tausch- und Handlungs-Comtoir* [sic!] is named as publisher. [Anonymous]: Anleitung zum Gebrauch des gemeinen Lötrohres zur Untersuchung der Mineralien. Hanau 1803. Im Verlag des Mineralien-Tausch- und Handlungs-Comtoirs. Likewise the more particular reasons why Leonhard decided to enter the business are not known. However, it might be recalled that his mother Susanne Godeffroy was a member of the well-known Hamburg merchant family Godeffroy. See Leonhard, Aus unserer Zeit (see note 19), 1:1.

step towards his becoming an acknowledged mineralogist, however, was his foundation of a new magazine for mineralogy in 1807—still, admittedly, as an assessor in the tax office—the *Taschenbuch für die gesammte Mineralogie* (Notebook for the Whole of Mineralogy).[27] Just a few years before, in 1801, Karl Ernst Adolf von Hoff (1771-1837) in Göttingen had sought to establish a similar project by the edition of his *Magazine for the Whole of Mineralogy* (which, however, was abandoned after its first volume).[28] One of the reasons for Leonhard's immediate success was that, owing to his personal connections, he was able to win well-known authors for his journal, such as J. C. W. Voigt (see note 15), Von Hoff, Mohs, and also Johann Wolfgang von Goethe (1749-1832).[29] First of all, however, Leonhard's journal addressed a new audience, i.e. it was a popular journal rather than merely a scientific one, including in particular a multitude of amateur mineralogists and mineral collectors. To the 'friends of mineralogy', he presented his magazine, as he wrote in the preface to its second number,[30] and its contents would be the discoveries and improvements in the field of mineralogy in a broader meaning, including reviews of new literature, but not, for instance, the chemical analysis of minerals, or discussions of their economic use.[31] In 1830, Leonhard, together with the Heidelberg palaeontologist Heinrich Georg Bronn (1800-1862), relaunched his journal as a *Yearbook for Mineralogy, Geognosy, Geology, and Palaeontology*, which finally, in 1863, became the *New Yearbook for Mineralogy, Geology, and Palaeontology*, a mineralogical journal that is still prestigious today.[32]

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[27] Taschenbuch für die gesammte Mineralogie mit Hinsicht auf die neuesten Entdeckungen, 18 vols. (1807-1824), Frankfurt.

[28] Magazin für die gesammte Mineralogie, Geognosie und mineralogische Erdbeschreibung 1 (1801).

[29] Who was also a customer and a specimen supplier of Leonhard's shop, cf. Wilson, Leonhard (see note 18).

[30] Leonhard, Preface, in: Taschenbuch (see note 27) 2 (1808), v.

[31] Leonhard, Preface, in: Taschenbuch (see note 27) 1 (1807), vi-viii. Although Leonhard did not explicitly refer to it, he might also have had in mind a distinction from K.M.E. von Moll's *Yearbook of mining and metallurgy* (*Jahrbuch der Berg- und Hüttenkunde*), founded in 1797. Von Moll's journal was a leading one for mineralogical and geognostical subjects in the first decades of the 19th century; after 1826 it was combined with Leonhard's *Taschenbuch*. On Moll see also Marianne Klemun, Beruf, Berufung und Wissenschaft—Karl E(h)renbert von Molls (1760-1838) Visionen als 'Akademiker' in politischen Umbruchzeiten (mit der Edition eines Briefes), in: *Jahrbuch der Geologischen Bundesanstalt* 149 (2009), 309-323, here 317.

[32] The journal was first changed in 1825 to *Zeitschrift für Mineralogie* (5 vols., 1825-1829), publishing now several issues a year. The new journal, edited with Bronn, was started in 1830 as *Jahrbuch für Mineralogie, Geognosie, Geologie und Petrefaktenkunde* and became the *Neues Jahrbuch für Mineralogie, Geognosie, Geologie und Petrefaktenkunde* in 1833; finally, in 1863, it got its most recent title *Neues Jahrbuch für Mineralogie, Geologie und Paläontologie*. For the history of Leonhard's *Taschenbuch* see also Otto Nowotny, Carl Caesar von Leonhards 'Taschenbuch für die gesammte Mineralogie' (1807–1826), in: *Cartographica Helvetica* No. 9 (1994), 32–38.

