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Stony Realms: Mineral Collections as Markers of Social, Cultural and Political Spaces in the 18th and Early 19th Century

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Abstract: *»Steinerne Bereiche: Mineraliensammlungen als Marker für soziale, kulturelle und politische Räume im 18. und frühen 19. Jahrhundert«.* As mineral collecting and classifying various rock types constituted an important cultural and scientific practice of enlightened societies in Europe in the late eighteenth and early nineteenth century, the paper analyses the sometimes extremely different spatial dimensions the mineral collections embodied, amongst which the exhibits mediated. It shows how the development of scientific mineralogy at the end of the eighteenth century not only accentuated universally-scientific claims and classifications, but was simultaneously associated with the utilitarian goals of economic development of the individual states and territories. In this context, mineral collections became an important tool of state knowledge through which mining officials as well as private collectors tried to exhibit their "patriotic" vision of economic development and deliver a public picture of the natural resources of their respective country. However, these scientific and political orders present in most contemporary collections did not destroy a classical vision which highlighted in the tradition of the older Wunderkammer the most spectacular and the valuable objects of the exhibitions.

Keywords: History of science, state knowledge, minerals, museums, collections, social networks, mining administration.

1. Introduction[1]

Mineral collecting and classifying various rock types following the model set by the great mineralogists figured among those cultured practices of enlightened society in the late eighteenth and early nineteenth century, akin to those activities possessing the status of popular "fashionable sciences," notably botanization (Secord 2011), physiognomy (Ohage 1992) or even the "animal magnetism" of Franz Anton Mesmer (Darnton 1986; Belhoste and Edelmann 2015). Such activities had an impact upon those numerous and extensive min-

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eral collections of that epoch which were compiled and taken care of not alone by the ruling families of the various smaller and larger principalities but also by members of the aristocracy, well-to-do private individuals, monasteries and the relevant institutes within the universities. Thus the act of collecting minerals circa 1800 not only linked the social praxis of a cabinet science as practiced by middle-class scholars with the "polite science" of the royal courts and aristocratic salons (Sutton 1995; Terrall 1999; O'Connor 2007), but moreover in parallel coupled the travel experiences of the enlightened elites (inter alia Bödeker 2004) with the everyday working world of the miners.

As a social activity, the act of collecting minerals already boasted a lengthy tradition, one dating back to ancient times, as evidenced by the fact that ornamental stones – the so-called "gems" – have consistently constituted an essential part of those belongings or objects through which a person's wealth manifested itself. In the curiosity cabinets adorning the salons of the nobility and the ruling houses of the early modern period, the singularly spectacular mineral specimens or mounted gemstones were for this very reason an indispensable component of the collection, in which they duly represented (Daston and Park 1998) a fragment of the "marvel" that nature's bounty had to offer. With the advent of a scientific approach to mineralogy and natural history in the latter half of the eighteenth century, the practice of mineral gathering nevertheless procured a new-found significance as a scholarly practice, one which clearly went far beyond the collected rarities and those objects destined to stimulate philosophical reflection as were to be found in the *Wunderkammer*, those curiosity cabinets so typical in the early modern period.[2] In this recently emerging milieu of enlightened society and science at the close of the eighteenth century, the minerals and their respective collections also acted as a wellspring for discussion concerning natural history, as for example in the context of debates on the function of the deluge, or about the significance of fossil remains for the accurate classification of the geological history of the earth (Oldryd 1996), as well as a "geognostic" classification of the diverse regions and their economically viable mineral deposits.

Far more than a mere scholarly passion, mineralogy at the turn of the nineteenth century stood at the intersection of a whole array of social and cultural spheres that impart to the historian multifaceted insights about the relationship of those living at that time to their object world while at the same time positioning those objects in "spatial regimes" (Charles Maier) (Maier 2006) of that period which Reinhardt Koselleck notably described as the *Sattelzeit,* the transitional period between the early modern age and modernity. As for the mineral collections, their categorization and the manner in which they were interpreted by their contemporaries should make it patently clear, as indeed will be out-

[2] With reference to the Wunderkammer of the early modern period, cf., inter alia, Collet 2007.

lined in greater detail here, the numerous dimensions of the spatial interconnections that characterized the social aspect of science and of a mining world in transition between the early modern era and modernity. In years past, museums and exhibitions have been the focus of much attention from historians in the context of research designated as the "material turn" of history and anthropology (Bräulein 2012; Apparudai 1986; Miller 1998). In their studies, they examined[3] the diverse histories of knowledge, the representations of, and the social practices linked with the collector's item on display in museums not only through "biography of objects" but also through a glimpse at the manner in which they are presented and employed. In this particular context, mineral collections, too, once again[4] became an object of scrutiny of historians of science. Predominantly based on specific examples of individual collections, they underlined, inter alia, the changing relationship between public and private spheres around 1800 (Hamm 2001; Alberti 2002; te Heesen 2004), as well as the various Europe-wide and global networks (Klemum 2000; Fritscher 2012) that led to the establishment of the respective collections. The key spatial references that typified mineral collections in the late eighteenth and early nineteenth century have thus already been the object of historical research.

