ALCHEMY AT THE SERVICE OF MINING TECHNOLOGY IN SEVENTEENTH-CENTURY EUROPE, ACCORDING TO THE WORKS OF MARTINE DE BERTEREAU AND JEAN DU CHASTELET

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The purpose of this work is to revisit the life and works of the baron and baroness of Beausoleil, Jean du Chastelet and Martine de Bertereau, alchemists, geologists and mining engineers, active in the first half of the seventeenth century. The primary and, to date, most important source on the couple's activities are the autobiographical notes included in the work *La Restitution de Pluton*, published by Bertereau in 1640 (1). However, this work would most probably have remained unnoticed were it not because the French historian and mineralogist Nicholas Gobet decided to include their works in his anthology of French mineralogists published in 1779, together with valuable comments of his own (2). Little effort has been made since Gobet's publication to elaborate further on the lives and works of both, save the recent and valuable contributions by Martina Kölbl-Ebert (3).

In this work we have attempted to place their activities in the contemporary historical and scientific context, with the help of hitherto unknown archival documents, to afford in this way a more accurate perspective of their contributions to alchemy and mining.

The Beausoleils and Mining in a Troubled Europe

According to Gobet, Jean du Chastelet was born around 1578 at Brabant, in the then Spanish Netherlands, and his future wife, Martine de Bertereau, would have seen the light around the same year in the heart of France, either in the region of Touraine or in that of Berry (4). Gobet does not explain where he found the birth date of either spouse. However, we have noticed that the last of Bertereau's writings, *La Restitution de Pluton*, includes seven illustrations representing astral charts which are dated, not by chance, between the months of July and September 1578 (5). If we take into consideration the fact that it was a widespread belief at that time that those, such as the Beausoleils, who searched for mines should have been born under certain zodiac signs and under certain astrological conditions (6), it becomes obvious that Gobet guessed the birth date of both spouses from the mentioned charts, interpreting that what the baroness is showing in them is her own astral chart and that of her husband (7).

Gobet also points at the fact that both of these persons belonged to the nobility and he goes into certain detail describing their respective coats of arms (8), but he does not include any comments related to their childhood or their youth, to their education (9), nor to the place and date when they first met and eventually married. Notwithstanding this, it is not difficult to guess how the baron arrived in France and how the couple started to work in the service of the French King. In *La Restitution de Pluton*, the baroness states that she and her husband had begun working in France thanks to Pierre de Bering-

hen's invitation (10). It had been soon before the Edict of Fontainebleau, in June 1601, when King Henry IV of France (1589-1610) had appointed Pierre de Beringhen, a national of the Netherlands, as his first Chamberlain and general Controller of the French mines (11). Therefore, the Beausoleils must have begun working in France in the first decade of the seventeenth century, after the appointment of Beringhen in 1601 and before the death of Henry IV in 1610 (12). For the rest, the appointment of Beringhen—and the subsequent arrival of his compatriot Chastelet and his wife, Bertereau, with him—should not surprise us, since the data coincides with what it is already known about the policies adopted by Henry IV in those years. With France devastated by the Wars of Religion, this monarch brought in a large number of artisans and engineers from the surrounding Germanic countries, with the hope that they would help to reactivate the economy of his unfortunate kingdom (13). Moreover, if the couple were in those early days as deeply interested in alchemy as they would be in the years to come, they would have found in France a suitable atmosphere, due to King Henry IV's alchemical patronage (14).

However, this first mission of the Beausoleils in France only lasted for a short time. At a date that is mentioned neither by Gobet nor by themselves, which perhaps we should estimate in connection with Henry IV's murder in 1610 and with the instability generated by that event, the couple started to lead an itinerant life which lasted until 1626. Gobet does inform us that they traveled through a vast part of Europe and that in the course of their travels the baron received some "important commissions" to develop mining activities, as well as titles (15). The first point, related to the couple's travels, is confirmed by Bertereau herself, who takes Gobet's assertion even further by stating that she and her husband had even crossed the Atlantic and visited the mines of Potosí (16).

We do not have any reasons for doubt on the second point either, that is, in relation to the different titles and honors that were conferred on Chastelet. As a confirmation of this claim, in the only document we know signed by the hand of the baron, he defines himself as a counselor of the Germanic Emperor and as a knight of the order of Saint Peter Martyr's Cross (17). This document (Fig. 1), from May 1631, had remained unnoticed until now in the archives of the British Library (18). Moreover, he refers to himself in the same manner in the only book that he wrote, entitled *Diorismus Verae Philosophiae: De Materia Prima Lapidis*, a small treatise on alchemy that we shall comment on in the second part of this paper. He dared to dedicate it to such prominent figures in the realm of the Counter-reformation as the Emperor Ferdinand II of Habsburg, the archduke of Austria Leopold V, the Elector of Bavaria Maximilian I, and Othon Henri Fugger, a knight of the Golden Fleece (19). Such dedications give us an idea of how well related this couple were and of the kind of spheres in which they moved. It is not surprising, therefore, that people with such contacts should have occupied such relevant positions as stated by Gobet.

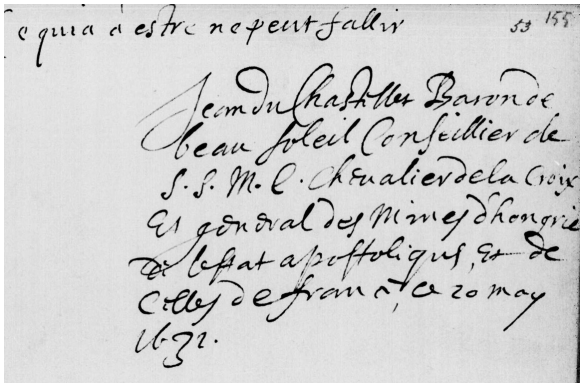

***Figure 1**. Full manuscript note by Jean du Chastelet, preserved in Guillaume de Ruytter's* album amicorum *and reproduced with permission of the British Library (Ms. Sloane 3416, f. 53).*

At the end of their tour, the Beausoleils returned to France in 1626. At that time, Antoine Coëffier de Ruzé, marquis of Effiat, held the position of Superintendent of Mines and Miners of France, and it was he who authorized Jean du Chastelet to open and exploit all the mines he could find on French soil (20). However, his activities would soon be interrupted again. It so happened that in 1627, while the Beausoleils were in Morlaix (Brittany) trying to register his commission before the Parliament of Rennes, they experienced one of the saddest episodes of their lives, when a provincial provost called Touche-Grippé, broke into their domicile and confiscated all their instruments, papers, documents and personal belongings under the accusation of witchcraft. Under these unfavorable circumstances, deprived of the necessary instruments and materials to continue further their exploration of ore deposits in France, they decided to leave the country again to settle in Germany shortly after, probably in 1628-1629 (21). Neither the Beausoleils nor Gobet give any reason why the Breton provost acted with such virulence. It has been suggested that the constant going and coming of the couple made them look suspicious to the public opinion of the region: they would

look with hostility at these "strangers" who used instruments they had never seen before, in order to search for underground treasures which supposedly did not reveal themselves to the human eyes in a natural way (22). We are more readily inclined to suppose that the accusations of witchcraft were only an excuse to get rid of some outsiders who were intruding in their private interest and who, moreover, represented the Crown (23). In any case, the accusation did not get any further and it seems that Touche-Grippé was not able to keep all the documents he had confiscated: according to records preserved in the archives of Ille-et-Vilaine, on November 12-15 he pressed charges against Amaury Jascob de Pellan, Officer of the King and friend of the Beausoleils, because the latter had stolen from him some papers "*concernant les opérations du baron*" (24).