All these magazines, of course, were also used to promote mineral dealing, including Leonhard's own companies at Hanau and later at Heidelberg (even though he always tried to keep his own name out of advertisements and announcements). Starting with the third volume of the *Taschenbuch* in 1809, the journal included an independent column on mineral dealing, starting with a list of 40 mineral dealers in various European cities (for Vienna alone nine dealers are listed, and five for London).[33] A first detailed advertisement of the *Mineralien-Handels-Komptoir* at Hanau was inserted in 1811, offering 'oryctognostic' and 'geognostic' collections of various size. All the specimens, it is declared, would be fresh, i.e. recently collected, and delivered with detailed descriptions, including information on their localities. Detailed catalogues of the complete supply of minerals, i.e., types of collections, would be sent on request.[34] Similar advertisement for the Hanau mineral warehouse were inserted in all the subsequent volumes until 1816, and Leonhard also used several other popular journals for the promotion of his business.[35]

Although the column on mineral dealings itself is continued in the subsequent volumes, there were no more announcements concerning the Hanau mineral store. This might be because Leonhard had sold his shop, together with considerable parts of his private collection,[36] to his co-worker Menge in 1817 (according to other sources: in 1816). With Menge he had run the business since 1806. After the end of the Napoleonic era, Leonhard got into political difficulties and because he had been accused of collaboration he was degraded to the rank of an assessor at the Bureau of Taxes. In 1816, therefore, he changed to the *Bavarian Academy of Sciences*,[37] and two years later, he accepted a professorship in mineralogy and geognosy at the University of Heidelberg, where he remained for the rest of his life.[38]

The Hanau mineral shop, described above, was continued by Menge. He had had no formal education when he entered the shop, and also no particular training in mineralogy. He was given practical advice by Leonhard on mineralogical

[33] Leonhard, Taschenbuch (see note 27) 3 (1809), 395-399 & 4 (1810), 405. The list implicitly indicates a well-established practice of mineral dealing around 1800. Cf. once again Cooper (2006); Markl (2005).

[34] Leonhard, Taschenbuch (see note 27) 5 (1811), 396-397.

[35] See, for instance, advertisements in Intelligenzblatt zum Morgenblatt für gebildete Stände, No. 9 (1811), 36, and ibid., No. 2 (1812), 8; Intelligenzblatt der Jenaischen Allgemeinen Literatur-Zeitung, Januar 1813, col. 32.

[36] On his early collection see Carl Caesar Leonhard, *Einige Worte über meine Mineralien-Sammlung*. Hanau, 1814.

[37] Leonhard was appointed (most probably on the recommendation of his friend K.M.E. von Moll, and on a salary of 2000 Guilder) as a member of the *Bavarian Academy of Sciences* in 1815. Leonhard, Aus unserer Zeit (see note 19), 1:503-505.

[38] Ibid., 1:596-597.

excursions, and he was allowed to use his library. And in 1809-1810 he used a stay in Zurich to gain some knowledge in medicine and philosophy.[39] The mineralogical trip to the North in 1819, announced in the press (see above), was funded by the *Senckenberg Natural History Society* (*Senckenbergische Naturforschende Gesellschaft*) at Frankfurt (Menge was a corresponding member of the society), and it was designed to study the Icelandic geysers, and, of course, to collect minerals. In 1819, Menge published a small booklet on the utility of mineralogy.[40] Actually, the journey became the basis for a changing (and international) career. The journey brought him into contact with German Reformed churches, and this induced him to move to Lübeck (northern Germany) in 1820 (according to other sources: in 1819), and to transfer his mineral shop there. Over the following ten years we find him engaged in quite different matters. For instance, we find him on a mineralogical expedition to the Ural Mountains (1825/1826), and in Paris studying East Asian languages (1827).[41] Nevertheless, during the 1820s, advertisements for Menge's *Naturalien-Comptoir* were sporadically to be found in various magazines. Finally, in 1830, following the death of his wife, he left Germany for England, and later, for Australia, where he became a pioneer in the mineral exploration of the country. One of the last notes to be found concerning the *Naturalien-Comptoir* (and this means: concerning Leonhard's first mineral shop) is a prospectus. This was among papers read to the members of the mineralogical section of the ninth meeting of the *Gesellschaft Deutscher Naturforscher und Ärzte* at Hamburg, in 1830, on the 'raffle of the mineral warehouse of Mr. Menge'.[42]

Consequently, it was actually a relaunch of his business in more than one respect when Leonhard began to establish a mineral warehouse at his new residence, the *Heidelberger Mineralien-Comptoir*. Already in 1824, Leonhard handed over the proprietorship to a young mineralogist, Karl Friedrich August Moldenhauer (1797-

[39] On Menge, there is actually little information. The only more recent paper is Bernard O'Neil, Johannes Menge, in: *Neue deutsche Biographie* 17 (1994), 66-67. Cf. also Buttler et al., Oekonomisch-technische Flora der Wetterau (see note 26), 92. For Menge's later work see D.W.P. Corbett, The foundation of Australian geology, in: *Earth Sciences History* 6 (1988), 146–158.

[40] Johannes Menge, Winke für die Würdigung der Mineralogie: als Grundlage aller Sachkenntnis, Hanau (1819).

[41] O'Neil, Johannes Menge (see note 39), 66-67.