The fact of focusing, however, on individual collections or a specific museum had as a consequence that the somewhat considerable differences and even the self-contradictions among the spatial references were seldom worked out, which – depending on the social context – could be an integral part of the minerals collections. While collections emanating from the royal courts, for instance, often centered around patronage networks and the official administration networks, they markedly differed from private collections, which in most cases were considerably less substantial, comprising sometimes only individual groups of minerals, and at the same time strongly contingent upon dealings involving purchase or exchange. On the other hand, those collections that emerged in the various mining educational institutions and used for educational purposes had yet another priority (Laboulais 2013a). Furthermore, research paid but scant attention to the changing classifications and rearrangements of the objects in the mineral collections over time – an aspect that Samuel Alberti had in the most general sense identified as a part of "object biographies" in museums (Alberti 2005, 567). If anything, here the research has painted a picture of a progressive process toward the establishment of the science of collecting under the influence of scientific mineralogy, which paradigmatically posi-

[3] See, among others, te Heesen and Spary 2001; Alberti 2005; Savoy inter alia. 2010; Collet 2012.

[4] Since the nineteenth century, a traditional approach to the history of mineral collections focused mainly on the external and internal development of individual collections. The description of their history was generally embedded in a relatively uncritical vision of the main evolutions of scientific mineralogy, highlighting the great heroic figures of the discipline and their respective theories.

tions mineral collections in the overall developmental history of museums (Klemum 2000, 18f). Overlooked, however, were in most cases not only the periodically vehement controversies about the "correct" spatially-scientific classification of the minerals, but also the influence of political spheres of action in numerous collections, in which the minerals were showcased as a constituent element of the *savoirs d'Etat* of a specific State (Dauser and Schilling 2012).

Considering the general perspective of this issue, this essay would hereafter like to lay open to view the sometimes extremely different spatial dimensions the mineral collections embodied, amongst which the exhibits mediated. Unlike the standard approach to research in this field, the intention, here, is not to focus on a specific collection and its ensuing development; rather, the aim is more to consider the differing spatial references of contemporary collections in a broader trans-regional and temporal context. Geographically the chosen examples belong primarily to the Central European sphere, without, however, losing sight of the broader European and global context, out of which the cultural practice of collecting minerals emerged. This overarching view enables one to appreciate, beyond the local manifestations of mineralogy and natural history, the widespread emergence throughout Europe of an enlightened practice of mineral collecting in the second half of the eighteenth century and in the opening decades of the nineteenth century, which ab initio not only accentuated universally-scientific claims, but was simultaneously associated with the utilitarian goals of *Landesentwicklung* [territorial development] of the individual states, which circulated in the context of "economic enlightenment" and of the German-speaking Cameralism (inter alia Popplow 2010; Laborier 2011; Wakefield 2009).

In line with the suggestions advanced by Samuel Alberti, both the constitution of spatial networks of mineral collecting and the spatial concepts embodied in the presentation and reorganization of the objects concepts will be analyzed. In so doing the diverse and occasionally conflicting spatial references most collections displayed in 1800 become obvious, given that they at once wanted to conform with the all-encompassing and universally designated scientific criteria of mineralogy of that period, and yet depict other, more socially and politically designated spaces of contemporary societies. Normally, private collections differed only slightly from the more majestic royal collections in their constituent networks, given that they were integrated in very similar geographies of collecting, which involved – in addition to the scholarly exchange and state-diplomatic channels – professional dealer networks, but moreover also construed the minerals in a similar fashion as an expression of state knowledge. In this respect the new, scientifically-informed practice of collecting and public display of minerals at the end of the eighteenth century by no means entailed the disappearance of those social and cultural spaces, which the old *Wunderkammer* of the early modern period had previously embodied, or of yet another disentanglement from the concrete political spheres whose economic development, economic rationalism had been committed to.