The Beausoleils were warmly welcomed in Germany. Gobet states that on September 29, 1629, Emperor Ferdinand II reinstated Chastelet to his previous position of General Commissar of the Hungarian Mines (25), and this information is corroborated by independent primary sources. Indeed, we have recently found a document, preserved in the State Central Mountain Archive in Schemnitz (today, Banská Štiavnica, Slovakia), dated January 12, 1630, which contains Ferdinand II's letter to the local authorities in Schemnitz, asking them to help "*Commissarius Herr Johann Castelleti* [sic] *Freiherr del Bellsole* [sic]" in his tasks, in order to improve the mining and metallurgy works in the area (26). Another document, also preserved in Schemnitz Archives, lets us follow Mr. "Castelleti" / Mr. "Chastelleto" in his activities as Mining Commissioner in the so-called "lower Hungarian mountain region" (today Slovakia), around the cities of Banská Štiavnica, Kremnica (Kremnitz) and Banská Bystrica (Neusohl) (27). Finally, several documents, which remain unpublished, are preserved at the Austrian State Archives, and account for the stay of Chastelet in Germany from August 1629 to March 1630 (28).

However, despite this warm welcome in Germany, the couple soon decided to come back to French soil, and on March 29, 1630, Chastelet was given permission to interrupt his activities (29). This decision could have been motivated by the hope that, by continuing their work in France, they would obtain the fortune and prestige that had been—until then—evasive. However, we must not forget the instability in Central Europe, as a result of the Thirty Years War, which broke out in 1618 and which would have prevented them from working in the Holy Roman Empire (30).

If it was money and glory they sought returning to France, that was not what they found. It is true that, in 1632, Louis XIII gave them some letters of reference that would enable them to register the commission that had been awarded to them by the marquis d'Effiat in 1626 (31), in the Parliaments of Paris, Rouen, Dijon and Pau. However, apart from these letters, the Beausoleils did not find any kind of economic assistance on the part of the monarch. This is made evident by the two pleas that the baroness addressed the court, requesting some kind of financing beyond mere kind words. The first of such pleas, dated on the same year 1632, had as its title *Véritable déclaration faicte au Roy et à nos Seigneurs de son Conseil des riches et inestimables thrésors nouvellement descouverts dans le royaume de France,* and it was dedicated to Antoine de Ruzé, marquis d'Effiat, the same person who had called them into France six years before (32). The second, written in 1640, was this time dedicated to Cardinal Richelieu himself, and it is no other than the *Restitution de Pluton* from which we have extracted so much biographical information for this paper.

The publication of the *Restitution de Pluton* in 1640 is the last piece of information offered to us by Gobet. We would know nothing about the reply obtained by the couple from Richelieu or about the end of their lives, but for Duvergier de Hauranne, the abbot of Saint-Cyran (1581-1643). In the last years of his life, between 1638 and 1643, this known French Basque Jansenist was confined in the prison of Vincennes by order of the Cardinal, and in two of his letters he provides information about how the baroness of Beausoleil was imprisoned together with one of her daughters there in Vincennes, while her husband was kept in the Bastille (33).

We do not know what could have happened for the couple to finish their lives in such a way. Traditionally, their imprisonment is explained in relation to the publication of *La Restitution de Pluton*: something in it must have bothered Richelieu and driven him to order their arrest. It has been said that perhaps the favorite of Louis XIII interpreted the complaints of the baroness as a criticism to his power (34). Nevertheless, the baroness spares no praises for Richelieu, her attack being launched against Touche-Grippé and the local authorities, not against the royal power. If we accept that the Cardinal felt offended or insulted, how was it possible then that the baroness obtained approval to publish her work? Still more, why did not Richelieu arrest the couple in 1632, after the publication of the first pamphlet, the *Véritable déclaration faicte au Roy*? Other scholars suggest that maybe the Cardinal did not approve the supernatural ap-

pearance that surrounded the Beausoleils' practices, the accusations of witchcraft being again revived (35). However, Richelieu did not have anything against alchemy and occultism. On the contrary, his alchemical interests are more than proven, so in our opinion this hypothesis lacks consistence as well (36).

We are not therefore inclined to believe that these were the authentic reasons for the imprisonment of the Beausoleils. If we look closely at the letters of the abbot, we see that he refers to Martine de Bertereau and her daughter in only two of them, noticing that they were ill-dressed in church and not prepared for the cold (37). Unfortunately, his letters are not dated, so any attempt to date them is merely speculative. Nevertheless, he seems to have known the baroness and her daughter only for a very short period of time, before the arrival of the winter months or, as Lancelot would say, "*à l'entrée de l'hyver* [sic]" (38). Considering that the abbot was freed in February of 1643, we can speculate that the spouses were deprived of liberty in the previous year, that is, in 1642, more specifically, at the end of that year. If so, then the publication of *La Restitution de Pluton* in 1640 was not the decisive factor that determined their imprisonment, but was simply something that took place two years earlier. Yet, what could have happened in 1642?

Faced with the silence of the sources, we are only left with the possibility of moving within the realm of speculation and guesswork. However, in our opinion, it seems very significant that 1642 was also the year in which Henri Coiffier de Ruzé, marquis Cinq-Mars, rebelled unsuccessfully against Richelieu. This betrayal must have been particularly ominous in Richelieu's eyes, for he had taken Henri, then a boy twelve years old, under his protection after his father's death in 1632. Considering the special relationship that our couple had maintained with Henri's father—let us remember, once again, that Antoine de Ruzé, marquis d'Effiat, was the person who had called them into France in 1626, and that it was to him that the baroness has dedicated her *Véritable déclaration* in 1632—we have the impression that the coincidence of date cannot be mere chance, but should rather be interpreted as an indication that the Beausoleils had been part of the plot or, at least, that they were sympathetic to it in the eyes of Richelieu (39).

Alchemy and the Occult in the Beausoleils' Works

The Beausoleils authored three different printed works, which have been referred to in the previous section. The first one in time is an alchemical treatise authored by Jean de Chastelet printed in 1627 (Fig. 2), in Béziers, in the French region of Provence, in the house of Jean Martel, one of the most famous printers active in that city. The Latin title of this work is *Diorismus Verae Philosophiae: De Materia Prima Lapidis* (*Definition of the True Philosophy: On the First Matter of the Stone*). The work was reprinted in 1630 in Augsburg (Fig. 3), with a new title page and a short preface by Chastelet himself, but apart from this difference, both editions are identical (19). This interesting work, structured in 32 paragraphs, is basically devoted to discuss the role of the *Archeus seminalis* in the alchemical work and the required conditions for this Archeus to operate on matter.