[42] '[...] Verloosung [sic!] der Mineralien-Niederlage des Herrn Menge [...]'. Announcement in: *Amtlicher Bericht über die Versammlung deutscher Naturforscher und Ärzte in Hamburg im September 1830*, ed. by J.H. Bartels and J.C.G. Fricke, Hamburg (1831), 40. According to other sources Johannes Menge had already sold the shop in 1820 to his brother Peter Menge. See Buttler et al., Oekonomisch-technische Flora der Wetterau (see note 26), 63.

1866),[43] although he remained seriously involved in the business.[44] Moldenhauer, however, left after just a few years in 1828, and Leonhard himself, with the help of his co-editor of the *Neues Jahrbuch für Mineralogie*, Heinrich Georg Bronn (1800-1862), sought to keep the *Heidelberger Mineralien-Comptoir* going.[45] Nevertheless, at this time, as with his first shop at Hanau and throughout the following years, Leonhard always endeavoured to keep his name out of advertisements (although everyone knew that he was the driving force behind the company). In 1841, another young mineralogist, J. Lommel (fl. 1826-1867/1868),[46] joined the *Heidelberger Mineralien-Comptoir*. Ultimately, Lommel inherited the business when Leonhard died in 1862,[47] and kept it going until his own death in 1868.[48]

The four decades from its reestablishment in the 1820s until Lommel's death were the heyday of the *Heidelberger Mineralien-Comptoir*. This, again, is documented in several advertisements in various journals[49] and in several separately published catalogues.

As a particular example a double-sided advertisement of 1827 might be quoted. This was inserted in the Journal for Geognosy, Geology, and Natural History of the Earth's Interior (Zeitung für Geognosie, Geologie und Naturgeschichte des Innern der Erde) of Leonhard's contemporary and, as editor of a geological journal

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[43] See http://www.minrec.org/library.asp (last visited February 2012).

[44] Leonhard's continuous engagement in mineral dealing is also shown by the continuation of relevant notes and announcements in the *Zeitschrift* and the *Yearbook* (see notes 32).

[45] Although there is not yet evidence, it might be assumed that the mineralogist Johann Reinhard Blum (1802-1883) was also involved in the business. Blum was Leonhard's brother-in-law. He was born at Hanau, and, like Leonhard himself, first studied cameralistics before changing to mineralogy, studying with his brother-in-law at Heidelberg. In 1828 he became a 'Privatdozent' and a professor of mineralogy in 1838 (succeeding Leonhard as Ordinary Professor in 1856); in 1853, Leonhard was also joined at Heidelberg by his son Gustav Leonhard (1816-1878) as an Extraordinary Professor of geology.

[46] See http://www.minrec.org/labels.asp?page=1&colid=900 (last visited February 2012).

[47] Leonhard's personal collection of 8,000-10,000 specimens was bequeathed to the University of Göttingen upon his death (as several private collectors and mineral dealers had done in 19th century, i.e. various university collections owe essential parts of their holdings to the realms of mineral collecting and mineral dealing). Cf. Marco Beretta (ed.), *From private to public: natural collections and museums*, (Uppsala studies in history of science, 32; European studies in science history and the arts, 5) Sagamore Beach/MA (2005).

[48] For the further history of the *Heidelberger Mineralien-Comptoir* (still working in the 1920s) see Wilson, Leonhard (see note 18). Concerning the various managers of the *Heidelberger Mineralien-Comptoir*, and Leonhard's simultaneous and continuous engagement in the shop, it is in any case not possible to decide, according to the available sources, who was actually responsible for the *Heidelberger Mineralien-Comptoir* in a particular year. Nevertheless, from the point of view of his (national and international) customers, it was constantly Leonhard himself to whom the *Heidelberger Mineralien-Comptoir* was particularly related, i.e. to whom it owes the greatest part of its success.

[49] In 1825, the *Heidelberger Mineralien-Comptoir* offers collections of reagents (*Reagenzien-Sammlungen*) and chemical devices (designed mainly for pharmaceutical uses, i.e. less for chemical studies on minerals). Leonhard, Zeitschrift (see note 32) 1 (1825), 568. And in the *Yearbook* of 1832, for instance, the *Heidelberger Mineralien-Comptoir* announced a 'very comprehensive catalogue'. Leonhard, Jahrbuch (see note 32) 3 (1832), 256.

also competitor, Christian Keferstein (1784-1866).[50] The advertisement, signed 'Heidelberg, December 1st 1826', offered 'geognostic-paleontological collections' (geognostisch-petrefactologische Sammlungen), emphasizing that from now on the shop not only provided minerals, but also fossils. Collections of this type would scarcely be offered by mineral dealers because of their comparatively low prices (and, thus, they yielded smaller profits compared to oryctognostical, i.e. mineralogical collections). The collections, particularly recommended for the use in schools and for private study, were announced as being provided in partial shipments of 50-60 specimens, labelled in German, English, and French. The complete delivery would consist of about 8-10 such parts, comprising altogether some 500-600 specimens. Included in the last partial shipment a catalogue would be delivered, for easy organization of the collections, namely according to the systems of Alexander von Humboldt (1769-1859), Ami Boué (1794-1881), and Keferstein. Finally, the price of each partial delivery was 22 fl., or Rhenish guilders (200-220 guilder for a complete collection).[51]

