

# Non-living naturalia in Clusius's correspondence, Part I. Clusius's collection and Cromer's subterranean adventures

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## RESEARCH ARTICLE

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### ABSTRACT

Carolus Clusius (Charles de l'Écluse, 1526–1609), one of the most renowned naturalists of sixteenth-century Europe, was a versatile man of letters. One of his fields of interest neglected in scholarship is his attitude and activities around what was called *fossilia* at that time, and what can today be called non-living *naturalia*: metals, gems, various strange „stones”, fossils, medicinal earths. Such *naturalia* appear several times in his correspondence: this study reviews how Clusius took part in the collecting, exchange and discussions about these inorganic objects in the European *respublica litteraria*. He could even be involved in geological or palaeontological issues of his age. The investigation will not only throw light on the activities of Clusius and some of his correspondents, but also taps into to the broader topic of communication and exchange in the Literary Republic of the time, and may even contribute to the history of the natural sciences in the period. Some of the non-living *naturalia* Clusius was interested in (like „Saint Ladislaus's coin” or the medicinal earth of Tokaj) could be found in Hungary and he looked for them by way of friends in that region (it is known that one of his most important patrons was the Hungarian aristocrat Boldizsár Batthyány). For reasons of space, the study will be published in two parts: Sections 1–3 can be read in this issue, while Sections 4–7 will be published in the next.

### KEYWORDS

Carolus Clusius, metals, fossils, mining, mineralogy, geology, palaeontology, *respublica litteraria*, humanism, Early Modern medicine

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## 1. INTRODUCTION

On November 29, 1566, Carolus Clusius, who was becoming a leading naturalist in Europe in the last decades of the sixteenth century, wrote a letter to his “disciple” Thomas Rehdiger, son of the rich Wrocław patrician Nicolaus Rehdiger. Among other things, Clusius expressed his wish to see the many rarities in the region around Valence – where Thomas Rehdiger happened to be that time –, and ended his letter as follows:

“Not far from Lyon, and perhaps also in the mountains closest to Valence, eagle-stones can be found. They are mostly the size of a walnut; some are bigger, other are smaller, some round and some flat, moreover they are laden [or „pregnant”: *praegnantes*]. When you shake them, they can be heard to have another small stone inside; the French call them *pierres d’aigle* [eagle stones]. If you acquire such and other similar miraculous little stones, I ask you to remember me, since I yearn for all wonders of nature.”<sup>1</sup>

The eagle-stone (*aetites*) does actually exist in reality: it is a hollow geode stone that has little pieces inside, as if it were “pregnant”. According to Pliny the Elder, it can be found in eagles’ nests and helps propagation. Clusius had had a chance to see similar wondrous *naturalia* in his Montpellier-based period (1551–54) and this is what he seems to be remembering in his letter. The eagle-stone was believed to promote childbirth, but Clusius does not mention it in a medical context: it is one of the „wonders of nature”. On the same day, Clusius wrote to a friend of his<sup>2</sup> and the Rehdigers, Johann Crato von Craffheim, the renowned physician and humanist, who was also based in Wrocław, but as a confidential physician of the Habsburg emperors travelled much in Central Europe. Having mentioned earlier in the letter Konrad Gessner’s death,<sup>3</sup> Clusius closes his letter with these words:

„Gessner’s little book about stones<sup>4</sup> once again aroused my enthusiasm which had been almost asleep; therefore, if you can support it in any way, that would be most welcome, and I really entreat you to do it.”<sup>5</sup>

This book is the *De omni rerum fossilium... liber* published in 1565,<sup>6</sup> a collection of treatises about underground objects of nature, the editor of which (as well as the author of the last treatise) was Konrad Gessner, one of the leading naturalists of the mid-sixteenth century. *Aetites* appears in the book,<sup>7</sup> so it might have given the idea in the other letter (that to Rehdiger) written on the same day, but it is only one among the many intriguing *naturalia*. Clusius’s enthusiasm is

<sup>1</sup>Ed. Ram (1847), 14. In the last clause (*sum enim omnium naturae miraculorum studiosissimus*) the word *studiosissimus* expresses both the enthusiasm for and the investigation of the *naturalia* in question.

<sup>2</sup>Clusius had corresponded with Crato since 1561. The latest edition of Clusius’s letters to Crato and Thomas Rehdiger is Ram (1847).

<sup>3</sup>Dec. 13, 1565.

<sup>4</sup>See below on the broad meaning of *lapis* in Clusius’s time.

<sup>5</sup>Ed. Ram (1847), 55.

<sup>6</sup>Gessner (1565). On this book see primarily Leu (2016), 367–378. In Clusius’s expression *Gessneri libellus de lapidibus*, the diminutive *libellus* probably refers to the small size of the octavo book, and not merely to the last treatise in that book, written by Gessner himself.

<sup>7</sup>Pages Cc1-Cc3; also E2v-E3r.



not new – he speaks about the re-awakening of his interests (*studium... denuo excitavit*) –, which went on to evolve further, as we see in his letter to Crato on March 23, 1567. In spite of the baleful events in the Low Countries,

„I cannot help thinking about the *res metallica*<sup>8</sup> (about which I wrote to you recently), and that ardour grows every day.”

And again, he begs Crato for related sendings.<sup>9</sup> Crato’s richness and the strong involvement of „stones” in traditional medicine make it all the more understandable why Clusius turned to him.

On one occasion Clusius speaks about eagle-stones, in the other letters about *lapides* or *res metallica* in general: these together adumbrate a more general field of natural science Clusius was interested in. Indeed, what the authors of the treatises in Gessner’s edition call *fossilia* cover a wide range of such objects. Due primarily to Georgius Agricola’s *De natura fossilium* (1546)<sup>10</sup> and this *De omni rerum fossilium... liber* (1565) – summarising works from leading naturalists of the time – *fossilia* came to be used as an umbrella term denoting all kinds of valuable objects of nature that can be generally found underground and thus can potentially be dug out: *fossilis*, *fossile* literally means „a thing dug out”, so the general term *fossilia* is not to be mistaken for modern „fossils”, petrified remnants of living organisms. For *fossilia* there is no equivalent modern term, these objects or materials are studied by various modern sciences like mineralogy, geology, palaeontology. The core categories of *fossilia* have already been established in antiquity: in Theophrastos’s classification, „minerals” consisted of „stones”, „earths” and „metals”. By Agricola’s and Gessner’s time, several minor groups have been added or included, like congealed juices or fossils in the modern sense, on the other hand there was still no one clear and generally accepted categorisation.<sup>11</sup>

To avoid confusion in the terminology, I am going to use the basic categories of *fossilia* according to Agricola’s classification in *De natura fossilium*, which seems to be the clearest sixteenth-century classification on the issue. If I put terms like „stones” in quotation marks, it means that I am using the term in its sixteenth-century meaning, which is based on the classical-medieval tradition; if the term appears without quotation marks, I am using its modern sense, unless the context suggests otherwise. One of the four basic classes<sup>12</sup> of *fossilia* in Agricola is „metals” (*metalla*): this is a lesser category than today, Agricola did not include some stone-like metals that have since then turned out to be metals, like pyrite. Another class is „stones” (*lapides*), a much larger category than stones or rocks are today; it includes „gemstones” (*gemmae*), the above mentioned stone-like metals, but also some animal-based products like pearls, which are now regarded as organic matters. Once-living petrified („*lapidescens*”) things

<sup>8</sup>This hardly translatable expression covered not only metal-related *naturalia*, but referred to a wider category of inorganic *naturalia*. The original meaning of *metallon* was „mine” or „shaft”.

<sup>9</sup>Ed. Ram (1847), 55.

<sup>10</sup>In the following I will use the 1558 edition of the work: Agricola 1558, 161–380.

<sup>11</sup>Agricola added congealed juices as a distinct class of *fossilia* beyond the classes of stones, earths and metals. In *De rerum fossilium... liber*, Gessner and Johannes Kentmann apply a classification based on form, with several special categories including animal-based products or fossil woods (in Kentmann’s terms: *lapides in animalibus* and *ligna in saxa corporata*, see Gessner 1565, a5v).

<sup>12</sup>Not counting Agricola’s fifth class, the composite *fossilia (mista or composita)*.



are also treated under „stones”. A third class, „earths” (*terrae*) is again different from our notion of earth or soil; most importantly for our topic, there were several types of *boli*, medicinal earths. In Agricola’s new class, that of congealed juices (*succi lapidescentes*), there are also materials that are as shiny and spectacular as gemstones, like vitriol.

The greatest uncertainty concerned the general notion, the umbrella term covering all the above mentioned types of materials. Several classifications were born during antiquity and the Middle Ages; in some of them, *mineralia* was used as the umbrella term covering valuable inorganic materials, but *lapides* could also occur in a similar general sense, as well as (*res*) *metallica*. But even if these were used in a general sense, neither of them really covered all that was later called *fossilia*, as is clear from such compounds as *mineralia et metalla*.<sup>13</sup> Although the term *fossilia* came to be used in the sixteenth century, it was not so widespread that it would have been consistently applied in the Republic of Letters, and *mineralia*, *lapides* or *res metallica* could still be used in a general sense. As will be seen, Clusius and his correspondents, too, provide examples for the use of manifold terms for the same general category of inorganic *naturalia*.<sup>14</sup> In the absence of an adequate modern English term for *fossilia*, I will use the term „non-living *naturalia*” throughout this study.<sup>15</sup> Naturally, the boundaries between the different subgenres and *species* – that is, the terminology on the lower levels – were also unclear in many cases; if such terminological problems need to be clarified, they will be addressed at the discussion of the individual cases.

Specific non-living *naturalia* appear as a minor or major subject in a number of letters from or to Clusius. In the following investigation I will draw a picture about this aspect of Clusius’s world, involving if not all, but the bulk of mentions of such *naturalia*. In all these cases, it is either Clusius who is interested in specific natural objects or his correspondent, and Clusius plays another – for instance mediatory – role in the exchange. The analysis will contribute to a clearer view of the versatility of Clusius’s interests and activities. This versatility has been known to, but little investigated by scholarship. Clusius was not only a naturalist, but a man of letters with various concerns, including classical inscriptions and other antiquities, travel literature, or editing the correspondence of another man of letters. Within natural philosophy or the natural sciences (the sixteenth century was a time of transition from the one to the other), Clusius was not only interested in plants, but also in animals and non-living *naturalia*. The basic statement of this study is not that his interests or the volume of exchange in non-living *naturalia* approach those in botanical *naturalia*; naturally, Clusius was principally a botanist. Still, matters of *fossilia* seem to have accompanied him throughout his life, as an auxiliary field of interest that surfaced from time to time. This is also related to a general interest in nature’s wonders – shared by Clusius and so many of his contemporaries –, and to a lesser degree of specialisation among the natural sciences than we see today.