2. Knowledge Networks, Power Networks

As has been shown extensively (Wilson 1994), the latter half of the eighteenth century can undoubtedly be regarded as the zenith of mineral collecting, a period that witnessed the creation of extensive natural history collections nearly everywhere throughout Europe, and in which exhibits from the "mineral kingdom" were to play an essential component. The "Imperial Natural History Cabinet" established at the court of the House of Habsburg in Vienna by Emperor Francis Stephen in 1748 represented the paradigm for this development in Central Europe, subsequently progressing to become one of the foremost collections in Europe. As in numerous other instances,[5] the Imperial Cabinet took possession of a number of particularly spectacular minerals that were already present in the early modern Habsburg *Kunstkammer*. Some fifty years later, the future director of the collection, the Augustinian monk Andreas Stütz (1748-1806), however, minimized the significance of these older exhibits for the imperial collection, because they, in his view, did not possess the rank of scientifically significant finds:

> Everything, that was to be found with us in this field of study [mineralogy], consisted of some lumps of silver and gold from the Americas, probably gifts from the Kings of Spain of the House of Habspurg [sic], most famously, the opal weighing 34 *lothe* and a few insignificant minerals, all of which were stored alongside the various art works from rock crystal, agate, jasper and ivory at the Imperial Treasury of the Habsburg Empire (Stütz 1807, 11f).

In marked contrast, Stütz lauded the purchase by the Emperor in 1749 of the collection of the Florentine scholar and former director of the Uffizi Johann Ritter von Baillou ("which at that time [was] the just about only famous individual collection"), and which, in his view, initially set down the cornerstone for the Viennese cabinet (Ibid., 12). The acquisition of von Baillou's collection and the circumstances surrounding it are noteworthy in two respects: Firstly, they indicate the crucial importance of the act of establishing a "scientific" collection whose collection history began here, as in numerous other cases, with the purchase of yet another collection. The status of "collector" or "owner" of a collection in this sense did not preclude an economic relationship with other collectors. Secondly, this episode also highlights the important state-political context in which the transaction took place: It was significant in this context that Francis I, the Duke of Lorraine, had come into the inheritance of the last Medici, the Duke of Tuscany in 1737, so that the transfer of the Florentine collection to Vienna four years after his ultimate election as Emperor was also imbued with an impending power political dimension.

[5] Cf. for instance the case of the collections of the Russian tsar as described by Anon. (1805, 511).

In fact, the possession of an important mineral collection constituted for the royal dynasties of that era a prestige factor that should not be underestimated, in that it reflected the scientific renown of the respective Great Houses. Hence the major European royal households also rivaled one another round the middle of the century in establishing natural history cabinets, whose scope was progressively being enlarged through purchases and bestowals. The Parisian Court served as a paragon (Spary 2000); as early as the 1740s it had established a natural history collection put together by Buffon and Daubenton on a site adjoining the Botanical Gardens, in which the various minerals of the collections of the French king were brought together under one roof. To some extent the twenty-year period between 1750-1770 can thus be regarded as the *take off* phase of those great royal minerals collections, a finding, which is also proven by sources in those mining regions, from where the exhibits featured in the collections originated.[6]

In this way Carlos III of Spain, for example, had a royal natural history collection established in Madrid in 1772, by dint of especially assembling minerals from the kingdom's overseas colonies (De Vos 2007). In Prussia, the Royal Mineral Cabinet was established circa 1770, evolving from the still very modest older kind of natural history collection belonging to the Royal Kunstkammer collection (Hoppe 2000, 10f). Likewise in Russia, the Tsarina Catherine acquired in 1767 the mineral collection, originally belonging to the mining official Henkel, as the foundation for a private collection for the exhibits obtained from the Kunstkammer of the Imperial Academy of Sciences established by Peter the Great (Anon. 1805, 511). One of Napoleon's ultimate projects, which envisaged not just bringing art works but also precious natural and mineral collections, specifically from those regions occupied by French forces, to Paris so as to integrate them in the collections at the *Musée d'histoire naturelle* established during the revolution and which originated from the ancient *Cabinet du roi* (Savoy 2003), entirely corresponded to this emerging trend in the mid-eighteenth century, in which rulers wanted to assert their claim to power by means of as valuable and as extensive a natural history collection as possible.[7]

A key element in constituting extensive royal collections were the surveys carried out by officials in the state administrations on the collecting of minerals. In the Habsburgian context, Stütz notes that as early as the reign of Maria Theresia "the most measured and persistent commands" were issued in such a way as to "search for and send in everything that was novel and noteworthy in all mining areas of the imperial hereditary states" (Stütz 1807, 22). Moreover,

[6] Also consult as an example of the mines in the Fürstenberg territories in the Black Forest: Markl (2005, 241ff).

[7] The Napoleonic art thefts were by no means an isolated phenomenon; this can be demonstrated by the plundering of castles and art collections carried out by Austrian and Russian troops during the short-term occupation of Berlin in the Seven Years' War.

as was commonplace in other states, the officials of the Habsburg mining administration were mandated to immediately set aside exceptional discoveries in the mines for the imperial collections and to have them dispatched to Vienna without delay. Even overseas consular legations were included in these networks, so that, for example, "Herr Koste, Legation Secretary for the Austro-Hungarian Empire posted to the court in Lisbon" had repeatedly sent to Vienna "minerals that he in part collected himself and some Portuguese and Brazilian minerals he purchased" (Ibid., 23). The Spanish king, too, instructed his subordinate officers in a similar fashion to also send to Madrid (De Vos 2007, 218-23) those minerals that came to their attention in the course of their naturalistic surveys about usable resources of the individual overseas territories – a practice that in parallel was also promoted in a regional context by local officials even in the significantly smaller principality of Fürstenberg in southern Swabia (Markl 2005, 241).