What was not mentioned in Keferstein's journal were the various other types of collections offered at this time by the *Heidelberger Mineralien-Comptoir*. These were to be found, for example, one year later in an advertisement in the *Magazine for Pharmacy* (*Magazin für Pharmacie*). Apart from the geognostic collection of 600 specimens, and a fossil collection, the following were offered: an oryctognostic collection of 650 mineral specimens (organized according to Leonhard's *Textbook of oryctognosy*), a gemstone collection of 50 pieces, a pharmaceutical collection of minerals, a collection of 700 minerals of economic value, and also a collection of 123 crystal models.[52]

Besides advertisements in various magazines, however, the essential instrument for promoting the business (always referred to in the advertisements as

[50] On Keferstein, known as author of the first coloured geological map of Germany, and his journal, see Kathrin Polenz, Christian Keferstein - ein Amateurgeologe im mitteldeutschen Raum um 1800 und seine Zeitschrift 'Teutschland, geognostisch-geologisch dargestellt', in: *Sudhoffs Archiv* 95 (2011), 30-47.

[51] [Heidelberger Mineralien-Comptoir], in: *Zeitung für Geognosie, Geologie und Naturgeschichte des Innern der Erde* (1827), No. 3, 417-418. Notwithstanding Leonhard's statement on minor profit expectations, and also considering that it is hardly possible to calculate an approximation of these prices in terms of modern currencies, it could be noted, at least, that complete oryctognostical/mineralogical collections extended to several thousand euros/US dollars, i.e., mineral dealing could actually be a lucrative business.

[52] [Heidelberger Mineralien-Comptoir], in: *Magazin für Pharmazie und die dahin einschlagenden Wissenschaften* 6 (1828), quoted from Wilson, Leonhard (see note 18). See also Carl Caesar Leonhard, *Handbuch der Oryktognosie*, Heidelberg (1821).

being obtainable from the warehouse) were separately published lists or catalogues of the available mineral and rock specimens. From the earlier Hanau period of Leonhard's business, no such sales catalogue seems to have been preserved. There is, however, a catalogue of a *Natural History Specimens-Exchange- and Trading-Bureau at Hanau* (*Naturalien-, Tausch- und Handels-Bureau zu Hanau*), published in 1809, and signed, amongst others, by Leonhard and Gottfried Gaertner (1754-1825), the then president of the *Wetterau Society for the whole of Natural History* (*Wetterauische Gesellschaft für die Gesamte Naturkunde*). The shop was obviously founded according to the model of Leonhard's *Mineral-Exchange- and Trading-Comptoir* (*Mineralien-Tausch- und Handels-Kontor*) by members of this Society (founded in 1808, with Leonhard and Gaertner as founding members).[53] Unlike Leonhard, however, the Society's Bureau had not any commercial interest in view; rather, as noted in the introductory remarks of the catalogue, it aimed solely at the 'distribution/circulation of scientific knowledge'.[54] The catalogue itself, written in German and French, offers minerals—most likely from Leonhard's shop—plants and animals (i.e., birds, fish, insects), and in this all the minerals and animals are listed individually.[55]

The earliest, more comprehensive catalogue, of the *Heidelberger Mineralien-Comptoir* itself, compiled by Moldenhauer, was published in 1825 (reprinted in 1826), again an alphabetical list giving short descriptions of some hundred specimens and explanations in German and French.[56] Until the 1860s, various catalogues (usually in several editions) followed, and of these we might mention, J. Lommel's *Catalogue of Collections of Fossils, according to Bronn's 'Lethaea geognostica'* (1841, in German, French, and English),[57] and a catalogue of 1848, addressing particularly school instruction, and also offering crystal models.[58]

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[53] [G.] Gaertner, [J.P.A.] Leisler, C.C. Leonhard, J.J. Schaumburg, *Naturalien-, Tausch- und Handels-Bureau zu Hanau* [Sales catalogue] 1809. On Gaertner, the *Wetterauische Gesellschaft für die gesamte Naturkunde* and its Bureau see Buttler et al., Oekonomisch-technische Flora der Wetterau (see note 26), 8-10 and 62-63.

[54] Quoted from ibid., 62.

[55] Ibid., 63.

[56] *Catalogue des minéraux et des collections classées du Comptoir de Minéraux à Heidelberg*, Heidelberg 1826, pp. 38. [Verzeichniss der Mineralien und geordneten Sammlungen des Heidelberger Mineralien-Comptoirs]. Cf. also the entry on K.F.A. Moldenhauer in *Curtis Schuh's* Biobibliography of Mineralogy (see note 43).