<sup>13</sup>For the terminological problem concerning *mineralia* or inorganic materials in general, see Goltz (1972), esp. 1–4.

<sup>14</sup>One example occurs above when Clusius speaks about Gessner’s book on *fossilia*, but goes on to mention “*Gessneri libellus de lapidibus*”.

<sup>15</sup>In line with Agricola’s term *fossilia*, once-living organisms that were petrified in the past will be included among the „non-living *naturalia*”; parts of animals or plants which are (or were recently) still living, like antlers, will not be included in this category. A border case is represented by animal-based products that are similar to stones and could be categorised under „stones”, like bezoars; such cases will be peripherally treated in Section 6.



Non-living *naturalia* seem to be absent from the horizon of Clusius-scholarship; even when such natural object(s) form a major subject of letters and the occasion is clearly significant from the perspective of Clusius as a naturalist or mediator, these instances are very rarely touched on, let alone investigated by scholars. One of the reasons for this must be that a large-scale exploitation of Clusius's correspondence in general (around 1600 letters, in several languages) has only recently begun, after the millennial turn. Florike Egmond and some other scholars have shown to what a great extent this correspondence can contribute to our knowledge about scientific development and the intellectual history of the period, and the role that Clusius played in the European *respublica litteraria* of the time.<sup>16</sup> Beyond Clusius's printed works, his letters are now at least as much investigated. At the same time, Clusius as a man of letters and a member of the Literary Republic of his time has also become more graspable, going beyond his traditional image as a botanist/naturalist. These new emphases in scholarship are welcome, but the work needs to be continued and expanded further. Large parts of the correspondence have not even been edited. In general, the investigation of Clusius's relationship to his Central European correspondents – in whose letters most of the matters about non-living *naturalia* appear – seems to be lagging behind.

The significant presence of *fossilia*-related matters in Clusius's correspondence has various reasons and has to be examined from various perspectives: the manifold research questions of this study follow from these manifold perspectives. (1) One of the most important contexts is the sixteenth-century fashion of collecting rare *naturalia* and other curiosities, which activity could result in what came to be called, for instance, „museum”, „Kunstkammer” or „Wunderkammer”. Here I can only recall some key characteristics of these collections, which have developed into a much discussed and most interesting issue in scholarship.<sup>17</sup> They show a merging or overlap between the naturalist collecting (parts of) plants, animals, minerals or their representation, and the humanist collecting books, manuscripts and antiquities, all the more since a number of sixteenth-century men of letters can be regarded as humanists and naturalists at the same time. Whenever they had the means, many of them would create cabinets of curiosities, art galleries, gardens and so on. The reasons for amassing such rarities could be manifold: scientific reasons and curiosity, representation and prestige or practical reasons (instruction at a university, medicinal purposes or artistic imitation). In the museums of princes or other high dignitaries, the representative function could be more important than the scientific (although in the cases of the so-called prince-practitioners the two cannot be separated). In the collections of the men Clusius contacted at some time during his life, scientific purposes seem to have dominated. The physical possession of a natural object helped to investigate and to understand the world. „In a sense, the creation of the museum was an attempt to manage the empirical explosion of materials that wider dissemination of ancient texts, increased travel, voyages of discovery, and more systematic forms of communication and

<sup>16</sup>On the general level, three recent monographs on Clusius and his circles need to be mentioned in the first place: Egmond (2010), Van Gelder (2011), Van Zanen (2019). Clusius's relationship to specific individuals or groups has also been recently discussed in some articles; in the case of his Hungarian friends, for instance, see Ubrizsy-Savoya (2007) (Hungarian and Italian acquaintances), the relevant chapters in Bobory (2009) and (2018) (Boldizsár Batthyány), or Orbán (in press; Ellebodus and Purkicher).

<sup>17</sup>To mention only monographs or edited volumes, seminal works about sixteenth-century museums include Findlen (1994); Olmi (1976); Da Costa Kaufmann (1993) (esp. from p. 174); Impey–MacGregor (1985); Richter (2005).



exchange had produced.”<sup>18</sup> More and more scholars preferred experience and observation over other ways of acquiring knowledge, and it is easy to see how collecting and museums contributed to the development of the natural sciences.<sup>19</sup> The symbolic aspect of the collection, the representation of the world and the possession of nature through the museum played a role in case of the „scholarly” collectors, too.

Non-living *naturalia* generally formed an integral part of museums and lesser collections, and Clusius happened to have contacted a number of the great *naturalia* collectors throughout his life. In this introduction I merely enumerate the most important of such contacts and will discuss individual cases in the relevant sections. Clusius’s first patron, the young aristocrat Charles de Saint Omer, in whose Moercercke castle Clusius was based between 1565–1569, had one of the first Wunderkammer-type collections beyond Italy.<sup>20</sup> His next patron, Jean de Brancion, also had a collection (in his house in Mechelen), which his nephew Johan Van der Delft inherited in 1575; when Van der Delft, too, died in 1579, his garden was destroyed and the items of his collection were mostly stolen. The way in which Clusius reports about the sad event to his close friend Joachim Camerarius Jr. (himself a great naturalist), helps one sense clearly his concern for the collection, in which non-living *naturalia* seem to have constituted the most significant *naturalia* (at least in Clusius’s memory): „I fear that the collection of books, *fossilia* and nature’s other wonders... will be totally lost for me.”<sup>21</sup> Brancion and – from 1575 – Gian Vincenzo Pinelli, the great Paduan humanist patron and collector, paved the way for Clusius to build his network in Italy, the leading region in the development of natural history in the sixteenth century. Clusius corresponded with Europe’s two most famous collectors: the Neapolitan Ferrante Imperato, who dedicated most of his chief work *Dell’historia naturale* (1599) to non-living *naturalia*, and the Bolognan Ulisse Aldrovandi, whose museum has often been taken by scholars as the representative example of museums exhibiting *naturalia*. Crato called Clusius’s attention to Aldrovandi’s collection containing thousands of pieces of „*res metallicae*” already in 1567.<sup>22</sup> As will be seen, Clusius had at least one exchange transaction with at least four Italian scholar-collectors: Pinelli, Imperato, Aldrovandi and the Paduan Giacomo Antonio Cortuso.<sup>23</sup> In the Vienna-based period of his life (1573–1588), Clusius as *familiaris aulicus* could potentially see the imperial collections, and on the other hand he contacted humanist/physician collectors residing in Vienna, like János Zsámboky and Crato, although little is known about the *naturalia* part of their collections. The Hungarian aristocrat Boldizsár Batthyány, a most significant patron of Clusius after his dismissal from imperial service, was highly interested in metals and stones related to his alchemical activity, and owned mines himself. Finally, during his Frankfurt-based (1588–92) and Leiden-based periods (from 1593 to his death in 1609), Clusius

<sup>18</sup>Findlen (1994), 3.

<sup>19</sup>The role of correspondence in observation and scientific development in the sixteenth century has been demonstrated in an edited volume: Van Miert (2013). In this, an article by Egmond directly focuses on Clusius: Egmond (2013).

<sup>20</sup>Egmond (2010), 14–17, esp. 15.

<sup>21</sup>To Camerarius, Aug. 4, 1579; ed. Hunger (1942), 371. Mentioned by Hunger (1942), 99 and Egmond (2010), 19–20.

<sup>22</sup>To Crato, May 29, 1567 (ed. Ram 1847, 90): „...nunciatur mihi... D. Aldrovandum Bononiensem circiter 200 herbarum picturas et metallicarum rerum aliquot millia... habere.”

<sup>23</sup>See the cases and the literature about these Italians in the relevant chapters. It appears that there exists no scholarly literature on the collections of Brancion and Cortuso, or on the *naturalia* section of Pinelli’s collection.



made further connections to naturalist and/or apothecary collectors, mainly from the Low Countries, like Jacques Plateau or Bernardus Paludanus. In the University of Leiden itself, the curators brought up the issue of Clusius's lecturing about non-living *naturalia*, as will be seen.

This brief review already shows that throughout his life Clusius saw, read or heard about collections several times, and contacted a number of men of letters for whom non-living *naturalia* were at least as important as plants. Several questions arise: how do non-living *naturalia* as a subject matter of letters mirror Clusius's interests, and how do they reflect on those of his correspondents? If the correspondent was (also) a collector of such *naturalia*, how did Clusius contribute to his collection? Exactly what kind of services did they ask of Clusius, and how does this mirror his image as a naturalist in the Republic of Letters? Did he himself own, if not a museum, at least a small collection of non-living *naturalia*?

(2) For the people of the age, a large part of non-living *naturalia* could also serve as medicines or ingredients for medicines. In the classical-medieval tradition of *lapidaria*,<sup>24</sup> „stones” and „minerals” – particularly gemstones – appeared predominantly in a medicinal, pharmaceutical context: they described the stones' physical appearance and „virtues”, meaning their healing properties. Within each kind of non-living *naturalia* – metals and metalloids, precious stones, stones of a peculiar form, various earths – several *species* (as they were called) could be used for healing purposes, and could cure or protect against illnesses, poisons or mental afflictions. In the Early Modern period, printing helped the spread of lapidaries (healing manuals) to a great extent, and in parallel to this, external forms of protection such as wearing jewels against certain forms of afflictions, increasingly gave way to the habit of internal cures. For these the minerals had to be ground or dissolved in different ways and mixed with other ingredients.<sup>25</sup> No wonder that the role of apothecaries grew in the sixteenth century, many of whom had both a botanical garden and an inventory of non-living *naturalia*.