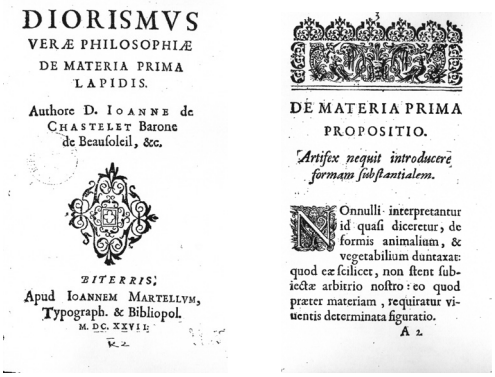
DIORISMVS
VERÆ PHILOSOPHIÆ
DE MATERIA PRIMA
LAPIDIS.
Authore D. IOANNE de
CHASTELET Barone
de Beausoleil, &c.
BITERRIS;
Apud IOANNEM MARTELLVM,
Typograph. & Bibliopol.
M. DC. XXVII.
DE MATERIA PRIMA
PROPOSITIO.
Artifex nequit introducere formam substantialem.
Nonnulli interpretantur id quasi diceretur, de formis animalium, & vegetabilium duntaxat: quod ea scilicet, non stent subiectæ arbitrio nostro: eo quod præter materiam, requiratur viuentis determinata figuratio.

Figure 2. *Diorismus, 1627 edition (19). Left: Title page. Right: first page.*

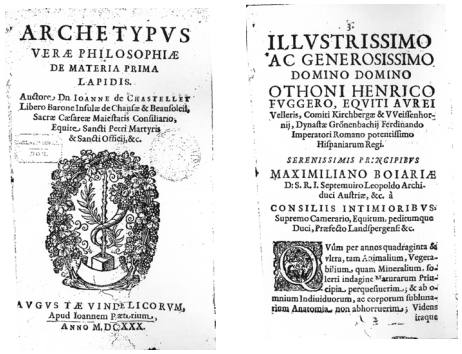
ARCHETYPVS
VERÆ PHILOSOPHIÆ
DE MATERIA PRIMA
LAPIDIS.
AVGVSTÆ VINDELICORVM,
Apud Ioannem Praetorium,
ANNO M.DC.XXX.
ILLVSTRISSIMO
AC GENEROSISSIMO
DOMINO DOMINO
OTHONI HENRICO
FVGGERO, EQVITI AVREI
Velleris, Comiti Kirchbergæ & Veiffenhorn, Dynastæ Grünenbachij Ferdinando Imperatori Romano potentissimo Hispaniarum Regi.
SERENISSIMIS PRINCIPIBVS
MAXIMILIANO BOIARIÆ
CONSILIIS INTIMORIBVS

Figure 3. *Diorismus (Archetypus), 1630 edition (19). Left: Title page. Right: dedication page.*

The second work in chronological order is Bertereau's *Véritable déclaration ...*, a small booklet, in which we find a short reference to the transmutations of metals carried out by the "*imitateurs de Nature*" (32), who are indeed able to obtain a universal medicine able to cure all diseases. But we also find there the first reference to a subject which will constitute one of the central

topics of the major work of Bertereau, *La Restitution de Pluton*. At the end of *Véritable déclaration ...*, she describes the way she discovered the mineral waters of Château-Thierry, by using a special instrument, the "compass mineral," which she places "*dans la charnière Astronomique*." Moreover, she declares she has the habit of using this instrument to find mines, minerals, and underground water (40).

The major and last work of Bertereau is *La Restitution de Pluton*, printed in 1640. A brief survey of the mining practice discussed in this work has been made in Ref. 3, while only the methods described by Bertereau in her book to find water, and her use of the divining rod for that purpose, are covered in detail in Ref. 41. However, the works of both wife and husband, taken altogether, touch upon some key aspects of the alchemical and the occult beliefs and practices of their time. The most important ones are the concept of the *Archeus seminalis* and its relationship with a ferment, presented in *Diorismus*; the existence of a close prime matter in the mines, from which the metals originate; the theory of metals as living entities, growing inside the Earth's womb from different exhalations and under the influence of the planets; the macrocosm-microcosm correspondence of planets, minerals, and living organisms, and the application of these theories to develop astrology-based mining prospecting techniques; and the belief in the actual existence of demons in the mines, which used to play a significant role in mining works. We will concentrate in this work on the two last topics, starting with the last one.

Danger in the Mines Coming from Demons

From the very beginning of *La Restitution*, Bertereau wishes to leave no doubt of her skills in the knowledge of mines and in the practice of metal separation from the ores, which she has acquired by direct experience. She claims to have descended to the deep in the mines of Potosí, in what is now Bolivia, and many others in the Kingdom of Hungary, such as those of Neusolh (Banská Bystrica) and Schemnitz (Banská Stiavnica), both in what is now Slovakia, to name a few. She mentions that in these mines, "little Dwarfs are often found, three to four palms tall, looking old, and dressed as those who labor in the mines..." Assertions like this one usually had the effect of lowering the credit of the whole work to the eyes of Enlightenment writers. However, it is necessary to place this claim in the appropriate cultural context to understand its roots. We will see in this way that such belief in the existence of mines' Dwarfs is by no means as bizarre as it might appear.

The Jesuit priest Athanasius Kircher devoted a whole chapter of his *Mundus Subterraneus*, published in 1665, to discuss the presence of demons in the underground metal mines. They were one of the three types of creatures living in the inner world, the other two being dragons and underground men (42). In the opening of this chapter, Kircher claims that the demons escape from the light of the day, and, therefore, it is quite logical that they must live in the darkness of the underground caves. For him, this truth is indeed a matter of faith, and nobody can ever doubt this without leaving aside his faith. Moreover, he identifies these demons with the dwarfs that were frequently seen in the metallic mines, known as *daemunculi montani*. Kircher refers to Agricola on this matter, who said that these dwarfs are called *Bergmanlin*, but he goes well beyond just citing this classic authority on mining and metallurgy. Indeed, Kircher declares in his *Mundus Subterraneus* that he sought for first-hand information on aspects related to mining activities by contacting the authorities of the Hungarian mines. For this purpose, he sent a questionnaire of nineteen points to the Jesuit father Andreas Schaeffer, of Neusolius (the Slovak town of Banská Bystrica), who distributed it among the directors of the mines (43). To question number six, on whether little underground demons were seen in the mines, all of them gave a positive answer and described many examples. Several members of the high staff of the Schemnitz mines even held a meeting in order to answer Kircher's questionnaire. It is interesting to notice that all the mine workers were convinced that those dwarfs were playing an active role in mining activities. Sometimes they are described in attitudes of disturbing the miners' labors, but more often their presence is taken as an indication of good luck in finding rich veins (44). On occasions, they were not seen, but their presence was deduced from the loud noise heard in the mines. Most probably for this reason the authors of mining works published in the eighteenth century, of whom Gobet is one example, explained the old references to the presence of such dwarfs as being the result of the emission of toxic gases in the mine, which is usually accompanied by loud noise (45). Moreover, references to the presence of footprints of "spirits" in the mines of Hungary were used by the fellow of the Royal Society Robert Plot in *The Natural History of Staffordshire*, to account for the frequently observed rings in the grass, commonly called "Fairy Circles," as due to the action of fairies in some cases and to little "Evils and Spirits" in others (46).

The reports from the mines of Schemnitz are particularly relevant in Kircher's investigation on dwarfs, because Schemnitz is found among the places where the

Beausoleils were working, as Bertereau declares in *La Restitution*, in agreement with the documents referred to in Refs. 26 and 27. Hence, we could eventually conclude that the brief mention she made of the presence of such Dwarfs corresponds actually to what they learned during their own long mining experience. This is the very first observational hint in *La Restitution* that points to this work as being an invaluable tool for understanding the mentality of learned miners. Different from what Agricola was reporting a hundred years earlier, we have in *La Restitution* a very rare report from inside the practice of the profession of mining. However, as interesting as it might be, *La Restitution* was not intended to be a complete and detailed manual for mining, as we have mentioned before. For this reason, the several and occasionally long fragments of text dealing with mining and alchemy, are intermingled with comments addressed to the main purpose of the work, i.e., to obtain Richelieu's permission to benefit from the mines they discovered in France. Probably for this reason the work has not been yet a subject of deep exploration, other than the long portion of the book devoted to the description of the searching of sources of mineral waters by using the divining rod already mentioned. But taking these fragments all together, as pieces of a puzzle, it is possible to reconstruct a coherent picture of their thought, linking the mining prospecting techniques described in the work with the theories of matter that serve as foundations of these technologies.