[57] [Heidelberger Mineralien-Comptoir], Katalog von Petrefacten-Sammlungen, nach Bronn's Lethaea geognostica/ Catalogue of collections of fossils, ed. by Heidelberger Mineralien-Comptoir, Heidelberg (1841). Heinrich G . Bronn, Lethaea Geognostica, oder Abbildung und Beschreibung der für die Gebirgs-Formationen bezeichnendsten Versteinerungen, 2 vols. Stuttgart (1834) (several later volumes and editions).

[58] [Heidelberger Mineralien-Comptoir], *Sammlung von Mineralien, Felsarten, Petrefacten und Krystall-Modellen für Unterricht und Selbst-Belehrung*, ed. by Heidelberger Mineralien-Comptoir, Heidelberg (1848). pp. 39. [Heidelberger Mineralien-Comptoir], *Erläuternder Catalog der Mineralien-Sammlungen von 300 Exemplaren, die besonders geeignet für Schulen, sowie zur Selbstbelehrung*, ed. by Heidelberger Mineralien-Comptoir, Heidelberg

In addition to advertisements and catalogues, Leonhard used several of his writings for *product placement*, that is, for the recommendation and popularization of mineral dealers and mineral warehouses as a means to build and complete collections. In his *Introduction to mineralogy* (*Propaedeutik der Mineralogie*, 1817), again written with his friend Kopp and Carl Ludwig Gaertner (1785-1829),[59] a separate chapter is devoted to the buying of minerals. To purchase minerals that cannot be collected personally, Leonhard stated, is a good way, in general, of enlarging one's collection but he also cautioned the beginner to contact reliable dealers, for 'in no other branch of commerce are there more cases of more fraud than in mineral dealing'.[60] Travellers were particularly recommended to visit local mineral shops to get the domestic minerals of the visited regions that they had not been able to collect for themselves. Furthermore, Leonhard advised collectors to purchase complete and organized collections, where again they should be careful to get collections arranged 'in accordance with the recent methodological spirit of science'.[61] Apart from such immediate recommendations to buy minerals, Leonhard's writings frequently include references to mineral dealers.[62]

Finally, Leonhard's early writings, overall, might be seen as a further strategy to promote mineral collecting (and thus, mineral dealing). His first major publication, the three-volume *Manual of a General Topographic Mineralogy* (1805-1809) was actually a guide for mineral collectors.[63] And one year after its first volume, i.e. in 1806, Leonhard, together with his friends Kopp and Ernst Karl Friedrich Merz (about whom I have not been able to find any further information) provided the guide to arrange the collections according to his *Systematic-tabulated Overview and*

(1854). Moreover, in 1860 the *Mineralien-Comptoir* also published a separate catalogue on crystal models: [Heidelberger Mineralien-Comptoir], *Krystall-Modelle*, Heidelberg (1860), pp. 11.

[59] The chemist C.L. Gaertner was the then secretary of the *Wetterauische Gesellschaft für die Gesamte Naturkunde*, and the nephew of its president G. Gaertner (Leonhard's co-author of the 1809 catalogue of the Hanau Bureau, see note 53). See Buttler et al., Oekonomisch-technische Flora der Wetterau (see note 26), 19-20.

[60] '... denn bei keinem merkantilischem Zweige erlaubt man sich mehr Betrügereien als gerade bei dem Mineralien-Handel'. Carl Caesar Leonhard; Johann Heinrich Kopp; Carl L. Gaertner: *Propaedeutik der Mineralogie: mit 10 schwarzen und ausgemalten Tafeln*. (Einleitung und Vorbereitung zur Mineralogie) Frankfurt (1817), 223.

[61] Leonhard et al., Propaedeutik der Mineralogie (see note 60), 223.

[62] See, for instance, Carl Caesar Leonhard, Handbuch der Oryktognosie (see note 52), 6.

[63] Carl Caesar Leonhard, Handbuch einer allgemeinen topographischen Mineralogie, 3 vols., Frankfurt (1805-1809).

Characteristics of Mineral Compounds.[64] Also his *Introduction to mineralogy* (1817), quoted above, was first of all a valuable and instructive compendium of all sorts of information useful to the mineral collector.[65] Further examples are Leonhard's *Characteristics of Rocks* (*Charakteristik der Felsarten*, 1823-1824), addressing particularly the collectors working in the field,[66] and his *Agenda geognostica* (1829), which was, according to its subtitle, a 'Manual for Travelling Geognosts and a Textbook for Lectures on Applied Geognosy'.[67]

Mineral dealing and Biedermeier culture

In the foregoing I have sought to sketch the various strategies by which Leonhard promoted mineral dealing in the first decades of the 19th century, and in particular the way he made his own company one of the best-known mineral warehouses in Europe. This he achieved by frequently inserting advertisements in popular journals, by publishing sales catalogues, and by providing manuals, lectures, and also a separate magazine particularly dedicated to mineral collecting and mineral collectors. All these strategies, however, feature to a greater or lesser extent an overall characteristic already occasionally indicated above; they all address a new audience, namely—as they were usually called at the time, and as Leonhard himself had explicitly done in his first lectures on chemistry at Hanau in 1803—the *Cultured Classes* (*gebildete Stände*).[68] In other words: he particular addresses the new civic/private culture emerging since the middle of the 18th century, which was particularly important in shaping the Biedermeier era from 1815-1848.