Clusius was trained, among other things, as a physician. Lapidary medicine must have been involved in the curricula in Montpellier and Paris, moreover, in at least two cases he in fact stayed at the home of his professor of medicine: with Caspar Peucer in Wittenberg, and Guillaume Rondelet in Montpellier. The best evidence that he was well aware of and knew a great deal about the medicinal use of non-living *naturalia* is his *Antidotarium*, a Latin translation of an Italian book on medicines. Clusius's version of this work saw two editions in 1561.<sup>26</sup> It deals with the proper equipment of pharmacies, and provided a number of recipes complete with their ingredients. Descriptions of non-living *naturalia* are also included, although not many, since medicine at this time was mostly based on herbal, plant-based ingredients. After his years of study (i.e. after 1562), Clusius did not opt for a career in medicine; nevertheless did contact several friends who practiced medicine (all the more since the professions of the physician, the botanist, the naturalist and the apothecary overlapped considerably, and people would often pursue several of these vocations at the same time, but with varying emphases). It is not medicines but non-living *naturalia* in their original form that appear several times in the

<sup>24</sup>In the wide sense of the term, *lapidaries* had several forms: mineralogical books, exemplified by the *De lapidibus* of Theophrastus, or the *Book of Minerals* by Albertus Magnus; encyclopaedic works including such *naturalia* as Pliny's *Historia Naturalis*; verse or prose lapidaries proper; and popular healing manuals. See Harris (2009), 11–14.

<sup>25</sup>On lapidary medicine in general, see e.g. Harris (2009), 1–83.

<sup>26</sup>Clusius 1561a, 1561b. It was based on the *El ricettario della citta di Firenze* (1550). On Clusius's work see Vandewiele (1971, 1974).



correspondence – but do these truly have a medical context? Could any of the exchanges of *fossilia* have a primarily practical purpose – that of medicinal cure?

(3) A highly exciting category of non-living *naturalia* are „stones” of a curious shape, imitating either geometrical forms or living plants and animals. As for the latter, we in the 21st century know that they are mostly fossils in the modern sense – that is, remains or impressions of once-living organisms –, but these objects puzzled sixteenth-century observers who came up with various explanations about their origin. Some fossils were already considered to have been living things in Clusius’s time; other types were intensely debated; and there were fossils whose organic origin was not even suspected. In retrospect, we can witness a play of ideas oscillating on the verge of the living and the lifeless, and groping for the secrets of creation. Clusius’s correspondence gives us insight into his and his contemporaries’ personal stance and activities concerning these objects. How did they search for them? How were they circulated? How did scholars try to identify and classify them? More generally, what exactly was Clusius’ involvement in all this? Although the instances involving unusual stones will be discussed primarily from the perspective of the network and common interests of humanists/naturalists, and not from the perspective of development of palaeontology, the analysed cases may also contribute to this field in the history of science. The subject matter of curious stones will be treated in Section 6 and also at the end of Section 3.

(4) Clusius’s network extended to most parts of Europe, from the Iberian peninsula to Poland, from Norway to Crete, and his correspondence is a relatively accurate representation of the correspondence of naturalists in Western and Central Europe. We may well ask whether, viewed in the mirror of this correspondence, there were regions within Europe where contemporaries were particularly interested in certain non-living *naturalia* as a type of finding? No doubt one would have to think of mountainous regions first – the question is, did any such areas come into the foreground in Clusius’s circles?

(5) Due to the representative nature of Clusius’s immense correspondence, the examined examples for exchanges of *fossilia* might contribute to our knowledge about late sixteenth-century humanist/naturalist communication and exchange in general. How did the humanist notion of *amicitia* help these exchanges? How did these networks function when it came to procuring or mediating a certain *naturalium*?

Naturally, all of these questions can only be answered with caution, indeed, in many cases one cannot go beyond making assumptions or suggesting directions for further research. Most of our primary sources are letters, and only a part of Clusius’s and his friends’ correspondences have survived, whilst Clusius’s responses to letters by others are rarely available. The other type of direct source we may rely on are the printed works of Clusius and others (which often include visual representations). Unfortunately, *naturalia* sent as attachments to letters have almost never survived. In Clusius’s correspondence in general, the letters are extant either in manuscript or in modern editions, some in collections of Early Modern correspondence. Most of the manuscripts are housed in the Library of the University of Leiden, and are accessible online.<sup>27</sup> In the following I will refer to these in the footnotes by date, and I will only provide the availability of a letter manuscript if it is not in Leiden. For reasons of space,

<sup>27</sup>Either through the Digital Collections of the university, or through the online edition-in-progress (<https://clusiuscorrespondence.huysens.knaw.nl/edition/search>), which greatly helps the overview of the correspondence.





the original text of the translated passages in the main text will only be given (in the footnote) if there is no edition.

In the following two sections we are going to look at key sources for our topic, which pertain to non-living *naturalia* in Clusius's possession in general. Section 2 targets the question of Clusius's collection at the end of his life – an issue that needs to be clarified in order to know how to look at the specific cases of individual discussions and exchanges found in the correspondence. Section 3 is entirely devoted to Achilles Cromer's two 1580 letters to Clusius, the richest sources for our topic, which stage a wide range of non-living *naturalia* (metals, gems and crystals, fossils, medicinal earth). In [Appendix I](#) include an edition of these two letters. From Section 4 onwards, the discussion is structured according to groups of closely related *naturalia*, focusing on cases that are worthy of comparison within a distinct section. In Section 4 I will present cases featuring metals and „gemstones;” in Section 5 special types of earth; while in Section 6 we discuss curious stones in the above mentioned sense. Section 7 offers conclusions, and in a final [Appendix I](#) have collected the cases discussed or touched on in the study in a chronological table. For reasons of space, I publish this study in two parts: the present issue includes Sections 1–3 and the Appendix with Cromer's letters; while the second part comprising Sections 4–7 and the final Appendix is likely to be forthcoming in the next issue.

## 2. CLUSIUS'S COLLECTION

Founded in 1575, the Calvinist university of Leiden had a fine future ahead as Europe's fastest developing centre of natural sciences. In 1587, botany as a subdiscipline was officially incorporated in the curriculum of the Faculty of Medicine, and the establishment of a botanical garden was decided. Curators tried to win over the greatest experts available to lecture on subjects related to medicine and to manage the university garden. In 1591, for instance, they invited Bernardus Paludanus, the Low Countries naturalist famous for his collection of *naturalia* accumulated from all parts of the world, but he declined the offer.<sup>28</sup> The curators then turned to Clusius, who likewise refused the post in January 1592. They did not give up, and after negotiations a compromise began to take shape. In their letter of August 12 the curators offered Clusius an exemption from all regular public lectures, he would only have to attend the garden in the summer afternoons and instruct those who visited with an interest in the plants;

„In the winter, however, you should teach, only twice one hour a week, about spices, stones, earths, metals<sup>29</sup> [*aromata, lapides, terras, metalla*] and other things of medicinal use; or, if this is burdensome for you, you may kindly assist the teacher who will possibly lecture on these, for the common case of learning.”<sup>30</sup>

Clusius replied on August 27, asking the curators to exempt him from the burden of lecturing altogether,

<sup>28</sup>For the beginnings of medicinal and botanical education at the university, see [Kroon \(1911\)](#) or [Smit \(1973\)](#).

<sup>29</sup>Since Clusius mentions *lapides*, too, *metallum* appears here in the narrow sense of the term.

<sup>30</sup>From the curators; ed. [Molhuysen \(1913\)](#), 204.



„because, since I have little or no experience in the field of *res metallica*, I do not dare to offer my efforts. I will not ignore the matter, but I would gladly bestow it on the one who will be chosen for the post. Moreover, whatever I have of this kind [of *naturalia*] (although they are very few), I will most willingly donate to the university, so that they will be available and can be shown to the youth [during lectures].”<sup>31</sup>

With the exception of these winter lectures, he agreed to the conditions, and indeed moved to Leiden in October 1593. Still in 1592, on October 25, he expressed his relief over being exempt from lecturing to Jan van Hoghelande, a friend of his who had played a mediatory role in the negotiations:

„I am glad that the curators exempted me from the burden of lecturing on *metallica* in the winter months, because I am not experienced in that field of study and I could not have lived up to their and my own expectations.”<sup>32</sup>

It is not a special case that the university intended to charge Clusius with the task of teaching about certain inorganic *naturalia*: it was an established practice there that the lecturer on botany made use of the winter months in this way.<sup>33</sup> The notions *lapides*, *terras*, *metalla* in the first cited letter, and (*res*) *metallica* in the other two cover our notion of non-living *naturalia*; what the university's set of such *naturalia* included is not known, but those traditionally used in medicine must have dominated the inventory. Animal-based materials and parts of animals must have been included in the inventory: by the early seventeenth century, the garden was extended with a special *ambulacrum* and the whole complex developed into a museum, with animal-based *naturalia* dominating the gallery.<sup>34</sup> The curators must have already had a kind of museum in mind when they invited Paludanus,<sup>35</sup> and then Clusius: it was not only their expertise the curators counted on but also the *naturalia* (and also *artificialia*) that they would bring along, including inorganic ones. When Clusius refused the lecturing itself and referred in two letters to his lack of experience in non-living *naturalia*, there may have been an element of modesty and/or pretext in these references (especially in the letter to the curators), but he probably genuinely did not feel he was experienced enough for the task. The letters in themselves do not allow us to conclude anything about his interests: in the end he declined all botany lectures as well, not because of a lack of interest in plants, but with reference to old age, his recent accident and other reasons. Summarily, what can certainly be declared about Clusius's attitude based on the letters is that he did not feel like teaching about non-living *naturalia* at this point in his life.

On the other hand, he offered to contribute such *naturalia* as he owned, although he himself had „very few” of them. Had there been really just a couple of specimens, he would not have

<sup>31</sup>To the curators; ed. Molhuysen (1913), 205.

<sup>32</sup>Ed. Molhuysen (1913), 233. For more on Clusius and the post offered at the university, see Hunger (1927), 187–193, and Smit (1973); however, of the three above cited letters, Hunger does not include that of August 27, and Smit mentions none of them.

<sup>33</sup>References to this practice can be found for instance in 1575, 1617 (Kroon 1911, 12 and 85) or 1587–89 (Smit 1973, 244).

<sup>34</sup>See De Jong 1991, esp. 44.