Astrology-Based Prospecting Techniques and Detection of Metal Exhalations

Beside the mention of mines' Dwarfs, the other aspect that later cast discredit and incredulity on the whole work, making it closer to magic than to science, is the mention of the use of a set of devices built with the purpose of searching for mineral ores. In their own words (47):

> There are five rules that are necessary to learn to know the places where the metals grow: the first, by opening the earth, which is the less important; the second, by the herbs and plants that grow above; the third, by the taste of the waters that come from those places; the fourth, by the vapors that rise in the mountains and valleys at the time of the dawn; the fifth and last, by means of sixteen metal and hydraulic instruments, that are used above [the earth's surface]. Beside these five rules and sixteen instruments, there are still seven metal rods whose knowledge and practice is very necessary, which have been used by the Ancients to find from the earth's surface the metals that are inside.

It is clearly claimed in this passage that these instruments were used for exploring wide areas, with the purpose of determining possible locations of mineral deposits, by using them at the surface in a yet unknown way. We believe therefore that these are not the class of compasses and instruments described by Agricola and represented in his *De Re Metallica*: as Agricola himself recognizes in this book, his instruments were used not to discover new mineral deposits, but to design and measure mines, tunnels and shafts, in mineral deposits which had previously been identified as such (48):

> I have completed one part of this book, and now come to the other, in which I will deal with the art of surveying. Miners measure the solid mass of the mountains in order that the owners may lay out their plans, and that their workmen may not encroach on other people's possessions. The surveyor either measures the interval not yet wholly dug through, which lies between the mouth of a tunnel and a shaft to be sunk to that depth, or between the mouth of a shaft and the tunnel to be driven to that spot which lies under the shaft, or between both, if the tunnel is neither so long as to reach to the shaft, nor the shaft so deep as to reach to the tunnel; and thus on both sides work is still to be done. Or in some cases, within the tunnels and drifts, are to be fixed the boundaries of the meers, just as the "Bergmeister" has determined the boundaries of the same meers above ground. Each method of surveying depends on the measuring of triangles.

Furthermore, among the sciences and arts that the masters of the mines must know, Bertereau listed in third place "the Geometry" which "is also needed in order to dispose each part by manual operations, according to necessity, and to measure latitudes, longitudes and depth on the surface of the earth, and in its interior" (49). This description of the uses of Geometry in mining activities is the very same that Agricola describes in *De Re Metallica* under the heading of "Surveying," when he refers, as Bertereau does, to the "many arts and sciences of which a miner should not be ignorant," using for that quite similar words (50):

> Fourthly, there is the science of Surveying that he may be able to estimate how deep a shaft should be sunk to reach the tunnel which is being driven to it, and to determine the limits and boundaries in these workings, especially in depth.

As we have seen above, Bertereau only mentions the use of the metal rods and the sixteen metallic instruments

in the section of the text where she describes the several methods she uses to discover metal veins. However, as we have also seen, she is well aware of how necessary is the science of Geometry, but she never mentions in that section the use of the metal rods and the sixteen instruments. Moreover, there was no doubt for Gobet that both the *verga lucente* (shining rod) and the metallic instruments were considered in the same class of instruments used to discover metal deposits, as he himself commented in a footnote to *La Restitution* (51):

> Judicial astrology, as it was then taught, was an absurd science, but the influence of the winds, the influence of the sea, even that of the stars on the Earth and its inhabitants, is too much neglected by our Physicists: we can leave the verga lucente & the Geotric slivers, but we need to return to study nature, in order to make a judicious Astrology.

We believe then that it is quite reasonable to conclude that the sixteen metallic instruments were specifically designed to discover mineral deposits and, therefore, they do not belong to those used in the *mensurarum disciplinae* to which Agricola refers.

In other respects, for Beausoleils' instruments to work properly, they must be constructed under specific cosmological conditions (52):

> Those who are the masters of the mines, their chiefs and directors, must know a number of sciences and liberal and mechanical arts. I. They must know Astrology, that is based on the knowledge of the nature and properties of the heavens and stars, ... to allow them [the masters of the mines] to construct the sixteen instruments and the seven metal and hydraulic rods under the ascendants of the planets that rule the metals and minerals, to the discovery of which they are applied. For each planet, *as we have explained* [italics are ours], has a particular influence on a metal or mineral: as an example, if you wish to compose the *verga lucente* [italics in the original], or the big compass of the Sun with his Geotric and Hydroic fragments, to find the gold mines ... it is necessary to make it when the Sun and the other planets are placed as you see in the figure of the big compass at the end of this book; and in the other instruments in the same way.

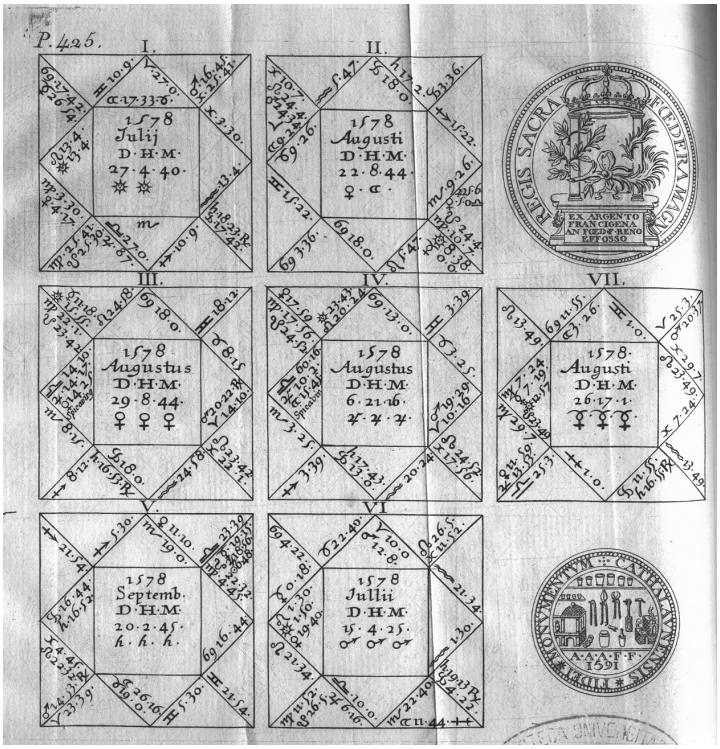

Figure 4. *Astrological diagrams from* La Restitution de Pluton *(53).*

This specific celestial arrangement has been reproduced in Fig. 4 (53). Each of these seven different astrological diagrams would most probably correspond to a specific metal.

