

# *A Short History of Alchemy*

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## Overview of Its History

Alchemy is not an easy subject to research because there are so many manuscripts, texts and books in libraries, museums and private hands, but also because their contents are often confusing and contradictory. Translation into other languages is not always accurate because alchemical terms don't always lend themselves to correct interpretations. It is not easy to discover what the meaning of symbols was for a people from another century who had different concepts of the universe than we do now. Alchemy also connected different areas of human activity and thought, such as philosophy, religion, sciences that vary from chemistry and medicine to metalworking, different crafts, and even finances. This diversity has divided the researchers. For some it is only a form of pre-scientific chemistry, for the others a mysticism. Alchemy contains real science, but also legends and symbolism.

The name itself was handed down to us by the Arabs and fades away somewhere

in its mythical origin, which is traditionally sought in ancient Egypt. The oldest texts that have survived, were written down in the first centuries of our era. They contain the most essential of practices and allegories, later handed down and supplemented by the Arabs and Byzantines. In the West, alchemy really only started in the 12<sup>th</sup> century and reached its peak in the following century, when the Latin texts were written down that would later become standard works. Alchemical art is known to us from the 14<sup>th</sup> century. Originally it seems to be determined by religious iconography, but later it was quickly supplemented with ordinary motifs. Even if alchemy was denounced, or occasionally condemned at the end of the Middle Ages, it was definitively on the list of official scientific disciplines.

In the 16<sup>th</sup> century alchemy experienced an extraordinary development, fostered by the diffusion of hermetic philosophy, with the result that a number of adepts devoted themselves to theosophical adaptations. This led to the formation of the Rosicrucians. At the same time, iconography flourished thanks to engravings.

The decline began in the 17<sup>th</sup> century, when the theories of the alchemists were violently attacked by the more positive sciences and the gradual organization of chemistry. The belief in the possibility of turning an ordinary metal into gold, which formed the basis of alchemy, was from then on rejected as fraud by the scientific system, being nothing more than naivety, ignorance or allegory.

## The Alchemical Work

The operations that the alchemist has to perform in order to bring a transmutation to a successful conclusion were labeled as the Great Work. They were to give him the Philosopher's Stone which was then *projected* onto an ordinary metal to ennoble it. At the same time the alchemist sought to obtain a *drinkable gold*, an Elixir of Life, which, in addition to the power and wealth of gold, would also grant eternal life. Not all alchemists had the same beliefs. Among them were researchers who, through the discovery of methods of preparation and products, through a better knowledge of matter, laid the foundations of chemistry. There were also fraudulent people who exploited the gullibility of the public. For others alchemical gold was not at all physical gold, but it was the expression of the perfection of one's existence.

Alchemy shows two aspects: one is practical and one is contemplative. The first deals with metalworking and pre-scientific chemistry, the second presents itself as a mystical quest. These two aspects were linked in varying degrees. The practical side of alchemy involves crafts as well as a basic knowledge of matter, and since ancient times they were accompanied by religious and philosophical considerations. Applied to metalworking alone, they were not always labeled as alchemical, although the origin of the word alchemy appears to be very old. Such alchemical texts go back to the 3<sup>rd</sup> and 4<sup>th</sup> centuries of the Greco-Egyptian, and these alchemists preferred to label their practices as a divine art. The word

chemistry was only rarely used.



*Detail from the title page of Révelation des mystères des teintures essentielles des sept métaux, by Basil Valentine, 1646, showing the philosophical aspect on the left side and the practical aspect on the right side.*

## Greco-Egyptian Origin of the Word Alchemy

The 10<sup>th</sup> century *Lexicon of Suidas* defines alchemy as the technique of making gold and silver, and adds that Diocletianus (c. 290 AD) burned all the books that the ancestors of the Egyptians had written on chemistry to punish them for their rebellion against Rome. He wanted to deprive them of an important source of wealth. The origin of these books is said to be a sacred text, *Chemeu*, a Greek term lying at the basis of the Arabic al-kīmiyā. It was first introduced by the Egyptian alchemist Zosimus of Panopolis at the end of the 3<sup>rd</sup> or beginning of the 4<sup>th</sup> century AD in the following passage:

"The Holy Scriptures, that is the books, say, my lady, that there is a race of demons who avail themselves of women. Hermes also mentioned this in his *Physika*, and nearly every treatise, both public and esoteric, made mention of this. Thus the ancient and divine scriptures said this, that certain angels lusted after women, and having descended taught them all the works of nature. Having stumbled because of these women, he says, they remained outside heaven, because they taught mankind everything wicked and nothing benefiting the soul. The same scriptures say that from them the giants were born. So theirs is the first teaching concerning these arts [*Chemeu*]. They called this the Book of *Chēmeu*, whence also the art is called *chēmeia*."