With their various mineralogical finds, the royal collections constituted in this way a broader power base as they not only imparted the political and economic power of the respective sovereigns, but also conveyed their manifold patronage relationships with their subjects as well as the networks of foreign political-based friendships and alliances with other sovereigns. In the Viennese collection, for example, Maria Theresia's political connections with Southern Italy manifested itself through the gifts that the Duchess of Calabrito Petronilla of Ligniville made to the monarch, and which, according to Stütz, included "a sterling collection of Sicilian red marble, jasper and agate-jasper, as well as a select collection of lava ejecta from Vesuvius" (Stütz 1807, 16).

Some years later that "nice selection of minerals" that the Emperor Leopold had placed "at his feet by a certain Freeyhern von Schmidt on the occasion of his coronation in Frankfurt am Main" also found its way into the collections (Ibid., 21). Given the "preference which has generally become well-known [...] and the apparent glorification of the mineral cabinet" belonging to Emperor Franz II, there was, according to Stütz, an even greater influx of precious objects, because the Emperor induced "several benefactors of natural history [...] also to do their bit when it came to the costs" (Ibid., 24). In particular, Stütz mentioned in this context – alongside the Prince-Archbishop of Salzburg and the Archdukes Anton, Johann and Rainer – a whole array of members of noble families holding high rank at the Viennese court, as well as the then British Prime Minister, Lord Grenville. Gifts and the purchase of existing collections could thus on occasion be closely interconnected, because collections were partly offered for the reason of purchase, as the vendor wanted to thereby convey his specially close proximity to the ruler, and to simultaneously ensure a livelihood for himself and his family (Ibid., 31). A similar constellation existed in the case of the director of the Bavarian mining administration Mathias von Flurl who offered his substantial collection to the King of Bavaria Maximilian Joseph and obtained in return for his donation an annuity of 500 guilders (Streit 1996).

Alongside the provenances accruing from the large state collection of the royal houses' political and social networks, the diverse scientific networks also were operative from the outset; they not only supported the smaller private collections of scholars but also in turn promoted the growth of large government collections. Scholars and royal collectors alike thus benefited mutually from their respective prestige, because through their exchange relationships within the circle of scholars, those scientists charged with the care of royal cabinets were also instruments in their expansion. In the Viennese case, Ignaz von Born, a privy counselor entrusted with the imperial collection of minerals in the 1780s, ensured – thanks to his extensive international contacts[8] – that the collection was continually enlarged through gifts from scholars such as Buffon in Paris, Fabricius in Denmark and Ilsemann and Trebra in the Harz region (Stütz 1807, 18). Such broad networks of international exchanges for precious collector's items and minerals also existed in the context of the great scientific expeditions and academic travels. Travelling natural scientists to some degree dispatched their discoveries by the case-load to Europe, whereupon they were re-distributed so as to embellish the individual collections in various countries.[9]

Beside political and scholarly networks, which introduced a steady stream of new mineral exhibits into the large collections, a professional mineral trade was already operative in the eighteenth century, which sought in as much as possible to satisfy the demands by collectors for exotic and spectacular stones – and thereby considerably earlier than has been usually indicated by the historical research.[10] Referring to the period around 1800, Stütz mentioned that there were a whole series of "foreigners as domestic mineral dealers" in Vienna and of whom he quoted nine by name.[11] Their large number, as well as the existence of an esteemed "Auction Institute," "in which four or five auctions took place on an annual basis" had the effect that – according to the director of the Imperial Collection – "one can consider it [Vienna] as the *Stappelstadt* [commercial hub] for the commerce of minerals " (Stütz 1807, 35). As the center of power of the Habsburg Empire, Vienna indeed was clearly one of the predominant centers for the mineral trade of the day, which in other respects was undertaken – as the various printed sales catalogues would suggest – more by private

[8] Cf. regarding the history of the imperial collection in Vienna as well as the role of Born: Fitzinger 1856.

[9] See, for instance, for the Niebuhr expedition in Arabia in the 1760s: Hansen 1981.

[10] Stütz's statements contradict the theses by Fritscher and Markl, in which it was only from the nineteenth century (and according to Markl only midway through the century) that an economicalisation of the mineral collections and a professionialisation of the traders occurred (Fritscher 2012; Markl 2005, 230).