<sup>35</sup>See De Jong 1991, 47.



made the offer at all – that would not have befitted such a famous naturalist. From Clusius's words we can assume that he in fact owned a small collection. As to whether we have any further evidence of this – actually we do, from a source related to the very end of his life. After Clusius died on April 4, 1609, his heirs sold his library and his collection of rarities (unfortunately, it was not unusual at that time for heirs to show such an attitude to valuable belongings of famous humanists or naturalists). They organised an auction on May 21 on the Pieterskerkgracht, where Clusius had rented a flat. A catalogue of his library was made and printed<sup>36</sup> – and recently edited by Sylvia van Zanen.<sup>37</sup> The section which is of interest to us at the present moment<sup>38</sup> is the „Notice to the reader” (*Monitio ad Lectorem*) – a paragraph before the *Appendix* and the only part that refers to other than written material.<sup>39</sup> According to this, after the auction of books, rare plants from Clusius's garden will be sold out, as well as maps, coloured images of living *naturalia* and various liquids;

„furthermore, the collection of coins, some handmade objects from abroad, and especially exotic fruits, roots, seeds; as well as a number of minerals, portions of sealed earth, and a great number of other similar<sup>40</sup> curiosities.”<sup>41</sup>

So, by the end of his life Clusius owned a collection of rarities dominated by plant-related things, but containing a number of other types of *naturalia* and *artificialia*. The categories related to our topic are at the end of the passage: *mineralium insuper complurium, terrarum sigillatarum, et permulta alia similis curiositatis*. Considering the milieu of Clusius's circles, *terrae sigillatae* must mean portions of certain medicinal earths, *boli*;<sup>42</sup> their indication as a separate category is noteworthy. Since this appears as a distinct group, *mineralia* must cover here objects falling into the groups of „metals” and „stones”. *Alia similis curiositatis* may also include stones of a specific shape. We know of no other sources concerning the different groups of non-living *naturalia* as Clusius's material heritage, and from this passage alone it is difficult to draw conclusions about the extent of his „non-bookish” collection. On the one hand, it cannot have been very large if it is referred to in merely a single paragraph within a whole booklet; indeed, if it had been comparable to the museums of the greatest scholarly (i. e. not princely, aristocratic) collectors like Aldrovandi or Paludanus, this collection would have certainly left traces in more widely known sources. On the other hand, the fact that books were listed individually and the other items summarily must also be due to the fact that the former practice, that of listing of books, was based on existing models. Moreover, it is much easier to list books

<sup>36</sup>*Catalogus 1609*.

<sup>37</sup>Van Zanen (2019), 281–343. On the library, the auction and the catalogue see id., 231–270.

<sup>38</sup>Some books in the catalogue will also be pointed out later in this study, since they are closely related to non-living *naturalia*.

<sup>39</sup>In Van Zanen's (2019) edition, pp. 337–8; mentioned in the main text on p. 236.

<sup>40</sup>I. e. „similarly curious/rare things”.

<sup>41</sup>*Peracta Librorum auctione, in iisdem aedibus habebitur auctio Plantarum rariorum hortuli Caroli Clusii: qua etiam vendentur Carta Geographica, designationes plantarum, florum, fungorum, fructuum, bestiarum, etc. vivis coloribus: olea item et liquores partim naturales, partim artificiales: Supellex praeterea numismatum, et aliquot manufacturarum peregrinorum, et inprimis fructuum, radicum, seminumque Exoticorum: mineralium insuper complurium: terrarum sigillatarum: et permulta alia similis curiositatis.*

<sup>42</sup>A whole section (Section 5) will be devoted to these.



accurately, while objects may be rare and hard to circumscribe;<sup>43</sup> the latter needed to be seen on the spot. We can also notice differences in the size of the categories: while there are only „some” handmade objects, there are „a number of” minerals and „a great number of” other curiosities. These attributes cannot be simple exaggerations for reasons of advertisement. Taking all these into consideration, the reference to non-living *naturalia* in Clusius’s collection in 1609 harmonises well with the references in his letters from 1592. Clusius did not accumulate a „museum” or a collection comparable to those of the greatest naturalist collectors of his time, but, at least in the last period of his life, he must have had more in his possession than just a few dozen specimens.

Which specimens were most likely to appear in his collection during his lifetime may be inferred to a surprisingly great extent from sporadic references in his correspondence. Let us turn first to the most informative sources in this respect, Achilles Cromer’s two letters written in 1580.

### 3. ACHILLES CROMER’S TWO LETTERS FROM 1580: THE WONDERS OF NATURE IN THE ZUCKMANTEL MINES

Clusius’s Vienna-based period (November 1573 – September 1588)<sup>44</sup> gave him occasion to explore several areas of Central Europe. He investigated and collected, either by way of field trips or correspondence, botanical and other peculiar *naturalia*, and also „*antiquitates*” (mainly inscriptions). Among the East Central European regions, he extended his network of connections toward Hungary, Bohemia, Moravia, and found new correspondents in Silesia, as well. Regarding the natural world of Silesia (or rather the mountains between Silesia and Moravia), Achilles Cromer was his main informer.

This friend of Clusius, a similarly open-minded and curious naturalist, does not seem to be known to scholarship beyond the level of encyclopaedia entries. Born in Neisse<sup>45</sup> (today Nysa), he taught in Breslau (Wrocław) and was secretary<sup>46</sup> to the bishop (and governor of Silesia) Martin Gerstmann. From 1583 to 1585 he studied in Bologna and Padua, earned a doctorate at the latter university, and became city physician of Brünn (Brno). He not only followed Thomas Jordanus (also a friend and correspondent of Clusius) in this position, but also married Jordanus’s widow and brought up her children.<sup>47</sup> From his correspondence with Clusius, fourteen letters are known, written by Cromer between 1580 and 1593.<sup>48</sup> The first two are edited and

<sup>43</sup>The heritage was surveyed on the spot: see [Van Zanen \(2019\)](#), 234.

<sup>44</sup>Between 1574 and 1576 Clusius received a yearly stipend from the emperor (as *familiaris aulicus* and *prefectus* of the botanical garden), later he was supported by various patrons; during the whole period he mostly resided with Johann Aicholtz. On the Vienna period, mainly from the perspective of botany, see [Van Gelder \(2011\)](#).

<sup>45</sup>Probably around 1550. I refer to the Silesian towns and villages using their German name in the first place, as used by the German burghers, to whom Cromer seems to have belonged.

<sup>46</sup>Referring to the years around 1580, Clusius calls him *Achilles Cromerus Nissenus... Episcopo Vratislaviensi a secretis* ([Clusius 1583a](#), 70 and 1601, 83).

<sup>47</sup>A recent review of Cromer’s main biographical data is provided in [Offner \(2017\)](#), 190.

<sup>48</sup>Thirteen of these have survived in manuscript, mostly in the Library of the University of Leiden. One letter has survived in its edited version (discussed below).



discussed in this study; the later letters are mostly from Cromer's Brünn period and throw light both on his private life and on the intellectual climate there, including botanical, medical and bookish issues. A further source of their relationship is Clusius's botanical work on the Austrian-Hungarian flora<sup>49</sup> (its brief title being *Pannonian flora*), in which the author often mentions Cromer as his informer who would also often send him plants. The edition of the bulk of Cromer's letters, their exploitation to the benefit of micro-historical and intellectual network studies, and a review of the Clusius–Cromer relationship are tasks still awaiting scholarly attention. For the purposes of the present study it will suffice to highlight the long and strong cooperation and the close ties between the two men. In a letter sent to Clusius in Frankfurt am Main in 1591, Cromer recollects the earlier period (with Clusius still in Vienna) in the following words: „I recall with pleasure that time when we would converse about our respective studies and other matters almost every week”.<sup>50</sup> He is certainly exaggerating, but the tone of the surviving letters, the frequency of exchange of objects, and the explicit references to their friendship in the sources all suggest a close relationship, even taking into account the topical nature of *amicitia* in the context of humanist correspondence. When Clusius mentions Cromer in *Pannonian flora* as a source of plants or descriptions, one can sense his gratitude toward his Silesian friend as he recalls such episodes from 1578 (twice),<sup>51</sup> 1580,<sup>52</sup> 1582,<sup>53</sup> Cromer's Paduan period,<sup>54</sup> and twice without date.<sup>55</sup>

Cromer's two letters from 1580, in which he relates his visits to the metal mines of Zuckmantel (today Zlaté Hory, CZ) and the nearby mountains, are not only his most interesting, but belong, in my view, to the most exciting letters on *naturalia* surviving from the sixteenth century. They are informative with regard to Cromer's personality, intellectual habits at the time, the pertinent issues of the natural science of the era, and also the Zuckmantel mines themselves. Moreover, they have something of the adventurous, thrilling atmosphere that has generally been shared by fictitious or real stories about going beneath the earth into caves, mines or labyrinths. From the most ancient human cultures to the present age, the subterranean world seems to have always intrigued people; this milieu often makes one feel *awe*, a strange mixture of enthusiasm and fear. Myriads of myths and folktales, often originating in Neolithic times, tell us about the subterranean adventures of heroes, or about smiths who possess an ambivalent knowledge of the secrets of metals, children of Mother Earth. In classical and Christian times these notions naturally mixed with those of Hades/Tartaros or hell. The descent to the underworld has a prominent place in the emblematic literary works of these ages, in Homer's *Odyssey*, Vergil's *Aeneid*, or Dante's *Divine Comedy*, but also in outstanding modern works of

<sup>49</sup>Clusius 1583a. When Clusius rearranged and expanded the contents in his first *opera omnia* volume (Clusius 1601), he updated certain data regarding Cromer and other Silesian friends; he added one further case of Cromer's sending of a plant (Clusius 1601, p. 267).

<sup>50</sup>To Clusius, Aug. 20, 1591: „Ideoque felix ego illud tempus reputo, quando singulis fere septimanis de nostris rebus atque studiis invicem conferre nobis licuit.” *Studia* could mean in this period all kinds of literary or scientific pursuits.

<sup>51</sup>Clusius 1583a, 70 and 1601, 83; Clusius 1583a, 405 and 1601, xcvi.

<sup>52</sup>Clusius 1583a, 117 and 1601, 118.

<sup>53</sup>Clusius 1583a, 71 and 1601, 83.

<sup>54</sup>Clusius 1601, 267.

<sup>55</sup>Clusius 1583a, 510 and 1601, cxviii; Clusius 1583a, 670 and 1601, clvii.



art like Wagner's *Der Ring des Nibelungen* (as in German mythology itself). The best evidence that the appeal of the subterranean has not decreased in modern times is the frequency of this milieu in the genre of fantasy, including the most famous fantasy, Tolkien's wonderful *The Lord of the Ring*.