A well-known and widely used phrase to characterize this peculiar civic culture, and one that was proclaimed by many as the quintessential activities of the Biedermeier, is *sammeln und hegen* (*collecting and nurturing*), which originally related to

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[64] Carl Caesar Leonhard, Systematisch-tabellarische Uebersicht und Characteristik der Mineral-Körper, Nürnberg (1806).

[65] Leonhard et al., Propaedeutik der Mineralogie (see note 60).

[66] Carl Caesar Leonhard, *Charakteristik der Felsarten für akademische Vorlesungen und zum Selbststudium*, 3 vols., Heidelberg (1823-1824). The book was one of the most comprehensive works on petrology to appear in the early 19th century. Nevertheless, it has been criticized for being based solely on visual examination, and thus appears arbitrary and largely unsatisfactory by modern standards.

[67] Carl Caesar Leonhard, Agenda geognostica: Hülfsbuch für reisende Gebirgsforscher und Leitfaden zu Vorträgen über angewandte Geognosie, Heidelberg (1829).

[68] As already indicated above, *Cultured Classes* is just an approximated translation of the German notion of *gebildete Stände*. For the historical meaning of this notion, intended in the present paper, see, for instance, Julia A. Schmidt-Funke, *Kommerz, Kultur und die 'gebildeten Stände'. Konsum um 1800* (15.01.2012), in: Goethezeitportal, URL: www.goethezeitportal.de/db/wiss/epoche/Schmidt-Funke_Konsum.pdf (last visited February 2012).

the descriptions of nature (*Naturschilderungen*) by the Austrian writer Adalbert Stifter (1805-1868). Although usually used to denote conservatism, i.e. the middle-class ethos of the time, it seems to be even more appropriate to regard this as part of the strong empiricist moments of the time. 'In literature as in life, flowerbeds, green houses, rock collections, gardens and tillage, libraries and museums expose the urge towards objective knowledge, factual precision, and pragmatism.'[69] This means that the success of the *Heidelberger Mineralien-Comptoir*, and the rapid growth of mineral dealing in the first half of 19th century can hardly be understood without relating it to this cultural background.

A more detailed discussion of the ties between mineral dealing and (German) Biedermeier culture would show that it was not the sheer number of new collectors that allowed for the establishment of a profitable trade, but rather a particular cultural affinity to minerals and mineralogy. Such a discussion would have to focus on the notion of vision (*Anschauung*) and its relation to education and learning (*Bildung* and *Erziehung*), i.e., on a peculiar pedagogical notion of vision. Education and learning in the Biedermeier era meant less the accumulation of knowledge, or the training of specific abilities, and more on the formation, or the shaping of the human character. And as an essential instrument of education in this sense, 'vision' has been cited, comprising both viewing, i.e., purely sensual perception, and contemplative consideration.[70]

It was the philosopher and educationalist Johann Friedrich Herbart (1776-1841) who explicitly gave mineralogy its pedagogical meaning. 'Vision', he stated, 'this indispensable, this most solid and broadest bridge between man and nature,' has to be an essential concern of all pedagogical endeavours.[71] And mineralogy, Herbart continued, is one of the essential means to form vision in that peculiar pedagogical meaning, 'in so far as it determines fossils [that is, 'things dug up'; here minerals] according to their external characters. There is hardly a similar opportunity, to

[69] Virgil Nemoianu, The taming of romanticism: European literature and the age of Biedermeier, Cambridge/Mass. (1984), 16.

[70] For a discussion of the pedagogical context of 19th century natural history see also Bernhard Fritscher, Zwischen 'Humboldt'schem Ideal' und 'kolonialem Blick': Zur Praxis der Physischen Geographie der Gebrüder Schlagintweit, in: *Wissenschaft und Kolonialismus* (see note 10), 72-97, here 85-89.