[11] Stütz (1807, 23f). The detailed addendum of the publisher concerning the various "Viennese mineral dealers" (Ibid, 385ff) mentioned in addition to eight minerals dealers in the narrower sense of the term, six gem dealers as well as a number of gem cutters, who it would appear also traded in minerals.

individuals, often heirs to the collector, or by publishers and merchants as an ancillary business.[12] Nevertheless, scarcely any of these Viennese merchants owned a private business office, because, as Stütz put it: "Among the mineral merchants Kollmann is the only one who owned a public store in the Kapucinergasse, adjacent to the new market, and Stephan is the only one who owned a small booth on Stephansplatz, that now seems to be run by his heirs." (Stütz 1807, 36) Apparently, it was more a case of the merchants fostering personal contacts with their customers in the mineral collector milieu that enabled them to forego establishing their own business premises.

As Stütz's remarks regarding the varying provenance of the minerals in the individual merchants clearly indicate, a regional specialization existed in the mineral trade: while one merchant might import "new products now and then from Tyrol and Inner Austria" others might deal in "exquisite Bohemian," "foreign mostly French and Nordic," "Transylvanian" or "Hungarian products typically for sale" (Stütz 1807, 36). In the individual mining regions the high-ranking mining officials were especially involved in organizing the sale of collector's items from the mines (Markl 2005, 228-58; Fritscher 2012). With their own mineralogical publications they also contributed to the dissemination of knowledge regarding their respective regions and their mineral wealth, so that their writings could even acquire the character of advertising brochures. According to Gregor Markl, the extensive publications by mining officials of the Fürstenberg principality about the mineralogy of the cobalt mines in the Black Forest around 1800 ought to be classified in this context since the authors repeatedly referred to the possibility of procuring suitable collector's items for interested buyers (Markl 2005, 252-58). Already from the 1770s onwards the territorial lords had wanted to regulate this profitable trade in collector's items; not in order to prevent the export of minerals from the royal mines per se, but merely to gain some degree of control over the roaring trade.

The mineral trade and the various exchange networks not only interconnected the world of royal mineral cabinets but also linked them with the numerous private collections. Such private cabinets, which – as indicated in the numerous recommendations for "traveling mineralogists" – could well possess minerals of considerable scope and grandeur, were to be found in nearly all Central European cities in the second half of the eighteenth century.[13] Using the example of Sigmund Zois, a collector based in Ljubljana, Marianne Klemun has demonstrated that a private collector also relied upon extensive international networks of exchange partners in his acquisition of minerals, which in Zois' particular case span from London, France, Russia, Norway to Sweden (Klemum 2000, 15). Nevertheless, Zois had particularly close links with mineral collectors

[12] See, for example: Stieglitz 1772; Anon. 1792; Pötzsch 1807; Anon. 1815.

[13] See, for example, the discussion by Stütz concerning the different regions in Austria in: Stütz 1807, 36; or also Gottschalk 1806, 148.

from the various Habsburg lands, notably the imperial capital of Vienna represented the most important reference point for his trading activities. Thus it was ultimately the imperial sphere of the Habsburg Empire, which facilitated the key contacts for putting together Zois' extensive mineral collection.

However, the networks based upon the Imperial relationships of exchange were only partially reflected in the regional distribution of the individual objects in his collection, for trading with his business partners could have certainly also involved minerals whose provenance lay outside the realm. Zois, according to Klemun, saw himself in this context primarily as an "intermediary for corroborating the ore-rich environment of Carniola and Carinthia" as well for the minerals he had obtained through his trading activities with Italy, and thus as a representative of a territorially-based mineralogy, that deemed his collecting activities in the broader European context as a manifestation of a "patriotic" activity motivated by Cameralist utilarian thinking (Klemum 2000, 18).

3. Mineralogical Science and the Disappearance of Space

The very different origins of the minerals and hence their collection networks were, however, barely recognizable in the presentation of the collections for visitors. This was the effect of the application of Carl Linneas' classificatory method in the mineral collections that was swiftly put into practice in the second half of the eighteenth century, a method which classified the various objects in the collections according to the scientific systems of the well-known mineralogist. The labels attached to the various finds or noted in the lists, identified all the exhibited minerals under the relevant scientific classification scheme, and while a written reference to their place of origin was usually retained any further indications concerning the object's life-story were rarely noted in greater detail.[14] Yet, the classificatory grouping of the objects in the prevailing scientific system appeared much more important, with their specific nomenclature and various sub-divisions, wherein the minerals were chiefly divided according to their external appearance in varying mineral groups or classes and whereby *de facto* the place of discovery merely played an ancillary role.