As for the Early Modern period, two successes natural scientific publications from the 16th and 17th centuries, respectively, are entirely devoted to the subterranean: Georg Agricola's *De re metallica* (1556) – indeed, his entire oeuvre –, and Athanasius Kircher's *Mundus subterraneus* (1665). The plot of one of the best known Early Modern Latin novels, Ludvig Holberg's *Nicolai Klimii Iter Subterraneum* (1741), also takes place underground. But let us mention descents more comparable to that of Cromer, descents to mines of the region by humanists-naturalists of the period. In the 1490s, Conrad Celtis (1459–1508), the German „Arch-humanist”, who made great efforts to involve the natural disciplines in the *studia humanitatis*, composed an elegy<sup>56</sup> about a most probably real<sup>57</sup> descent of his in Wieliczka, the famous salt mine near Kraków; in this he vividly represented his ambivalent feelings and also some real mechanic structures there. Adam Schröter (1525–1572), the Silesian humanist-naturalist one generation older than Cromer, also visited Wieliczka and recorded his experience in a panegyric poem published in 1553.<sup>58</sup> At the end of the work he describes the entire journey of the visiting group, representing in detail the wheel structure in front of the mine, the basket in which they were lowered, the great halls underground, the salt pillars, the miners, the underground waters and wooden structures. Both poems render vividly the above mentioned mixture of fear and curious wonderment; indeed, these strong ambivalent feelings are understandable considering that, on the one hand, such a descent was technically much less secure than nowadays (not to mention that the existence of *Berggeister* and dragon-like creatures was taken for granted, see Agricola's and Kircher's works), on the other hand, a sixteenth-century person could really feel close to the secrets of nature whilst underground and could see things that had never really been seen before. While Celtis's and Schröter's humanist poems have fictitious or at least poetic elements (to be sure, with frequent allusions to Hades/Tartaros), Cromer obviously relates only real experiences in his private letters to Clusius. Moreover, in contrast to the previous humanists, Cromer was not merely a „tourist” underground, but went there to study that world thoroughly – although as a layman rather than a professional –, and some of the issues he was interested in formed part of discussions between him and Clusius.

Zuckmantel was one of the mining centres of Silesia; several metals, with gold as the most important of them, had been mined there since at least the thirteenth century.<sup>59</sup> The extension of the shafts and tunnels, as well as the names of several villages and streams referring to gold-washing, still show the significance of pre-modern gold production. The mid-sixteenth century saw a new wave of development in the mining industry at Zuckmantel. Around 1580 the mining

<sup>56</sup>Celtis 1502, *Amores* I, 6.

<sup>57</sup>Although he relates the event briefly and his presentation is stylised in line with the mythological-cosmological framework of the *Amores*, the realistic details of his descent, including the wheel structure in front of the mine (lines 19–22), the ropes and clothes provided for him (lines 37–39) or the experiment with a kindled object thrown down to measure the depth of a shaft (lines 17–18) enhance the probability of the reality of the adventure.

<sup>58</sup>Schröter 1553.

<sup>59</sup>On the medieval and Early Modern history of mining in the Zuckmantel region, see Peter (1885); Novotný and Zimák (2003).



region belonged to Martin Gerstmann, bishop of Breslau/Wrocław and governor of Silesia – and the same man whom Cromer served at that time. It is all the more understandable that he received the technical support needed for the descent to the mines, and could even collect valuable materials there.<sup>60</sup>

The two letters by Cromer which I first review briefly appear in a fully edited form in the Appendix. The first letter, extant in manuscript<sup>61</sup> and dated Neisse, May 15, 1580, offers a short summary of his visit to the mines, without going into much detail. [1a] A few weeks earlier – relates Cromer – he had made excursions to the mountains of the Zuckmantel region, not only to collect rare plants, but also to study the very birthplace of metals and to send the results of the collecting to Clusius. He was also inclined to go underground because of the rainy weather. [1b] He saw a great variety of metallic veins, some crusts of which he sent off on this occasion, together with minerals collected earlier in Glatz county. [1c] Among other things, the miners informed him about a huge fossilised tree firmly imbedded among the rocks; Cromer refers here to an earlier discussion between him and Clusius to which this finding contributes. [1d] He also expects materials from the duchy of Sweidnitz. The rest of the letter does not concern the subterranean world, but informs us further about the two correspondents' habits of exchange. [2a] Cromer wishes to know where Clusius was to move from Vienna; he hopes they would continue the discussions they had begun, and that Clusius would be able to send him tuberous plants. In Cromer's own garden a tulip with peculiar characteristics had just flowered. [2b] He also makes reference to an opportunity relating to botany which seemed to arise under Hieronymus Beck's patronage and which also concerned Clusius and Aicholz; this did not eventually materialise, but he, Cromer would acquiesce in whatever he could achieve in the future.

Clusius's reply has not survived, but it may be deduced from his note on the manuscript that he had received the letter on May 23 and replied on the same day.<sup>62</sup> In Cromer's second, longer letter, surviving in a miscellaneous edition of sixteenth-century letters<sup>63</sup> and dated Neisse, July 24, 1580, the author reports in more detail a visit to one of the Zuckmantel mines. Although in the edited version the place name is spelt 'Zuidemantell' we can be certain that he is speaking about Zuckmantel: in Cromer's handwriting the letter combination *ck* can be easily mistaken for *ide*; and the tiny „sparks” (*scintillae*) of gold referred to in this letter<sup>64</sup> are also mentioned by Agricola as something peculiar to Zuckmantel;<sup>65</sup> and the context in which the name of the town appears<sup>66</sup> is also characteristic of this particular place. Cromer had descended to the mine in the company of Friedrich Sebisch („Sebizius”),<sup>67</sup> a friend and a physician in Breslau. [1a] Cromer begins his letter by stating that while he is to write a separate letter about the plants of the region

<sup>60</sup>The letters do not provide clues which could enable us to identify with certainty the exact mines he visited, but the research questions of our study do not render this necessary.

<sup>61</sup>Amsterdam, University Library, 64 EM. Henceforth I will refer to this letter as “Letter 1”.

<sup>62</sup>*Accepi Viennae, X Kalendis Junii. Respondi illa ipsa die.*

<sup>63</sup>Crenius 1700, 237–240. Henceforth I will indicate this letter as “Letter 2”.

<sup>64</sup>Letter 2, [1b].

<sup>65</sup>Agricola 1558, 328.

<sup>66</sup>Letter 2, [1a]: *in montani oppidi... fodinae sunt complures etc.*

<sup>67</sup>Letter 2, [2c].



to Aicholz, it is the issue of non-living *naturalia* (*de Metallicis*<sup>68</sup>) that he will inform Clusius about. While exploring the region, he found a specific mine (*Thoniche Suche* with the local name) with much clay inside, and with muddy pieces dispersed that contain gold in the form of tiny „sparks”. He<sup>69</sup> had descended by means of a rope to an especially deep level; where he grew afraid, and began to doubt whether all that he saw was worth the risk. [1b] He started to explore the tunnels, and learned that the miners searched for gold only at places where the upper and the lower parts of the mine were different in colour and form. When he asked them about the possible origin of the tiny gold pieces, the miners answered that the pieces had been brought there by inundations in the past, and were later superseded by what was now the mountain. Cromer was surprised, but they added further arguments based on their findings. Gold had only been found in a fully mature state in that mine; moreover, fully grown trees had been recently found underground, obviously driven there by floods. [2a] Another reason why Cromer sent Clusius particles of the „*Solea*”, the clay-like lower layer of the mountain, was the following. [2b] It had been the experience of the miners that while heavy things always tend to strive downwards, this kind of earth strove upwards. The tree trunks used to support the miners’ tunnels were deformed as if a force had affected them from below, and not from above. The usual explanation for such deformations, namely earthquake, did not seem satisfactory to Cromer either; in his letter he enumerates four circumstances why. [2c] All that Cromer reported can be confirmed by Sebisch who accompanied him. [3a] After he had ascended, he explored the region further, found so called „red earth” and also saw some fairly large crystals. [3b] He also made excursions to the adjacent Friedberg region (Žulová, cca. 10 km east of Zuckmantel), since he had heard that metals and precious stones had been found there and sent samples of what he collected. Gems could also be found on the ridges, embedded in the rocks, but for various reasons people had neglected them. [3c] Cromer insisted that he would keep sending Clusius rare treasures from his fatherland [4a] and hoped that Clusius would send him tuberous plants.

In the following my intention is not to explore fully the local historical, mineralogical or geological contexts of the two letters, but to investigate the kind of material objects and the related questions that Cromer – and indirectly, Clusius – were interested in, and to find out which of the broader scholarly issues of the age lurk in the background of the phenomena referred to in the letters. The basic reason of Cromer’s descent must have been his curious nature in general, and the lure of the subterranean that had always attracted people with its secrets and treasures, as reviewed above. In addition, the age of the Renaissance saw a huge new wave of curiosity regarding the natural world. Search for the secrets of nature became one of its hallmarks; and where better to explore secrets of nature than underground? Cromer does not conceal his feelings, as ambivalent as in the previous examples: arriving at the bottom of the *Thoniche Suche*, he had strong fears, but he also expresses, at various points of the two letters, his rapture and the joy of exploration and of being surrounded by such wonders (the word *mirum*

<sup>68</sup>As seen above, the notion (*res*) *metallica* covered non-living *naturalia* in general, and indeed, many types of such *naturalia* are treated in the letter. On the other hand, the dominant finding in the Zuckmantel mines was metal in the narrow sense, so, unsurprisingly, it is (*res*) *metallicae* that Cromer uses as an umbrella term, and not *lapides*, *fossilia* or any other term.

<sup>69</sup>Although Sebisch, as mentioned in the letter, was certainly in Cromer’s company most of the time and the two of them probably also had guide(s), Cromer writes about his adventures in the first person singular. I have retained this usage in my review of the letters.





and its derivatives are abundant). As he concludes at the end of the longer letter, „If someone explores the bowels of mountains, he will find, in my view, what makes him happy.” However, beyond Cromer’s general Renaissance curiosity, his descent was also related to scholarly issues of his time.