The key point to understand the use of such prospecting devices lies in the theory of the generation of metals and minerals professed by the Beausoleils (54). Bertereau describes the existence of a "Universal Spirit in all the elemental things, for them to be able to produce what is similar to them, what has been called the vegetal, animal and mineral soul." Moreover, Bertereau claims that this can be proven every day in the mines, where all metals have a "principle of growing," because of the presence of a certain "vapor liqueur" that comes from the metal matrices, which transforms itself into an oily or butter-like substance, often associated with gold and silver in the mines. Moreover, this very rare first matter of the metals can be conveniently used to prepare the great Elixir, able to cure all diseases and to "purge metals of their imperfections bringing them to the highest degree where nature would have brought them after a long time," i.e., gold and silver. Bertereau is describing here what is known as the *Guhr* theory of the genesis of metals (55). Quite interestingly, Jean Beguin witnessed in 1611 the existence of such an oily substance in the mines of Schemnitz (56). Furthermore, Bertereau states that the generation of metals and minerals is made by the joint action inside the earth's womb of the celestial bodies and some exhalations, the one warm and dry to produce minerals, and the other warm and humid to render metals. For both minerals and metals, the reason

for their diversity has to be found in the joint activity of the celestial influences and the first four qualities. She explains then in detail the "sympathy" between minerals and metals on the one side, and the Sun, Moon and the seven planets on the other. The theory on metallogenesis developed by Bertereau was still in use by the time they published their works, but the novelty here is that, based on the grounds of the theory, they develop a set of instruments for prospecting minerals and metal ores. We do not know how the "sixteen instruments" might have looked and how they were used; this would be of much interest (57), but more information can be gathered regarding the metal rods, used not only to prospect minerals, but also sources of mineral waters (41). Kircher comments at length on divining rods in his *Mundus Subterraneus*, where he acknowledges that they are very much used by metallurgists for mining prospecting (58). He rejects the effectiveness of the common divining rods made of the wood of different trees and plants according to the nature of the target metal. However, he does believe in the existence of a kind of "sympathy" between different substances and natural bodies and in the actual presence of exhalations coming from mineral deposits. Based on these beliefs, he develops an original method to fabricate working divining rods, which he declares to have tried with success. These rods are made by joining a piece of wood with a piece of another material, which will be the active part of the rod, both having the same weight. Then, the rod is held just at the joining point of both parts, remaining then in equilibrium. When this special rod is subjected to the influence of the vapors coming from a substance having sympathy with the active part of the rod, then this part is charged with particles coming from the substance, and the rod loses its equilibrium, the active part being heavier than the wooden arm (Fig. 5).

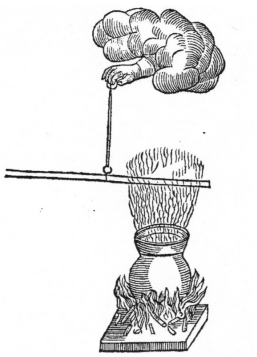

Figure 5. *Working divining rod, according to Kircher (59).*

Kircher gives three examples of such special divining rods, and the second one is of particular interest here. This rod is made of wood and gold, and when it is placed in balance on a receptacle containing boiling quicksilver, the particles coming from the mercury join the gold arm, and as a consequence the rod inclines to this side. The same happens if the gold arm is replaced by a silver arm, and the rod is then placed on a receptacle containing powder of silver heated to high temperature. But Kircher adds "the same would happen to the rod when it is placed on a copper mine, when the vapor or exhalations of the mine rise by the heat of Vulcan, or by the external heat of the Sun." He then concludes (59):

> From this it is clear that, thanks to the rods, it is possible to discover the hidden matrix of all those things that approach each other due to a certain sympathetic attraction, provided the rod, charged with a sympathetic force towards another body, is made as has been just described... Some trees that grow on metallic veins, their leaves and branches overcharged with the vapor, as covered by a sort of skin, are inclined down, until they almost touch the soil.

Kircher provides here a mechanism that can be experimentally tested in favor of the actual existence of vapors or exhalations coming from mineral deposits, and devises an experimental set-up in order to prove it. His approach would not be too far from what our couple of miners and alchemists was advocating in their works, and serves to illustrate what they might have built based on similar beliefs (60). It is most curious that the belief in the actual existence of exhalations, coming from deposits of minerals, is not restricted to European culture. The Spanish Franciscan friar Bernardino of Sahagún (1499-1590), collected in his *Historia General de las cosas de Nueva España* (*General History of the Things of New Spain*, that is basically the present-day Mexico), valuable information on the conception of the natural world and associated practices by the indigenous Nahuatl populations. Regarding the techniques used by these populations for searching for minerals, he wrote (61):

> There are persons who know where the precious stones are grown, for every precious stone, wherever it is, is expelling a vapor or exhalation, like a delicate smoke. And this smoke appears at the Sunrise, and those who know that and search for them, place themselves in an appropriate place, at the Sunrise, and look towards the place where the Sun rises, and where they see a delicate smoke to come, they know in that place there are precious stones.

In conclusion, the Beausoleils' mining practices concerning the procedures used to discover mineral deposits were strongly shaped by their alchemical beliefs, and they show a remarkable internal coherence.

Acknowledgments

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References and Notes

1. M. de Bertereau, *La restitution de Pluton*, H. du Mesnil, Paris, 1640.
2. N. Gobet, *Les anciens minéralogistes du royaume de France avec des notes*, Ruault, Paris, 1779. For biographical information on Nicholas Gobet, see his entry in *Biographie Universelle, Ancienne et Moderne. Supplément*, t. 65, L.-G. Michaud, Paris, 1838, 440-441.
3. A comprehensive discussion of the bibliography on the Beausoleils will be found in M. Kölbl-Ebert, "Life, work and historical reception of alchemist and mining engineer Martine de Bertereau (d. ca 1643)," *Proceedings of the 26th Symposium of the International Commission on the History of Geological Sciences*, Universidade de Aveiro, 2003, 235-249. See especially the section entitled "The strange posthumous life of Martine de Bertereau" (pages 241-244), where the author analyzes the different opinions voiced on Bertereau and her career: the baroness has been seen successively as a "charlatan, suspect adventuress (during the Enlightenment), as a visionary economist, a prophet of the industrial age, and a romantic national heroine (during the nineteenth century), or as a feminist heroine, the first female European scientist to be occupied with geology (nowadays)."
4. Gobet, Ref. 2, 261.
5. Ref. 1. Gobet reproduces in a smaller format these seven birth charts (Ref. 2, folding plate after page 424).
6. The Jesuit father Athanasius Kircher, for example, states, "*Putant enim plerique superstitiosiores hujusmodi ... neque negotium ullum sucessum habiturum, si explorator non fuerit die Dominico natus*." ("Indeed, many superstitious people think ... the work will not be successful if the searcher is not born on Sunday." A. Kircher, *Mundus Subterraneus*, Joannes Janssonius, Amsterdam, 1678, Vol. 2, 200.
7. Contrary to what Gobet proposes, Martine de Bertereau could not be born about 1578, since one of her daughters, Anne, was 12 years old in 1642 (J. Duvergier de Hauranne, *Lettres chrétiennes et spirituelles de Messire Jean Du Verger de Hauranne, abbé de S. Cyran. Qui n'ont point encore été imprimées jusqu'à présent*, s. l., 1744, Vol. 2, Letter XXXIV, 755). Anne was born then in 1630, when her mother, if she had been born in 1578, would have been 52, which seems a biological impossibility. On the contrary, L. Figuier estimates that Bertereau would have been born about 1590. His estimation is based on Bertereau's *La restitution de Pluton*. In this book, the baroness states that she had been working in mines for thirty years (Gobet, Ref. 2, 348). As *La Restitution de Pluton* was published in 1640, Figuier infers that Bertereau would have started to work about 1610 and, consequently, she would have been born in 1590 (L. Figuier, *Histoire du merveilleux dans les temps modernes*, 2e ed., Hachette, Paris, 1860, Vol. 2, 19-20). Nevertheless, in our opinion, Figuier's theory also lacks proof, since this kind of estimations, based on criteria of plausibility, cannot be put forward as a historical argument. Briefly, Martine de Bertereau probably was not born as early as Gobet affirms, in 1578, nor as late as Figuier claims, in 1590, but sometime during the decade of the 1580s.
8. Gobet, Ref. 2, 261.
9. In any case, there is no doubt that Bertereau had received a solid education. Through her works, she has shown herself to be accomplished in alchemy, chemistry, metallurgy, geometry, hydraulics, and other sciences. She spoke fluently not only Latin and French, but also Italian, German, English and Spanish. According to some quotes in her texts, perhaps she knew even little Hebrew.
10. Gobet, Ref. 2, 350: "*Estant parvenuë à la perfection de mon art, et desirée par le feu Roy HENRY LE GRAND, d'heureuse memoire, mandée, et sollicitée de sa part, par le feu Sieur de Beringhen: nous y sommes arrivez mon mary et moy...*" ("Having arrived at the perfection of my art, and wished by the late King HENRY THE GREAT of happy memory, sent for and requested on his part, by the late Sieur de Beringhen: we arrived there, my husband and I ...")
11. Gobet, Ref. 2, 262. For further information on the Beringhen family, cf. C. Grell and B. Pellistrandi, Eds., *Les cours d'Espagne et France au XVIIe siècle*, Casa de Velázquez, Madrid, 2007 (especially the chapter by N. Le Roux entitled "La maison du roy sous les premiers Bourbons").
12. On the contrary, L. Figuier thinks that Jean du Chastelet arrived in France in 1601 and married Martine de Bertereau ten years later, in 1610. His theory is again not well founded, since it is based on the estimations he had used to calculate the baroness's date of birth (cf. Figuier, Ref. 7, 21).