Particularly influential in terms of style for the public display of the exhibits was the re-organization of the imperial mineral cabinet that the Habsburgian mining counselor Ignaz von Born had carried out in the 1780s. It followed the principles established by Linnaeus and the research undertaken during that period by his compatriot Johann Jakob Ferber (1743-1790) who was teaching at the "academic high-school" in Mitau in Kurland (nowadays situated in Jel-

[14] A telling example in this context, alongside the collection owned by Goethe (Hamm 2001), himself the minister responsible for mining in the Weimar principality, is the publication of Voigt 1821.

gava in Latvia). These vied with the system established by the geologist Abraham Gottlob Werner based in Freiberg, which was an evolution of the mineralogical system developed by the Swedish metallurgist and mining expert Alex Cronstedt. Werner's system, however, was unavailable in print but instead was principally disseminated by his various disciples, especially the Berlin mineralogist Dietrich L. G. Karsten. In the late 1780s Karsten had created his mineralogical "masterpiece" by dint of putting in order the collection of the late Marburg professor of Natural History and Cameralism, Nathanael Gottfried Leske, whose extensive printed catalogue served as a basis for various sales negotiations (Karsten 1789).

Thanks to such published catalogues, the mineralogical classification systems circulated widely and moreover constituted for many private collections an important reference point in how to present their various finds. According to the notes, which the publisher of Stütz's book contributed to the volume concerning the Viennese private collections, both the system developed by Born as well as the categories advanced by Werner co-existed in the imperial capital of Vienna in 1800, the latter mainly propagated by Werner's former Freiberg student and disciple Friedrich Mohs. At that time, there existed only one private collection based upon the principles of crystallography of the French mineralogist Abbé Haüy (Stütz 1807, 353-87). Due to the pan-European networks of mineralogists, the dissemination of classification systems was not exclusively limited to the German-speaking realm. The catalogue, for instance, compiled by Karsten of the Leskean Cabinet in 1798 was even translated into English thanks to its acquisition by the Dublin Philosophical Society. It thus influenced also the established classification and presentation of minerals in the English-speaking world, conveyed in this instance by the British naturalist and geologist Richard Kirwan in tandem with his Dublin colleague George Mitchell, who took charge of the translation of Karsten's work (Karsten 1798).

Furthermore this way of ordering and presenting minerals based on scientific criteria gave rise to a discrepancy emerging between the continuously renewed scientific mineralogy and those classifications that materialized in the collections over time. Hence the constant development of the discipline led to the collections being repeatedly reorganized in order to ensure the up-to-datedness of their classification systems. The configuration of the individual minerals in the overall context of the collection, along with their names and descriptions repeatedly changed over the decades – but in such a manner that these changes did not leap out at the visitor, since this operation usually also involved the designated labeling tags of the individual finds being replaced or renewed (Hoppe 2001, 8, 12ff).

The implementation of crystallography, which was also becoming increasingly prevalent in Central Europe in the opening decades of the nineteenth century, notably introduced an essential innovative thrust in the various collections, and yet entailed a fundamental departure from the external classification

criteria of the minerals, as hitherto championed by the likes of Werner and Born. The publisher of Stutz's work, who furnished the relevant volume with a detailed descriptive of the various private mineral cabinets in the Austrian imperial capital, accordingly also explicitly noted the exceptional value of the collection belonging to the Count von Fries, who at that time was the only collector in Vienna to command a classified collection which followed the recently developed schema involving crystal forms as elaborated by Abbé Haüy (Stütz 1807, 360).

The appointment of the renowned crystallographer Christoph S. Weiss to occupy the chair at the Mineralogy Department at the recently established University of Berlin in 1810, which concurrently was linked to administration of its mineral collection, was a particularly explosive event bearing in mind this background, because his crystallographic classification was vehemently rejected by the adherents of the older Werner system (Hoppe 2000). Nevertheless, given the academic priorities set out by the newly appointed chair-holder, the reorganization of what in the meantime had become an extraordinarily large number of finds dragged on for a considerable period. Initially, it solely affected those sections that were re-arranged and re-catalogued with the help of Weiss' assistants. It was only at a later stage that the collection underwent a thoroughly radical re-organization (Hoppe 2001).

4. State Knowledge: Territorial-Political Draft Regulations in Mineral Collections around 1800

The keen attention, which contemporary mineralogists previously attributed to these scientific controversies and the corresponding reorganization of the collections, has partially, in terms of historical research, accorded a less important role to a development in the history of collecting which represented an essential feature of the social practice of collecting, classifying and exhibiting minerals in the latter half of the eighteenth and the early nineteenth century: its close connection with the extensive activities for promoting mining throughout the various European states. In fact, officials in charge of royal mining administration all over Europe at the end of the eighteenth century constituted not only the leading panel of specialists for the cultural praxis of collecting as well as scientifically defining the various minerals,[15] but they also significantly shaped these practices by virtue of their Cameralistic mindset. Its imaginative sphere also bore upon the delineation of geographical space whose regulations were compartmentalized for the mining officials (Garner 2006), on the one hand, by