According to the first letter, Cromer had gone underground to examine „the life-giving ground of metals, their birth and generation”, and in the second letter, too, his first question to the miners pertained to the emergence of gold there. As regards the issue of the origin of minerals,<sup>70</sup> Aristotle was the main authority (not surprisingly), according to whom minerals were born from a combination of the elements: earth and water fertilised by sunrays or exhalations originating in sunrays.<sup>71</sup> Even in antiquity, such notions were combined with those of astral influences on the origin of minerals. In the sixteenth century, ideas about the origin of metals and minerals were strongly determined by Aristotelian concepts; the most important new theory seems to have been that of Georg Agricola, according to whom a so called *succus concretus* or *lapidescens*, a “lapidifying juice”, born in the earth and full of mineral materials, has the potential to deposit metallic ores wherever it goes, in cracks and fissures, thus creating metallic veins.<sup>72</sup> The letters contain no clue as to what theori(es) Cromer may have had in mind, but anyway, such theories about the birth of metals or minerals – a process measured by the hundreds of years and featuring invisible actors – could hardly have been investigated by simple observation. What is certain is that Cromer was intrigued by the birth of minerals (most importantly metals proper), the metallic veins were in his words „intermingled in the rocks” by „nature’s wondrous and never satisfactorily explicable art”; this combination of frequent „wonderings” on the one hand and a basically scholarly-secular (not religious) attitude to natural phenomena on the other is characteristic of Cromer. More graspable is his stance to the „maturing” of metals, and to the issue of origin from a different perspective: namely, whether a given metal or any *fossilia* underground was born where it is now, or had been brought there by certain forces of nature.

Non-living *naturalia*, *fossilia* found in peculiar circumstances, formed the starting point of nascent geology, a science that began to take shape in the sixteenth century. One of its central issues was how such *naturalia* were created that seemed to be alien to the environment in which they were found, like marine shells in mountains. The basic traditional notion was nature’s ability to produce by itself, *sui generis*, all kind of beings underground, whether animate or inanimate; this force was also called nature’s *vis plastica*. From the early sixteenth century at the latest, this view was repeatedly challenged, most importantly by theories based on floods and the forces shaping the surface of the earth. The most important of these changes was thought to have been the biblical Deluge (Luther reckoned with no other factor, thus his idea may be called „radical diluvialism”), but most scholars (Fracastoro, Alessandro degli Alessandri, or Agricola) reckoned with successive phases of surface-forming events, predominantly floods. However, theories based on the *vis plastica* of nature and the *in situ* genesis of fossils, persisted to a

<sup>70</sup>The classical notion of „minerals” more or less covers our modern notion of minerals, thus it includes metals, gemstones and other minerals.

<sup>71</sup>Aristotle, *Meteorologica*, passim.

<sup>72</sup>Agricola further elaborated or challenged the Aristotelian concepts about the origin of „minerals” at many other points, for example concerning the origin of exhalations, the maturing of metals and so on. For an overview of the issue of the origin of metals up until the Early Modern age, see Adams (1954), 277–328; Ellenberger (1996), 170–172.



remarkable extent, even well into the seventeenth century.<sup>73</sup> Agricola was surprisingly modern in his ideas about slow, extended processes shaping the surface. For instance, he was the first to describe the phenomenon of erosion,<sup>74</sup> but when in his *De natura fossilium* he enumerates a number of petrified fossils – bones of animals, trees etc. – found in Central Europe, he simply establishes that these once living things had turned to stone by way of the *succus lapidescens*, either in the earth or in lakes and rivers<sup>75</sup> He does not propose the idea that they might have got there through floods; indeed, he refers to Theophrastos’s statement that bones can be born in the earth.<sup>76</sup> Gessner, who in his *De rerum fossilium... liber* (1565) classified the *fossilia* based on outer appearance and their grade of complexity in the order of nature, similarly seems to avoid discussing the difficult issue of origin, including the case of the most famous recent finding, a three meter long piece of a petrified tree with roots and boughs discovered in Joachimstal/Jáchymov (also a mining centre!) in 1557, of which Gessner received a piece from Kentmann.<sup>77</sup> However, diluvial ideas were in the air; this tree, too, which has only been identified as a heteroxyloous fossil wood in the 21st century and had been called *Ulmium diluviale* or *Laurinoxylon diluviale* since the nineteenth century, was called *Sündfluthholz* (wood of the Deluge) at the time of its finding.<sup>78</sup>

The discussion with the miners that Cromer summarises in his second letter [II, 1b] can be regarded, in fact, as a „lay” example of the same discourse that had already been going on at the scholarly level, with the possible diluvial origin and the *in situ* genesis of *fossilia* as the two main poles of the debate (while there is no proof of a *direct* link between any of the specific scholarly theories and either Cromer’s or the miners’ ideas). When Cromer asks them about the generation of the tiny gold pieces, the miners insist that none of them had originated in the mountain but were brought there by the floods, before being covered by that part of the mountain which is still called *das Gebirge* (as opposed to *die Sole* or *Solea*). The miners seem to have spoken about one event of inundation, in other words about the Deluge.<sup>79</sup> Cromer’s reaction is the following:

„I wondered at the opinion of these people, still, what could dissuade me from contradicting? Since no seeds of gold appeared there, nor was there anything that had attained the primary or intermediary [phase of] perfection, but all were in a fully perfect state.”

The positive connotations of the verb „to wonder” (*mirari*) in the whole letter and the conjunction „still” (*tamen*) suggest that Cromer had heard the miners’ opinion with curiosity or admiration rather than scorn. But he had to contradict, and he did this apparently on the ground

<sup>73</sup>For an overview of the entire subject, see Ellenberger (1996), 122–157.

<sup>74</sup>See Ellenberger 1996, 160–170.

<sup>75</sup>Agricola 1558, 324–325.

<sup>76</sup>Ibid., 325.

<sup>77</sup>Gessner 1565, Rr3v-Rr4r; Leu (2016), 377.

<sup>78</sup>Dupéron et al. (2008), 4–5.

<sup>79</sup>Observe the singular in the phrases *diluvio* and *universali aquarum inundatio*. Regarding the next phrase, *fluctibus*, the plural of this word is often used in a poetical sense. Nevertheless, the interpretation of this clause as referential to the Deluge is not certain, and we must also bear in mind that we only have access to Cromer’s *interpretation* of what the miners had said.



of the traditional view about the „maturing” of metals: in the long run, metals go through a process of transmutation, from the less perfect to the more perfect. Lead, for instance, is able to „mature” into silver, and silver will one day become gold, because, as Aristotle had established, Nature always strives for perfection.<sup>80</sup>

However, this is a very slow process. If seeds of metals or any „preliminaries” of the Zuckmantel gold pieces had been torn out from their original place (called *matrix* in ancient theory) by the huge inundation at the beginning of times and brought there, they could not have ripened into gold, the perfect metal – this seems to have been Cromer’s implicit argumentation. (Observe also Cromer’s words *vitale solum*, „life-giving ground” above.) The miners, however, continue their reasoning:

„they asserted that a number of ancient trees have been found there [in the mine], and that not long ago they themselves had found a huge tree, which had been undoubtedly driven there by the same impetus of the waters.”

The miners stick to their opinion, Cromer continues, and think in the same way about all minerals, whether embedded in rocks or not. They cannot be dissuaded or „torn away” (*avelli*) from this opinion by any argumentation. Cromer remains, to say the least, cold toward the miners’ literally ground-breaking theories. „With the benefit of five hundred years’ hindsight we know that the miners were essentially right, as long as we take “the floods” in a more general sense. One wonders what was Cromer’s reasoning behind the rejection of the tree’s diluvial origin? The first letter throws light on this, where he reports in some more detail about a similar finding [I, 1c]:

„...I was informed by the miners [literally: „diggers”, *fossores*] that a few years ago a huge tree was dug out, with long branches and boughs, among pyrites, solid rocks and metals, and that the wood was so tightly enclosed and covered [literally: „protected”, *munita*] by these [rocks etc.] all around that it seemed to have grown along with them [around]<sup>81</sup> at that very spot. You know why I write this to you, and what this can confirm.”

It is hard to translate precisely the first sentence and to render what Cromer meant, but he clearly imagined a tree that was once developing and growing to maturity (*excrevisse*) there in the soil, tightly surrounded by the solid materials, and the emphasis on the *in situ* maturing of the tree – *ibi locorum*, „there at that very spot” – suggests that he contrasted this to another idea, namely that the tree had been driven there from somewhere else. Most probably this contrary idea in Cromer’s mind was a diluvial theory, similar to what he had heard a little later from the miners themselves and rejected. The possibility that not only a tree could petrify but also the alluvial sediment that came with it does not seem to have occurred to Cromer: if the tree was well surrounded by solid matter, that was there from time immemorial, and must have grown forth there, *in situ*. This seems logical, but we cannot be certain that this indeed was his reasoning.<sup>82</sup> (It was also a debated issue in nascent palaeontology whether it was always a living

<sup>80</sup>For a summary of this traditional idea see Adams (1954), 296–305.

<sup>81</sup>*Cum illis* here can be understood as „together with them”, that is, „while/even though it was covered all around by these solid materials”.

<sup>82</sup>In the context of the gems at the ridges of the region, he again speaks of these as „born enclosed in the rocks (*nascuntur saxis inclusae*)” [II, 3a].



organism that the *vis plastica* of nature created underground, or whether it could create things that only *resembled* their living counterparts. At any rate, based on the sources neither Cromer nor Clusius seem to have taken the latter possibility into account at any point.<sup>83</sup>) However, the important thing for us is not the theory itself but that Cromer mentioned the case of the tree as an argument in the framework of a theoretical discussion, as is made clear by the following sentence: „You know why I write this to you, and what this can confirm.”

This sentence places the two letters in a new light. It provides proof that it is not only a general interest and openness toward natural sciences on the part of Clusius that inspires Cromer to inform him abundantly and send him the valuable attachments. They had actual discussions about current theories and issues pertaining to the subterranean world. Since the clause „why I write this [*hoc*]...” must refer to the previous sentence, it is possible that Cromer was alluding to a shared preference for the idea of the *in situ* genesis of fossils – or *fossilia* in general – as opposed to diluvial theories. We cannot be sure, but at any rate, the previous discussions referred to in the above brief sentence seem to have somehow revolved around the origin of *fossilia*. A few lines further down in the same letter [I, 2a] Cromer refers once more to certain specific discussions by way of letters (*per literas inchoata colloquia*), which he hopes they can continue in Vienna. The two men must have met before and may well have discussed such matters earlier in Vienna: the familiar, intimate tone of Cromer’s letters to Clusius in general cannot be explained without assuming prior personal encounter(s). That Clusius was particularly interested in fossilised plants is all the more probable since he himself found at least one, in exactly this period of his life: the fossil of a *Quercus cerris* near the castles of Boldizsár Batthyány. We will return to the issue of fossils in Section 6.