13. (a) J. M. H. Mathorez, *Les étrangers en France sous l'Ancien Régime: Histoire de la formation de la population française*, Édouard Champion, Paris, 1921, Vol. 2, 90. (b) J.-P. Babelon, *Henri IV*, Fayard, Paris, 1982.
14. For further information on Henry IV's alchemical interests, cf. (a) J.-F. Maillard, "Mécénat et alchimie à la fin de la Renaissance, de Louis de Gonzague-Nevers à Gaston d'Orléans," in D. Kahn and S. Matton, Eds, *Alchimie: Art, histoire et mythes*, Seha-Archè, Paris et Milan, 1995, 485-496. (b) D. Kahn, "King Henry IV, Alchemy and Paracelsianism in France (1589-1610)," in L. M. Principe, Ed., *Chymists and Chymistry*, Chemical Heritage Foundation and Science History Publication (Watson Publishing Int.), Sagamore Beach, 2007, 1-11. It is worth noting here that in this last publication it is mentioned that Jean Beguin dedicated his 1608 edition of the famous alchemical treatise *Novum Lumen Chemicum,* by Michael Sendivogius, to Martin Ruzé, director of the mining department created by Henry IV to which Pierre de Behringen belonged.
15. Gobet, Ref. 2, 262. Gobet mentions many regions in Central Europe (Germany, Hungary, Bohemia, Tyrol, Silesia, Moravia, Poland and Mazovia), but he also refers to Sweden, Italy, Spain, Scotland and England. Regarding the titles and honours Chastelet had been rewarded with, Gobet quotes the following ones: German Emperors Rudolph II and Matthias appointed him General Commissar of the Three Chambers of the Hungarian Mines; Archduke Leopold V of Austria constituted him Director-in-Chief of the mines of Trentino and Tyrol; the Dukes of Bavaria, Neuburg and Cleves conferred upon him several offices in their respective territories; finally, the Pope entrusted him with similar commissions.
16. We have been unable so far to find in the General Archive of the Indies (Sevilla, Spain) traces of Beausoleil's trip to America. Nevertheless, there is no reason to doubt the baroness's words: "*Estant moy mesme descenduë dans les puits et cavernes des mines ..., comme celles d'or et d'argent du Potozi, au Royaume du Peru, dont les carrieres sont appellées par les Espagnols, 'La Esperança de la muerte', 'Despanto' et de la fe, etc*." ("Having descended myself into the wells and caves of the mines ..., such as those of gold and silver of Potosí, of the realm of Peru, whose quarries are called by the Spanish The Hope of Death, of Fright, and of the Faith, etc." Gobet, Ref. 2, 348). The Potosí silver mines were in Upper Peru (now Bolivia). During those years, they had achieved their greatest splendour, so they would hold an irresistible attraction for any metallurgist. Moreover, the settlement of a number of Germans, French, and Central and Northern Europeans in Potosí at the beginning of seventeenth century has been documented: B. Lavallé, "Les étrangers dans les regions de Tucumán et Potosí (1607-1610)," *Bull. Hispanique*, **1974**, *76*(1-2), 125-141.
17. The Order of Saint Peter Martyr's Cross was probably created in Lombardy in the sixteenth century, and it seems to have had an ephemeral existence. It was actually an association of pious men, who promised to devote their lives and all of their resources to the service of the Catholicism: V. de Villiers du Terrage, "Les recherches de l'or dans le Finistère," *Bull. Soc. Archéol. Finistère*, **1903**, *30*, 75, n. 1.
18. We are referring to an autograph, signed by Chastelet himself in 1631 and included in the *album amicorum* of his compatriot, Guillaume de Ruytter (British Library, MS. Sloane 3416, f. 53). The fact that Ruytter decided to include Chastelet's signature in his album of friends, together with the signatures of other eminent figures of that era, gives us an idea of the recognition and consideration the baron received during those years.
19. The tract was first published without any dedication, under the title *Diorismus Verae Philosophiae: De Materia Prima Lapidis* (Jean Martel, Béziers, 1627). The dedication appeared in the second edition, printed under the title *Archetypus Verae Philosophiae: De Materia Prima Lapidis* (Ioannis Praetorius, Augsburg, 1630). On the other hand, Pierre Borel apparently refers to this work when he mentions the *Baronis de Beausoleil de Sulfure Philosophorum libellus* (see P. Borel, *Bibliotheca Chimica*, Carolus du Mesnil & Thomas Iolly, Paris, 1654, 41).
20. The authorization was conferred on December 31, 1626, and it is reproduced by Gobet. Thanks to him, we also know that it was registered by the Beausoleils at the Parliaments of Bordeaux (June 12, 1627), Toulouse (July 8), and Provence (December 10). Gobet, Ref. 2, 444-445.
21. Gobet, Ref. 2, 264-265. However, according to the account of the discovery of the mineral waters of Château-Thierry by Bertereau made by the French Doctor of Medicine Claude Galien, she was in 1629 in that French region, accompanied by her first-born son (C. Galien, *La descouverte des eaux minérales de Chasteau-Thierry & de leur proprietes*, Cardin Besogne, Paris, 1630, cited in Gobet, Ref. 2, 306-307). As we will show later, Jean de Chastelet was in the summer of 1629 back in the Habsburg Empire. Hence, it is most probable that he left France alone. However, Bertereau should have joined him somewhere before mid October 1630, for the couple, their children, servants and accompanied miners were given a passport issued October 14, 1630, to cross Brabant on their way back to France (Gobet, Ref. 2, 443).
22. A. Descoqs, "La Bretagne minière et les prospections du B^{on} et de la B^{ne} de Beausoleil," *Bull. Soc. géol. minéral. Bretagne*, **1920**, *1(4)*, 232.
23. This has already been suggested by Kölbl-Ebert (Ref. 3, 245, n. 4) as a cause for the final arrest of the couple.
24. H. Bourde de la Rogier, "Liste des juridictions exercées au XVIIe et au XVIIIe siècles dans le ressort du présidial de Quimper," *Bull. Soc. archéol. Finistère*, **1925**, *52*, 16-17. In spite of being Beausoleil's friend, Jascob de Pellan apparently did not return these documents to the baron and his wife, since in 1640, in the *Restitution de Pluton*, Martine de Bertereau still complained that she had not been given back any of the belongings confiscated at Morlaix, in Brittany: Gobet, Ref. 2, 421ff.