[71] 'Das Anschauen, diese unentbehrliche, diese vesteste, breiteste Brücke zwischen Mensch und Natur, - verdient gewiß, so fern es nur irgend einer Kultur durch Kunst fähig ist, daß ihm ein Hauptfaden des pädagogischen Bemühens gewidmet werde.' Johann Friedrich Herbart, *Pestalozzi's Idee eines ABC der Anschauung als ein Cyklus von Vorübungen im Auffassen der Gestalten wissenschaftlich ausgeführt*, 2nd edition, Göttingen (1804), 198.

sharpen the eyes also for the smallest distinctions of structure, of brightness, of colour, and, to combine simultaneously with it further sensual perceptions.'[72]

Furthermore, mineralogy has been related to Biedermeier culture by its widespread discussion as a peculiar German science, and thus, as an instrument within the political efforts to establish a United German Nation.[73] Concerning the Biedermeier practice of collecting itself, that is its peculiarities as against the aristocratic practice of mineral collecting prevalent in the 18th century (including a different need for professional mineral dealers), two aspects seem to merit consideration. Firstly, the interest of the Biedermeier collectors was less in curiosities, but rather in systematically ordered suites of minerals and rocks. And *completeness* of these suites related more to the various minerals and rocks of a particular region or country, than, for instance, to minerals of a particular mineralogical, i.e. chemical composition. This interest in systematically ordered suites of minerals and rocks, probably quite unspectacular in itself, but characteristic of a particular region, was evidenced, for instance, by Leonhard's brother-in-law, Reinhard Blum, and the Hessian mineralogist August Klipstein (1801-1894), in offering 'geognostic suites' of rocks from several Hessian regions or areas (such as the Odenwald, the Wetterau, the Vogelsberg, Rhön mountains).[74] And, secondly, mineral collections were no longer destined to build up extensive separate cabinets, but rather to be presented in the living area, which might be paraphrased as an interest in *nature in the sitting-room*.[75]

Leonhard's work, therefore, in more than one respect, was closely linked to the Biedermeier culture. The introduction to his *Lehrbuch der Geognosie und Geologie* (1835), for instance, can be read as an example of the political meaning of mineralogy indicated above.[76] In particular, however, it was Leonhard's strong interest in teaching or education that has to be related to the efforts of the epoch in improving

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[72] 'Es ist die Mineralogie, sofern sie die Fossilien nach den äußerlichen Kennzeichen beurtheilt. Schwerlich giebt es eine andre gleich günstige Gelegenheit, das Auge auch für die kleinsten Verschiedenheiten der Textur, des Glanzes, der Farbe, zu schärfen, und damit zugleich so manche andre sinnliche Wahrnehmung zu verbinden.' Herbart, Pestalozzi's Idee eines ABC der Anschauung (see note 71), 215-216.

[73] See, for instance, Bernhard Fritscher, Erdgeschichte zwischen Natur und Politik: Lorenz Oken's 'Zeugungsgeschichte' der Erde, in: *Von Freiheit und Verantwortung in der Forschung: Zum 150. Todestag von Lorenz Oken (1779-1851),* ed. by Dietrich von Engelhardt and Jürgen Nolte. (Schriftenreihe zur Geschichte der Versammlungen Deutscher Naturforscher und Ärzte, 9) Stuttgart (2002), 110-129.

[74] Leonhard, Zeitschrift (see note 32) 1 (1825), advertisement in attachment.

[75] Cf. in this respect the invention of the aquarium in the 19th century as discussed by Bernd Brunner, *Wie das Meer nach Hause kam: die Erfindung des Aquariums*, Berlin (2003).

[76] Carl Cäsar Leonhard, *Lehrbuch der Geognosie und Geologie* [first edition published as vol. 3 of *Naturgeschichte der drei Reiche*], Stuttgart (1835), S. 5-10.

school and university teaching indicated here, that is to pedagogy as the leading science of the era. Actually, most of Leonhard's works were textbooks and manuals with a more or less introductory character; they were primarily designed for education, and, to clarify, they were in no way restricted to university teaching, but rather designed for teaching at all types of schools as well as for private study (by the Cultured Classes). Leonhard himself had written several books to be used for the teaching of geology and mineralogy at secondary schools.[77] And there seems actually to have been a demand for such books: in 1852, his son Gustav Leonhard (1816-1878), who was to join his father as an extraordinary professor of geology at Heidelberg in 1853, observed in his booklet on the minerals of Baden (Baden-Württemberg) and their deposits that currently an 'eagerness for mineralogy' is prevailing at various types of schools.[78] Finally, Leonhard's efforts in popularizing mineralogy and geology—science popularization was a further achievement of the Biedermeier era—have to be mentioned here, namely his *Geology, or a Natural History of the Earth, treated in an easily comprehensible manner*.[79]

These few suggestions would surely require a more detailed discussion. Nevertheless, I hope to have indicated that the success of Leonhard's business—and the rapid growth of mineral collecting and mineral dealing in the first half of 19th century—was essentially due to the new civic culture of the Biedermeier era. In other words: Leonhard did not invent mineral dealing, but he connected it very successfully to the culture of his time. Moreover, the particular meaning of Biedermeier culture for the promotion of mineral dealing might be confirmed by the second great German mineral warehouse, which actually gave the initial ideas for this paper, that is the family firm of Adam August Krantz. It was founded in 1833 at Freiberg, moved to Berlin in 1837, and finally, in 1850, to Bonn, where it became famous as *Dr. A.*

[77] See Carl Caesar Leonhard, Leitfaden zum Unterricht in der populären Geologie oder Naturgeschichte der Erde, für höhere und Mittelschulen jeder Art, Stuttgart (1845). Ders., Naturgeschichte des Mineralreiches: ein Lehrbuch für öffentliche Vorträge, besonders in Gymnasien und Realschulen, so wie zum Selbststudium, Heidelberg (1825) (second edition in 2 vols., 1831/1833). See once again the specific catalogue of the Mineralien-Comptoir containing teaching materials (see note 58).