The wide spectrum of objects sent as attachment to the two letters also suggests earlier discussions between Cromer and Clusius. At the beginning of the first letter, Cromer explains why he also decided to descend to the mines, as follows: „to examine the life-giving ground of the metals, their birth and generation, and to share<sup>84</sup> with you what I searched out from there [or „the things required from there”, or „and thereupon to share with you the things asked for”: *indeque petita*], since I had no doubt that you are still in the habit of investigating with unwearied enthusiasm [or: devotion] and happy [or: fruitful] diligence, among other secrets of nature, the innermost [or: most secret] miracles of the earth.” As we can see, the original Latin sentence with its rhetoric and polysemious words is too rich to translate with complete accuracy; some of its constituents – *telluris intima miracula* or *indefesso studio et felici diligentia* – seem to be close to the characteristic topical exaggerations of the humanists. As for *petita* from the highly polysemous verb *peto*, its primary meaning for Cromer seems to have been the „things searched out”, if we consider the whole sentence, but the meaning „things asked for” (that is, by Clusius) also lurks in the background if we take into account the formulation *petita tibi communicarem*. We do not need to assume that Clusius had „ordered” specific metals or minerals from Cromer, although he may have asked his Silesian friend to send anything that could be of interest to him.

<sup>83</sup>Notably, Agricola warns the reader in *De natura fossilium* that in case a fossil has been dug out, one must carefully observe whether it has the features that prove its prior existence as a living organism; it often occurs that nature creates a thing which is merely similar (Agricola 1558, 324). Gessner also quoted this warning by Agricola (Gessner 1565, Rr3v).

<sup>84</sup>In sixteenth-century correspondence, *communicare* meant in the first place the sending of things, either of objects or of information.



One thing, however, seems to be clear: Cromer was aware from their earlier talks and scholarly discussions that Clusius was intrigued by non-living *naturalia*, and knew that his friend also liked to study and investigate the subterranean world and not merely collect its treasures. (*Telluris intima miracula* is a pretty Renaissance formulation of a complex of fields which today fall under the headings of mineralogy, palaeontology or geology). All of this is in line with Clusius's enthusiasm for eagle-stones, other *lapides* and *res metallicae* that were mentioned in the above cited letters from 1566–67.

Among the „wonders of the earth” referred to in the letters, metals stand in the foreground: in the first letter it is the metallic veins that Cromer remembers seeing in the Zuckmantel mines („I saw there... veins of gold, silver and other metals” [I, 1b]). But there were many more wonders besides metals. Along with his first letter he sends a set of mineral fragments, samples of what he had found and, as he says, „dug out with my own hand”. These raw pieces (in case of metals, ores) are of marcasite,<sup>85</sup> silver, lead, „the hidden [or: secret] liquids of vitriol and alum”<sup>86</sup> and sulphur. The specimens seem to have been marked by and/or packaged in pieces of paper on which at least the place of the finding was indicated.<sup>87</sup> Besides the treasures of Zuckmantel, those found a year earlier in Glatz county<sup>88</sup> were also included, and Cromer was expecting further pieces from another adjacent region, the duchy of Schweidnitz [I, 1d].<sup>89</sup> At the beginning of the second letter, he mentions pieces of Zuckmantel vitriol sent before (showing that there must have been at least one more letter with attachments from Zuckmantel which was lost) [II, 1a]. Cromer also sent some special types of earth: from underground, *Solea* [II, 2a] – the material which „strives upwards” –, and from the surface red earth similar to Armenian bole<sup>90</sup> [II, 3a]. Finally, he cursorily speaks about metals, gems and „crystals”<sup>91</sup> occurring at the ridges in the Zuckmantel and Friedberg regions, of which minerals he also attaches a set of samples [II, 3a]. (If Cromer had had access to any of the fossilised trees he had heard about, he would have certainly sent a piece of that, too.) Most of materials are beautiful minerals (marcasite, vitriol and alum, too, have crystal forms), but it is not primarily their aesthetic value that Cromer probably pondered while collecting them or selecting what to attach to his letter – nor was it, clearly, the material value of his findings. Some of the materials mentioned, like *bolus Armenus*, were used in medicine (this aspect will be touched on later in the study), but the medicinal value of the *naturalia* was clearly not Cromer's focus, either. What seems to have

<sup>85</sup>In the age, *marcasita* could refer to more than one of the metallic sulphides, like pyrite and marcasite proper.

<sup>86</sup>*Vitriolum* (or *vitriol*) is itself copper or iron sulphate (in a solid form), and *alumen* is a sulphate salt. Under *vitrioli humor* Cromer probably meant what was called „vitriol oil”, i.e. sulphuric acid. Agricola categorised vitriol and alum under *succi lapidescentes*. On these, as well as on *liquidum aluminis* and *oleum vitrioli*, see Agricola 1558, 209ff.

<sup>87</sup>...mitto aliquot... ex Comitatu Glaziensi... mecum delata, quae charta[,] quibus arctuntur[,] facile discernet [I, 1b]. In my view, the most probable interpretation of the clause is „it is easy to see [which are from Glatz] from the paper in which each [fragment] is packaged. *Carta* is in the singular because it probably refers to one specific portion (a fragment from Glatz), while it becomes plural in *quibus* because here it refers to each of the portions.

<sup>88</sup>A county west of the duchy of Neisse to which Zuckmantel belongs.

<sup>89</sup>A duchy northwest of the duchy of Neisse.

<sup>90</sup>*Bolus Armenus*, an earthy clay also used for healing at that time. The *vires*, „forces” of this earth – referred to in the letter – mean its useful properties or effects.

<sup>91</sup>Crystal had a narrower meaning in the age than it does today. In Agricola's *De natura fossilium, crystallum* is categorised as one of the gemstones that can have various colours; see Agricola 1558, 277ff.



counted most was the scholarly, „scientific” value of the findings he sent. The specimens were not to be examined primarily in a chemical sense – as in modern natural science –, but as attachments to the written information which could contribute to the understanding of nature and even illustrate or „incorporate” actual issues of natural science. Both aspects seem to have been important for Cromer: to express, to show the beauty and immense variety of nature in general – he explicitly refers to *miracula* and *varietas* several times –, and to contribute to the knowledge about specific elements, phenomena of nature, or specific scholarly issues raised by the circumstances in which they were discovered. In at least one case, that of the *solea*, the attachment has clearly no other than an „intellectual” value in that it illustrates a certain constituent of a mountain (a geological stratum) and a certain theoretical issue about the operation of gravity underground.<sup>92</sup>

If we examine the *naturalia* featuring in the two letters from the perspective of the classification offered by Agricola – a standard representative of the science of non-living *naturalia* in the sixteenth century –, we can see that each of the four/five classes of *fossilia* are represented by examples in the letters:

- gold, silver, lead: „metals”;
- „crystals” and „gemstones”, petrified wood: „stones”;
- *Solea, bolus Armenus*: „earths”;
- *marcasita, pyrites*, sulphur: „congealed juices”;
- vitriol, alum: „composite *fossilia*”.

Certain kinds of *fossilia* will be focused on later in this study (in Sections 4–6), thus several of the above mentioned examples will be involved in the later discussions.

The two letters mirror with outstanding clarity Cromer’s interest in several issues related to the subterranean world. It is easy to imagine Clusius having had similar interests, although in the absence of his return letters, we need to be more cautious in this question. In order to draw conclusions regarding Clusius’s attitude to non-living *naturalia* in the different periods of his life other sources also need to be investigated. At any rate, earlier talks and discussions between the two scholars seem to have persuaded Cromer about Clusius’s universal interest in nature. That must be one of the reasons why he consistently addresses his friend, in almost all of his letters, as *naturae universae indagator solertissimus*, „expert investigator of the whole of nature”.<sup>93</sup> It is also telling that when Cromer divided the botanical and *fossilia*-related matters in his parallel letters to Aicholz and Clusius (since the postal address was the same), he chose *de Metallicis* for Clusius [II, 1a].

<sup>92</sup>The idea that certain inanimate things underground strive „upward” instead of „downward” does not seem to have been the subject of scholarly debates at the time. The case summarised by Cromer in [II, 2b] seems to have focussed instead on the observation and assumption of the miners. Nevertheless he is interested in this issue as well, and is apparently inclined to accept the miners’ opinion. In theory, all heavy things strive downward (toward the centre of the world: Cromer’s starting point is, again, Aristotle), but the *solea* seems to contend upward, for instance, certain traces show that it puts pressure on the wooden trunks (that support the tunnels) from downwards and not from upwards.

<sup>93</sup>To be sure, one can sense that Cromer also longed to play such a role, and by virtue of his adventures and enthusiastic letters he could to some extent perceive himself in the role of a universal scholar, a bold investigator of nature’s secrets. The element of self-representation and the humanists’/naturalists’ conscious effort to build their image is not absent from sixteenth-century correspondence, irrespective of whether the letters were meant for the public or not.



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Appendix<sup>94</sup>

## Letter 1

## Achilles Cromer to Carolus Clusius Neisse (Nysa), May 15, 1580

Manuscript: Amsterdam, University Library, 64 EM.

Salutem.