25. Gobet, Ref. 2, 265.
26. Cf. Štatny Ústredný Banský Archív [State Central Mountain Archive in Banská Štiavnica], Haupt Kammer Grafen (HKG), Resolutions Prothocoll, inv. č. 493. 12. jan. 1630. Note that the spelling of Chastelet's name is different in every new source we provide. Here he is called *Commissarius Herr Johann Castelleti Freiherr del Bellsole*, whereas in the following note he appears as Mr. Chastelleto. On the contrary, he signed as Jean du Chastillet (see Fig. 1), whilst posterity remembers him as Jean du Chastelet.
27. Cf. Štatny Ústredný Banský Archív [State Central Mountain Archive in Banská Štiavnica], Haupt Kammer Grafen (HKG), Index über die Ordinari Acta, inv. č. 581. 1. febr. 1630.
28. Österreichisches Staatsarchiv [Austrian State Archive], Hoffinanz Ungarn (HFU), rote Nummer 138, fol. 248-249 and 299-300; rote Nummer 139, fol. 31-32; rote Nummer 140, fol. 51-121 and 134-271.
29. Ferdinand II again made things easier for the Beausoleils. He placed Hercule, their eldest son, in charge of the Hungarian mines and provided them with the documents they needed for their return to France. The safe conduct he issued for the Beausoleils and their entourage, consisting of fifty German and ten Hungarian miners, is dated March 29, 1630, and it is reproduced by Gobet (Ref. 2, 441-442). Together with it, Gobet reproduces another passport, issued in October 1630 by "François [*sic*] Henri, Prince d'Orange, Comte de Nassau" (maybe Frederick Henry of Orange-Nassau [1584-1647]): Ref. 2, 443.
30. In regard to the European political issues of the time, in June 1630 the Swedish army under the leadership of Gustavus Adolphus landed in Northern Germany, and started to move southward. Mining activities in Upper Hungary were severely affected by the war, see J. Majer, "Changes in mining on the territory of Czechoslovakia between 16th and 18th century," in J. Sánchez Gómez and G. Mira Delli-Zotti (eds.), *Hombre, Técnica, Plata: Minería y Sociedad en Europa y América, siglos XVI-XIX*, Aconcagua, Sevilla, 2000, 13-22.
31. These letters are also reproduced in Gobet's work: Ref. 2, 445-447.
32. This tract was reprinted in the same year, with the following title: *Véritable déclaration de la descouverte des mines et minieres de France, par le moyen desquelles Sa Maiesté et ses subjects se peuvent passer de tous les pays estrangers: Ensemble des proprietez d'aucunes sources & eaux minerales descouvertes depuis peu de temps à Chasteau-Thierry*, 1632.
33. Duvergier de Hauranne, Ref. 7, 754-756 (Letter XXXIV) and 763-767 (Letter XXXVII). For further information on these letters, see what is said in Saint-Cyran's memoirs: C. Lancelot, *Mémoires de Lancelot touchant la vie de M. de Saint-Cyran*, Cologne, 1738, Vol. 1, 188-189; Vol. 2, 216-217. The information transmitted by Saint-Cyran is also confirmed by other sources: according to Villiers du Terrage, Jean du Chastelet and his son, Hercule, appeared in a 1643 list containing the names of the Bastille prisoners. The list is today missing, but Villiers du Terrage claims to have seen it at the beginning of the twentieth century in the archives of the French State Department (Ref. 17, 80, n. 3).
34. P. Routhier, "Deux 'mineurs' spoliés et emprisonnés ou la *Restitution de Pluton* (1640) par Madame la Baronne de Beausoleil," *Travaux du Comité français d'Histoire de la Géologie*, **1987**, *1*(1), 5-6.
35. Figuier, Ref. 7, 46.
36. Richelieu's alchemical interests are especially attested in those years, for example in P. J. Fabre's dedication in *Hercules piochymicus*, dated in 1630, but published in 1634 (cf. Ref. 14a, 1995, 494-495). Indeed, if Noël Picard de Coulommiers (alias Dubois or Boismaillé) was imprisoned in Vincennes and latter put to death (June 25, 1637), it was not exactly because he was considered a wizard, but rather because he was a swindler whose alchemical experiments and transmutations had failed. Regarding Richelieu's appreciation of occult issues, it is worth recalling the weekly conferences organized and sponsored by Theophraste Renadout at his Bureau d'Adress in Paris between 1633 and 1642, under the patronage of Richelieu. Occult topics such as talismans or divination where addressed in those conferences: K. Wellman, "Talismans, incubi, divination and the book of M*. The Bureau d'Adresse confronts the occult," in A. G. Debus and M. T. Walton, Eds., *Reading the Book of Nature: the Other Side of the Scientific Revolution*, Sixteenth Century Journal Publishers, Kirksville, MO, 1996, 215-238.
37. Cf. Duvergier de Hauranne, Ref. 7, 754-756 and 763-767.
38. Cf. Lancelot, Ref. 33, Vol. 1, 188.
39. As is well known, Richelieu's reaction was harsh: Cinq-Mars' mother was exiled in Touraine, the family possessions were confiscated and their castle was destroyed. This episode was not the only serious conflict between the cardinal and the families of those who supported the Beausoleils in France. Henri de Beringhen, son of Pierre, successor of his father in 1619 as General Supervisor of the French mines and favourite of Louis XIII, fell into disgrace before Richelieu in 1630. The Cardinal fired him from that position, ordering him to leave France. He went then back to the Low Countries to join Maurice of Nassau's Protestant army.
40. This description has been confirmed by Dr. Claude Galien (see Ref. 21).
41. M. Kölbl-Ebert, "How to find water: the state of the art in the early seventeenth century, derived from writings of Martine de Bertereau (1632-1640)," *Earth Sci. Hist.*, **2009**, *28(2)*, 204-218.
42. Ref. 6, 122-124.
43. Kircher also includes in his *Mundus Subterraneus* the answers of the mining experts to the questionnaire: Ref. 6, 202-207