[78] Gustav Leonhard, *Die Mineralien Badens nach ihrem Vorkommen*, Stuttgart 1852 (preface, no pagination). However, in spite of this constant and increasing emphasis on minerals and mineral collections as a particular need in primary and secondary education since late 18th century, there is actually little knowledge on how these minerals, and mineral collections, were actually used in schools. Cf. Stefan Meier, Eine Zeitreise in die Welt der Mineralienkabinette und Klosterschulen: die 'bewegte' Geschichte der Amberger Naturaliensammlung, in: *Lapis* 37 (2012), No. 2, 32-38.

[79] Carl Caesar Leonhard, Geologie oder Naturgeschichte der Erde, auf allgemein fassliche Weise abgehandelt, 5 vols., Stuttgart (1836-1844).

Krantz Rheinisches Mineralien-Comptoir (from 1888 *Dr. F. Krantz Rheinisches Mineralien-Kontor*), and is still working today.[80]

Conclusions and further research

The discussion of mineral dealing as a particular *space in-between* made up by making objects move was the initial idea of this paper. Focusing on the history of Carl Caesar Leonhard`s *Heidelberger Mineralien-Comptoir*, it has been shown how this space was constructed between—and thus, connecting—scientific, economic, and public/popular uses of minerals. Furthermore, I have shown how the new civic culture of the Biedermeier era contributed to the specific construction of this space.[81] Minerals in this sphere became 'cultural objects', i.e. they were no longer defined just as mineral compounds with particular economic or also pharmaceutical uses, and also not as mere scientific objects. Rather, minerals in the space of mineral dealing became reconstructed according to the cultural practice of collecting. The various transformations which minerals are subjected to in this process of reconstruction, that is, in this space of moving objects, needs to be an essential topic of further research.
At least two of these transformations have been implicitly indicated in this paper. One of them might be called a *new economization* of minerals, i.e. an economization that no longer relates to their economic uses as minerals (as a material to extract metals or pharmaceuticals), but rather to their value within a cultural practice of collecting. This means that their value is no longer determined by their material components, nor primarily by their appearance, but rather by the place within a system of arrangement, and by the collector's purposes and particular needs (i.e. for minerals from a specific region).

A second transformation of minerals within this peculiar sphere of mineral dealing and moving objects relates to a new accessibility of minerals, of their overall nature, which might be paraphrased as an accessibility of *nature by catalogue*. The

[80] On the early years of the firm see Peter Schmidt, Adam August Krantz—Briefpartner Alexander von Humboldts, in: Acta historica Leopoldina 27 (1997), 75-88.

[81] With regard to this meaning of the civic culture of the Biedermeier era, i.e. the close relation of Leonhard's work to it, in a broader sense, this work might also be discussed as a particular representation of a new (German) style or practice of earth sciences. This practice was related less to mining, and to technical and economical uses of minerals and rocks, than to the new civic culture of the Biedermeier era in the sense stated, and, thus, might be called civic mineralogy/geology. For a more particular discussion of (scientific) styles in 19th century German earth sciences see Bernhard Fritscher, Erdgeschichtsschreibung als montanistische Praxis: Zum nationalen Stil einer ‚preußischen Geognosie', in: Staat, Bergbau und Bergakademien im 18. und frühen 19. Jahrhundert, ed. by Hartmut Schleiff and Peter Konečný. (Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte, special issue) Stuttgart (2012) (forthcoming).

mineral dealer (i.e., dealing in minerals) works as a mediator between minerals and their collectors, or, in a broader sense, between nature and society. A new access to nature is provided which is no longer restricted by requirements such as, for instance, finding minerals at their deposits, or acquiring knowledge about minerals: rather, nature, as *nature by catalogue*, is open to anybody. Such a general availability, of course, might also support a kind of *amateur practice* of collecting, i.e. a simple ticking off of pre-labelled objects from a list (so-called 'stamp-collecting'), without the need for any mineralogical or geological knowledge. Professional mineral dealers, such as Leonhard, however, rather intended to thwart such a practice. Their intention was to offer systematically ordered collections to prevent their customers from mere collections of curiosities, or, in other words, they did not sell just minerals but also the scientific knowledge of these minerals. They did not only bring minerals to the sitting-rooms of their customers, but also (modern) science. In this sense a more detailed discussion of sales catalogues of mineral dealers—mentioned only marginally in this paper—should be the subject for particular investigation in further research.