[15] This consisted of two sub-collections, of an "external indicator collection and the methodic oryktognostic collection."

the so-called *Bergreviere* [mining districts] and, on the other, according to the political map of the individual sovereign States and their territories. Due to the fact that collections such as Prussia's Royal Mineral Cabinet were openly used for training the future mining officials of the State, numerous collections at the end of the eighteenth century were not primarily classified according to the scientific classification systems of mineralogy but instead mirrored geographical-political spatial systems, thus hampering the otherwise prevailing scientific classificatory order of minerals. The Royal Mineral Cabinet supervised by Dietrich L. G. Karsten in Berlin, and closely linked to his lectures at the nearby "Berg-Eleven Institute"[16] (the forerunner of the Berlin mining academy) consisted in this respect in the early 1790s not only of a "Oryktognostic [mineral] collection" classified following the criteria of the classification tables of contemporary mineralogy as well as of the "geognostic [rock or petrographic] collection,"[17] but also of two other collections, namely, the so-called "economic," i.e. a collection sorted by deposits, and a "mineralogical geographical," i.e. a collection structured around the individual Prussian and "foreign" territories. Both later collections were presented in separate rooms in the new building at the Werdersche Markt in Berlin where the Prussian mining administration and the Royal Mint were transferred in 1800/1801 (Hoppe 1987, 301). The Prussian collection highlighted the diversity of the country's mining sites by dividing the state into territorial units that roughly corresponded to the reign's political order but followed mainly the classical identification of different "mining regions" by distinguishing Upper Silesia; Lower Silesia, Glatz; Poland [sic]; Prussia, South Prussia, Mark, Kurmark, Neumark; Bayreuth, Halle; Saalkreis, Mansfeld, Magdeburg, Halberstadt; Westphalia (Hoppe 1987, 301).[18]

A similar objective was also pursued by the mineralogist Matthias von Flurl (1756-1823) who was appointed as Director of the Deputation in Saline-, Mintage- and Mining Affairs by the Bavarian prince-elector with his "Bavarian District Suites Collection." Classified in terms of mineral mines, they presented the "national" minerals and rocks, which von Flurl had collected on his inspection tours throughout the length and breadth of the various territories belonging to the Bavarian crown (Kamp 2002, 241). Subsequently, these minerals vividly illustrated in the Bavarian King's consolidated collection the "patriotic" spirit with which von Flurl integrated his activities for the promotion of mining in his native land. He accordingly sub-titled the book he published in 1792 *Descrip-*

[16] For more detailed references to the Berlin "Berg-Eleven-Institut", see Klein (2013).

[17] This consisted of two sub-collections, of an "external indicator collection and the methodic oryktognostic collection."

[18] The French mining officials of the *Paris Maison des Mines* adopted an even more "political" order for their collection by dividing it along the different *départements* of the French state. After the defeat of 1814/5 and the loss of numerous territories by France they thus had to face the difficult task to rearrange their collection in order to adjust it with the new boundaries (Laboulais 2013a).

tion of the Mountains in Bavaria and in the Palatinate with the motto: "How the derelict mines mining could be propped up again" (Flurl 1792). Hence the motivation behind his offering his collection to the king – as stated by von Flurl – was that it could be employed "for educative purposes for mining and salt mining alumni" in the Bavarian state (Streit 1996, 173). In a similar way, most other mining officials regarded the practice of mineral collecting in the context of the economic development of their own country; for them it was a matter of presenting by means of their collections the mineralogical richness and diversity of the mining activities. In terms of the different finds, their intention was to graphically entrench the map of the country's stated-owned mineral deposits about its natural resources as a part of a general state knowledge.

In this respect, a comparably "patriotic" focus of the mineral collections circa 1800 is to be observed throughout Central Europe. To such a degree that even some royal collections the likes of the Fürstenberg mineral collection in Donaueschingen or the collection belonging to the Grand Duke of Baden in Karlsruhe, which was one of the foremost transnational collections in the late eighteenth century in Central Europe, were constituted along Cameralistic lines of economic "regional development." Alongside the "common good" of the populace, this focus should also serve to increase the portrayal of power and prestige of the individual territorial lords, in addition to particularly impressive mineralogical finds from all over the world with local minerals and mineral resources chiefly assuming priority (Markl 2005). Consequently, these plans also encompassed the idea to build "patriotic museums," in the manner in which they circulated within the context of the prevailing romantic, sovereign patriotism at the beginning of the nineteenth century especially amongst the Habsburg monarchy. They were manifested, for instance, by the establishment of the Joanneum, the royal mews in Graz, and invariably combined with the establishment of mineral collections which with their finds should not only constitute a training ground for civil servants but moreover should present to the educated public the richness of the natural resources of each country (Raffler 2007). So, here, the priority was no longer the mineralogically-based scientific classificatory objective, but rather a form of national political-economic ideology that depicted the individual objects as evidence of the rich natural resources of the respective country, because, to quote the anonymous author of the annual report concerning the Joanneum in 1815/16:

> Under such fortuitous circumstances, and endowed with such great benefits, this element of natural history must soon ascend, and the advantages thereof, in a land whose wealth and prosperity is predominantly based upon the products of the mineral kingdom, will soon be visible and soon be widely recognized (Anon. 1816, 155).