44. It has been mentioned that in the 16th century miners abandoned the Pyrenees mines mainly due to fear of the demons: F. Garrault, *Des mines d'argent trouvée en France*, Paris, 1579, cited in H. Heller, *Labour, Science and Technology in France, 1500-1620*, Oxford, 2002, 150, for its negative impact on the production of metals in France.
45. Gobet, Ref. 2, 349. It would be interesting in passing, to explore further the evolution of this belief, from the seventeenth to the eighteenth centuries.
46. R. Plot, *The Natural History of Staffordshire*, Oxford, 1686, 13, paragraph 24.
47. In Gobet, Ref. 2, 352.
48. G. Agricola, *De Re Metallica*, H. C. Hoover and L. H Hoover, Trans., Dover Publications, New York, 1950, 128-129, translated from the first Latin edition of 1556 (G. Agricola, *De Re Metallica Libri XII*, H. Frobenius & N. Episcopius, Basel, 1556, 88).
49. "*La Geometrie aussi leur est necessaire pour appliquer para operation manuelle, chaque partie en sa necessité, et mesurer les latitudes, longitudes et profondeurs sur la superficie de la terre, et dans le fonds d'icelle*" (in Gobet, Ref. 2, 391).
50. Cf. Agricola, Ref. 48, 4, "*Quarto mensurarum disciplinae, ut et metiri queat, quam alte fodiendus sit puteus, ut pertineat ad cuniculum usque qui eo agitur; & et certos cuique fodinae, praesertim in profundo, constituere fines terminosque*" (Agricola, Ref. 48, 1556, 1). Note that the Latin expression "mensurarum disciplina," used by Agricola, is what the Hoovers translated as "the science of Surveying." For more information, see the fifth book of *De Re Metallica*, where Agricola describes with more detail what he means by the art of surveying.
51. In Gobet, Ref. 2, 391: "*L'Astrologie judiciaire, telle qu'on l'enseignoit alors, étoit une science absurde, mais l'influence des vents, de la mer, celle même des astres sur la terre & ses habitans est beaucoup trop négligée par nos Physiciens: on peut abandonner la verga lucente & les esquilles Géotriques, mais il faut revenir à étudier la nature & faire une Astrologie sensée*." For "Geotric" in this passage, see Ref. 52 below.
52. In Gobet, Ref. 2, 388. We have chosen to translate the adjectives *Geotriques* and *Hydroïques* as "Geotric" and "Hydroic" respectively, because we do not find these terms in other texts of the period and we do not know exactly what the Baroness means by them. We suppose that they mean something along the lines of "Earthy" and "Watery" respectively; however, we maintain the ambiguity of the original French text by using these cognates.
53. Gobet, Ref. 2. The copy of *Les Anciennes mineralogistes* belonging to the Museum of Natural Sciences of the Spanish Research Council (CSIC) has been used to reproduce this figure.
54. Gobet, Ref. 2, 379-387.
55. On the early formulation of the of *Guhr* theory in the sermons of Johann Mathesius, see J. A. Norris, "The Providence of Mineral Generation in the Sermons of Johann Mathesius (1504-1565)," in M. Kölbl-Ebert (ed.), *Geology and Religion: A History of Harmony and Hostility*, The Geological Society, London, Special Publications, **2009**, *310*, 37-40. This concept also surfaces in Newton's alchemy: W. R. Newman, "Geochemical Concepts in Isaac Newton's early alchemy," *Geological Society of America*, **2009**, Memoir *203*, 41-49. It is worth mentioning that Herman Boerhaave was deeply interested in *Guhr*, as it might be the key to a theory for the composition of metals alternative to the sulfur-mercury one. See J. C. Powers, "Scrutinizing the Alchemists," in *Chymists and Chymistry*, L. M. Principe, Ed., Chemical Heritage Foundation and Science History Publication (Watson Publishing Int.), Sagamore Beach, 2007, 227-238. Gobet had already noticed the interest of Boerhaave in *Guhr*, Ref. 2, 276.
56. T. S. Patterson, "Jean Beguin and his *Tyrocinium Chymicum*," *Ann. Sci.*, **1937**, *2*(3), 243-298.
57. They lost their instruments in Bretagne during the confiscation in 1627, and it is most probable that they brought these instruments with them when they arrived in France in 1626 from the mining regions of Central Europe. Their loss would have prompted their return back to these regions in 1628-29, and it is most conceivable that they had new instruments when they got into France in the winter of 1630-31. It is most probable then that these prospecting devices were in use at that time in the wealthy mining districts of Central Europe.
58. Ref. 6, 198-201.
59. Ref. 6, 201.
60. Kircher, however, rejected any astral influence on the conventional divining rods as superstition.
61. Bernardino de Sahagún, *Historia General de las cosas de Nueva España*, 1557. Quoted from the 1995 edition, Alianza, Madrid, 788-789. This passage is quoted in M. Helena Alvim, S. F. de Mendoça Figueroa, "Minerales y piedras preciosas en La Nueva España del siglo XVI a través de la obra 'Historia General de las cosas de la Nueva España' del fray Bernardino de Sahagún," *Enseñanzas de las Ciencias de la Tierra*, **2007**, *15*, 56-64.

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(CSIC), the "Marqués de Valdecilla" Historical Library of Universidad Complutense in Madrid (UCM) and the Spanish National Library. The information collected in the project is available in both English and Spanish at http://catalogochymico.icp.csic.es

International Society for the Philosophy of Chemistry (ISPC) Summer Symposium 2012

The International Society for the Philosophy of Chemistry (ISPC)—Summer Symposium 2012 will be held from Tuesday August 7 until Friday August 10, 2012 in Leuven, Belgium, at the campus of the Katholieke Universiteit Leuven (KU Leuven). An optional excursion will be organized on Saturday August 11, 2012.

The ISPC Summer Symposium 2012 aims to provide a forum for discussion about foundational, epistemological, methodological and ontological problems of chemistry and its subfields by bringing together leading researchers and young scholars from all over the world.

In order to foster as much in-depth discussion and interaction as possible, the programme of the ISPC Summer Symposium 2012 will consist of eight plenary sessions, devoted to specific key topics within the field of the philosophy of chemistry.

Issues debated in the philosophy of chemistry emerge from three communities: the chemists reflecting on the foundations of their science, the philosophers of science investigating the nature and specifics of chemistry, and the historian of chemistry making sense of the pathways to discoveries and the practices of chemistry in the past.

Each day will consist of one morning and one or two afternoon sessions crafted to tackle specific issues emerging from one of the three broad areas mentioned above—the foundations of chemistry, the philosophy of science or the history of chemistry—relevant to the philosophy of chemistry. The topics have been chosen to reflect aspects previously lacking scholarly attention and/or to address prominent issues for the foundations of chemistry.

Each day will be introduced by a keynote lecture from a leading expert. Prof. Paul Popelier (Manchester Interdisciplinary Biocenter), James Ladyman (University of Bristol) and Hasok Chang (Cambridge University) have already accepted to give a lecture. The eight scientific sessions will include presentations based upon refereed abstracts selected by the scientific committee. Papers are invited on the following topics:

- Atoms in Molecules
- Reflections on Symmetry in Chemistry
- The Nature of the Chemical Bond
- The Role of Structure in Chemistry
- Ethical Aspects of Chemistry
- Philosophical Attitudes of Past Chemists
- Sustainable Chemistry
- The Social Perception and Understanding of Chemistry

For more information about the ISPC Summer Symposium 2012, please consult the conference website <https://sites.google.com/site/ispc2012/>. For all further queries, please do not hesitate to send us an email at ISPCSS2012@gmail.com.

The Local Organizing Committee
Pieter Thyssen, Brigitte Van Tiggelen, Arnout Ceulemans