[1a] Iam paucae praeteriere septimanae, Clarissime Vir, cum vicinorum montium territorii Zuckmantelini iuga peterem, non tantum eo animo, ut, si quid forte in praecocium plantarum numero offenderem rari, considerarem, et paulo familiarius mihi redderem; verumetiam, ut metallorum vitale solum, ortum et generationem inspicerem, indeque petita tibi communicarem. Quandoquidem mihi erat extra dubium, te cum aliis naturae arcanis, indefesso quoque studio et felici diligentia intima telluris rimari solere miracula. Plantarum lustrationem diligentiore diutius tum impediabant pluviae, quae me a sylvis arcebant, et vix semel ad optata admittebant exercitia. Ideoque metallica quo curarem attentius non deerat occasio: quomodo enim aër pluviosus et coelum turbidum moraretur cum ipsis inferis versantem in penetralibus terrae? [1b] Vidi illic, quod meminisse iuvat, auri, argenti et reliquorum metallorum venas miro et nunquam satis explicabili naturae artificio saxis permixtas tanta varietate, ut satis mirari non possem: in cuius quidem varietatis indicium hac mea, qua scribo haec, dextera eruta et evulsa frustra ad te mitto aliquot, et praeter haec diversa adhuc praeterito anno ex Comitatu Glazensi, qui hinc †...† distat miliaribus, mecum delata, quae charta quibus arctantur facile discernet. Ea omnia tibi futura grata minime dubio, non tam propter precium quam varietatem. Continent vero aenis[?] marciziet, si excoquantur, argenti plumbique plurimum, praeterea occultum Vitrioli aluminisque humorem, et sulphur. [1c] Intellexi praeter cetera a fossoribus, non multis ab hinc annis inter pyrites, solida saxa interque metalla erutam arborem ingentem proceris brachiis et ramis tam arcte illis inclusam et munitam undequam[?] ut lignum illud ibi locorum excrevisse cum illis videretur. Nosti cur hoc ad te scribam, et quid confirmare possit. [1d] Ex Sveidnizensi Ducatu indies expecto plura, quae si ad me venerint, vix plaustrum illis avehendis sufficeret.

[2a] De tuo discessu tuae me commonefacient literae, et ubi sedem sis fixurus. Spero tamen te adhuc per tempus Viennae haesurum, et inter nos per literas inchoata colloquia continuaturum. Si vero tuis rebus discessus inducere videbitur, fiat id precor Deo propitio et annuentibus fati. Nostrae quidem familiaritatis quin longius etiam a nobis remotus sis, memor futurus, minime ambigo. Gratissima mihi erunt bulbosa quae in posterum ad me miseris, quaecunque tandem illa fuerint, modo cures, ut ad minimum unum Tusai maturum illis adiciatur. Inter tulipas mihi iam floret quaedam flore luteo, patulo et magno, quis[?] inter folium infimum et caulem protrudit bulbum rubellum tantae magnitudinis, ut ex semine vix intra triennium talis nasceretur. [2b] Iudicium tuum de proposito mihi a nostro Aicholzio conditione apud Dominum Ieronimum Beckium tanti feci, ut continuo illi acquiescerem. Non fuisset

<sup>94</sup>In the transcription of the two letters I follow modern standards, modernising orthography (for instance i-j, u-v) and punctuation where needed. In accordance with the contents, I structured the texts into sections indicated by numbers in square brackets; as usual in sixteenth-century correspondence, neither of the original texts were clearly divided into paragraphs or other units. In the case of the second letter, the Early Modern edition clearly contains some mis-readings, which require emendation; in view of Cromer's hard-to-read handwriting, these mis-readings are understandable. I indicate all textual problems in the notes. For the persons, places and scientific notions mentioned in the letters, see the study itself.



repudianda mea sententia, si spes aliqua ad maiora affulsisset, si religio fuisset eadem, si erga rem herbariam studium et ardor, et liberalitate quadam iam pridem doctis innotuisset. Boni consulam praesentem statum: si laetior me exceperit fortuna, lucri deputabo loco; si deterior, non magnopere mihi dolendum erit. Bene vale Clarissime Vir. Nissae, Idibus Maii anno LXXX.

Tui studiosissimus

Achilles Cromerus

*Outside:* Clarissimo Viro Domino Carolo Clusio, naturae universae indagatori solertissimo, domino et amico optimo.

Viennae.

## Letter 2

### Achilles Cromer to Carolus Clusius Neisse (Nysa), July 24, 1580

Edition: Crenius 1700, 237–240.

Salutem.

[1a] Ne videar ex una fidelia duos velle dealbare parietes, de plantis ad Dominum Aicholtzium, de Metallicis vero nonnulla ad te perscribam, quae vos invicem, si ita videbatur, communicare poteritis. In montanis [!]<sup>95</sup> oppidi Zuckmantell<sup>96</sup> fodinae sunt complures, ut minime dubito te id ex victrilibus hactenus ad te datis animadvertisse. Cum igitur plerasque lustrassem, videbam inter ceteras esse quamdam a reliquis omnibus et opere et natura diversam, eamque die *thoniche suche* lingua vernacula a soli lubricitate haud inconvenienter nominari. Etenim cum reliquis metalla saxi inclusa plerumque foverent, et inde ignis beneficio excoquerentur, hanc unam scintillas auri puri putique, nonnunquam etiam grana luto involuta et hinc inde vage dispersa continere referebant, et omnem liquefactionem aut a scoriis separationem excludere. In illam fune immissus ubi essem, animadverti tantam illius altitudinem, ut saepius me poeniteret in via audaciae meae, et me incusarem, quod vitam meam tantis commissem periculis, cum tamen alias natura non ita sim fracto animo. Apud inferos ubi tandem pedem figere licuit, omnia sedulo lustranda et inquirenda putavi, ut cuius rei gratia eo concessissem. [1b] Conspicio cuniculos hinc inde plures, quorum aliquos eundo emetior, intelligoque aurum non in quovis loco, sive indicio terrae [!]<sup>97</sup> ab illis quaeri et inveniri, sed in illa tantum, cuius superior pars ab inferiore (illam *das gebirge*, hanc vero *die Sole* dicunt) et forma et colore differret, ita ut in medio petita delitescerent. Quaerenti mihi illius auri minuti generationem,

nullam in isto monte fieri respondebant, sed omne quodcumque ibi reperiretur, diluvio et universali aquarum inundatione alibi abruptum et fluctibus huc perlatum fuisse, partemque superiorem, quae montem constituit, tandem superingestam.

Mirabar hominum opinionem, quid tamen me avocaret, ut contradicerem? Cum nec ulla ibi auri semina apparent, nec quod vel primam, vel intermediam perfectionem nactum esset, usquam reperiretur, sed in summa perfectione omne. Utque, quod opinabantur, redderent probabilius,

nonnunquam ibi annosas arbores reperiri, et non ita pridem a se repertam quamdam ingentis magnitudinis affirmabant, quae sine dubio eodem aquarum impetu in illum locum fuissent detrusae.

<sup>95</sup>May have been *montani* in the manuscript.

<sup>96</sup>Reads *Zuidemantell* in the edition: see above for the reasons of the emendation.

<sup>97</sup>May have been *terrae* in the manuscript.



In hac illi sunt sententia, neque se inde ulla ratione avelli patiuntur, qua etiam reliqua metalla metiuntur, quaecumque tandem illa fuerint, sive saxis inclusa, sive sine his eruantur.

[2a] Illius inferioris terrae, quam *Soleam* sua lingua appellant, ut dixi, in sua sede lutosae, at in auras delatae lapidescentis, ita tamen, ut maneat friabilis et facile comminatur, particulas aliquot ad te do: eas tibi fore minime ingratas plane confido, vel ob hanc imprimis causam, quam tibi brevibus exponam. [2b] Gravia semper deorsum tendere, tam est notum quam quod notissimum: ex eo genere terra cum sit, merito etiam suum centrum expetit, et eo adepto quiescit. At aliam plane et contrariam hanc terram habere naturam illi Metallici Indies experiuntur, et experti referunt. Quae illa tandem? Sursum tendere. Quibus id colligunt rationibus? Asseribus, quibus cuniculos muniunt, ex utraque parte aptant ingentes arborum truncos, quos etiam vix plerosque uterque meorum brachiorum amplexus cingeret: illi frequentissime, *solea* in altum assurgente, vel in infima parte comminuuntur, vel ea impetum fortius perferente in medio incurvati franguntur. Magna vis certe et mira. Forte id fit ex superae terrae seu montibus pressura? Minime vero id quidem. Nam nec ullam vim ex supera parte illa ligna sustinere ex hoc apparet – quod ablatis illis, nihil terrae decidat, sed inferius tubera conspicuuntur –, et illa quidem solida et crebra, qualia mihi multa monstrabant praeteritis diebus in aequa planitie enata. Huius rei causam quam quis adferret aliam, quam communem terrae motibus, non video, quae tamen mihi vix in hac parte videtur satisfacere in tanta specus profunditate, reciprocis anfractibus, et telluris infimae crassitie; ne dicam de tanta illic aëris penuria, ut illum ingenti labore follibus per canales inflare necesse habeant in usum illorum, qui operi incumbunt. [2c] Has res omnes diligentissime mecum inspexit Dominus Sebizius, ex quo eadem, si quaeres, intelliges.

[3a] Superis restitutus alia indagavi, et reperi non ita procul a priori monte terram rubram, quae boli Armeni vires gerere posset, quem aemulari videtur. Hanc partim crudam, partim lotam et praeparatam accipies. Crystallos passim enatas vidi plures, et inter illas quasdam magnitudinis, ut plurimum tamen nubecula fuscas, nec tam pellucidas, ut magni essent usus. [3b] Concessi denique ad alia montium iuga in territorium Fridebergense, ubi et metalla effodi et gemmas pretiosas reperiri non ita pridem audiveram; quid in illis locis collegerim, videbis. Gemmas quod attinet, in summitate cuiusdam montis nascuntur saxis inclusae; quondam magna diligentia, ut apparet, curatae fuerunt, sed iam plane negliguntur, vel ob earum forte vilitatem, vel hominum nostratium socordiam, vel denique, quod vero similis est, insciam. Quo purius autem, candidius et lucidius saxum continens fuerit, eo gemma elegantior. Si quis montis rimaretur viscera, inveniret, mea sententia, quo laetaretur. Sed quis est, qui spem precio emere velit? Quae inde ad te mitto, collegi ex reliquis a maioribus prius repudiatis et abiectis, et quae placuerant, inde ablatis. [3c] Non cessabo, donec alia patriae meae munera pleraque tibi communicem; modo tale aliquid esset, quod tibi raritate placeret.

[4a] Bulbosa iam expecto, quaecumque illa fuerint, futura mihi longe gratissima. Vale Clarissime vir, et me, quod facis, ama. Nissae IX. Kalendas Augusti, anno MDLXXX.

Tui studiosissimus

Achilles Cromerus.

*Outside:* Clarissimo Viro Domino Carolo Clusio, rerum naturalium indagatori solertissimo, domino et amico observandissimo.

Viennae.

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