5. Minerals on Display: The Legacy of the *Wunderkammer*

Despite these developments, the classificatory spirit of contemporary science in the external design of the collections survived thanks to the retention of the strictly classified showcases, in which most contemporary minerals collections were displayed to visitors. It was only on a rare occasion – presumably not least for financial reasons – that a complete reorganization of the installations was made under the influence of the Cameralistic mindset so as to visually process the "patriotic mineral collections" for visitors. At the *Vaterländisches Museum* in Prague, however, it was decided in 1832 to change the erstwhile scientific and systematic presentation in such a way:

> [T]hat henceforth they are classified according to the various formations, not only granting an overview of the various mineral species to be found in Bohemia, but also in conjunction with the geognostic collection constitutes a clear picture of the uniqueness and extension of our mountainous formations in which the minerals are to be found (Steinmann 1832, 8).

And while a systematic mineral collection was yet retained, it was showcased in a less favorable place. However, such transformations of the exhibition space for presentation purposes of the minerals in accordance with this Cameralistic mindset remained more the exception. As the Bavarian example illustrates, the reverse scenario was more likely to be case, for in that particular instance Flurl's District Suites Collection was conversely incorporated in the systematic order of the Royal Mineral Cabinet (Kobell 1872).

Nonetheless most collections adhered more to the convention of mounting those particularly spectacular minerals in a representative and clearly visible manner for visitors, whereas other items in the collection to some extent disappeared into drawers or boxes, where they remained inaccessible unless someone declared the express wish to view them. At the State Museum of Natural History in Karlsruhe, originally established at the request of Princess Caroline Louise and whose mineral collection was deemed one the most significant among the German states, the exhibits were in some instances placed in ornate open-view cabinets; they invariably highlighted the most spectacular and most valuable minerals on a white mount behind a glass panel (Hartleben 1815, 271). Such forms of presentation in which the collection's "gems" were deliberately made the focus of attention – and thus occasionally criticized by professional mineralogists at that time – tied in relatively seamlessly with the classic exposition of the *Wunderkammer* (Karsten 1789, preface), which much in the same way had previously positioned the particularly eye-catching and "wonderous" collector's item in the foreground. In fact, even contemporary observers in their descriptions of the various mineral collections regularly noted those pieces that struck them as intensely beautiful and rare. In this respect, Stütz, director of the Imperial Cabinet, emphasized in relation to the collection of which he was in charge: "The proportions, beauty and rarity of the preserved pieces leave nothing

to be desired" (Stütz 1807, 27). Moreover he repeatedly stressed the exceptionally "splendid" individual pieces in the imperial collection. Just as in Karlsruhe, these were positioned directly behind a pane of glass in the exhibition cabinets so that the viewer could see them without hindrance, whereas "the remaining specimens in systematic order" were placed in individual drawers beyond the onlooker's gaze (Ibid., 28). Even in Berlin where the "patriotic collection" had been put in a separate room in the Royal Mint at the Werderscher Markt the most prestigious pieces were presented prominently in eight glass cabinets at the entrance in order to provide – as a contemporary author put it – "a pleasant overview even to the ignorant visitor" (Hoppe 1987, 300).

By essentially focusing on the spectacular, as well as the most beautiful and exceptionally rare collector's items, visitors were foiled both in terms of recognizing the universal and scientific classifications and in determining the Cameralistic territorial spatial relationships in which the composition of the collections should in practice have been structured according to the ideas of scientists as well as mining experts. Furthermore, in the new type of mineralogical collections of late eighteenth and early nineteenth century, the important social and cultural dynamics involved in collecting became obvious – a dynamic the classic *Kunstkammer* of the early modern period had previously characterized. And even if no longer involved in displaying such wondrous and inexplicable exhibits in the collections, a system nonetheless ensued through the preeminence of the spectacular, the beautiful and the rare in the presentation of exhibits for onlookers which ultimately gave preference to subjective as well as collective valuations over the other spatial references. The stony realms, which the mineral collections around 1800 depicted were not therefore solely an expression of a new assertion of scientific or economic concepts of the modern state. Rather, they ultimately reveal how the paths of change also engulfed this field, paths trodden by those actors who continued in light of new scientific and state economic value systems "to make visible" minerals as "a miracle of nature" (Kobell 1872, 15).

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