Zosimus used the word *chēmeia* to indicate the secret knowledge revealed by fallen angels to mankind.

The Arabs used the term *al khemia*, and was linked to Egypt, as it was referred to

as Khemia, the Black Land (a reference to the rich dark soil of the Nile river valley). The Arabs also made a link to the term *kâma*, which means to hide, to secrete, to conceal. Alchemical practices were mostly kept secret.

In the 12<sup>th</sup> century, after the Arabic science was passed on to us, the term *al khemia* appeared in its Latin form: *alkimia*, *alquimia*, *alchimia*, *alchemia*. At that time it was claimed that the name came from a monarch, Alchimius, who was the first to translate the Hebrew texts containing the secrets of this science into Latin. His name was thought to mean Matter or Substance.

The origin of the word alchemy has had many different explanations, even to this day. The connection to Egypt seems to be the most prevalent one.



*Lady Alchimia, from Theosophische Darstellung zur Alchemie, by Leonhardt Thurneysser, 1574*

## Greco-Egyptian Alchemy

Many alchemists thought that their art had its origins with the priests of ancient Egypt. Everything that had to do with gold working there was directed and guarded by the priests under the authority of the Pharaoh. The craftsmen were imposed the strictest secrecy, so that alchemy was labeled as occult, or hidden. Olympiodoros wrote:

"The whole kingdom of Egypt rests on three arts: the art of practical things, the art of nature and the art of working the minerals. This is the so-called divine art, which was revealed only to the priests. It was the law of the Egyptians that no one should spread these things in writing."

The few papyri that have handed down some of these processes are all associated with magical formulas. Such recipes were already known in Mesopotamia when they were incorporated into a ritual and linked to astrology. When Egypt came under the influence of Greek culture, the god Thoth was equated with Hermes. He was considered the inventor of the sciences and master of physical things, so that many alchemical texts were attributed to him by the Hellenistic Egyptians. He was called *Three Times Great* (trismegistos). His mystic texts were collected in the *Poimander*, the text of which only became known to us in the Renaissance. This philosophy left deep marks in the character of alchemy, which was already marked by its religious origin.

The Greeks also attributed the invention of alchemy to Vulcan, who this time was equated with the Egyptian Ptah. Many alchemists claimed that their art was practiced in the temple of Ptah. The information we have about Greco-Egyptian alchemy and its processes was provided to us by the Leiden and Stockholm Papyri of the 3<sup>rd</sup> century AD, discovered in a burial vault at Thebes, and also by the texts collected during the Byzantine period. The Byzantine texts date from the 11<sup>th</sup> to the 15<sup>th</sup> century. Everyone accepts as the oldest tract the *Physika kai Mystika* of Demokritos. It contains recipes on the working of silver, gold and purple, interrupted each time by the same magical formula.

The history of Western alchemy probably begins in the Egyptian city of Alexandria, a great center of Greek learning during the Hellenistic period. Among the most prominent Alexandrian alchemists was Zosimos of Panopolis, Egypt, who may have lived in the 3<sup>rd</sup> or 4<sup>th</sup> century A.D. Zosimos was of the opinion that a magical ingredient was needed for the creation of gold. Greek alchemists called this ingredient *xerion*, which is Greek for dry powder. Through Arabic, this word came into Latin and modern European languages as elixir, and later became known as the elusive philosopher's stone. Thus the idea of transmutation emerged. Zosimos also believed that substances are composed of the Four Elements: Earth, Water, Air and Fire.

Zosimos gives an example of pseudo-mnemonic writing, prevalent among alchemists, to remind them of complex ideas, ingredients and processes: the Formula of the Crab, or the Formula of the Scorpion, as it has become known. Marcellin Berthelot (1827–1907) displays it in his book *Collection des anciens alchimistes grecs* vol. 1, on page 152:

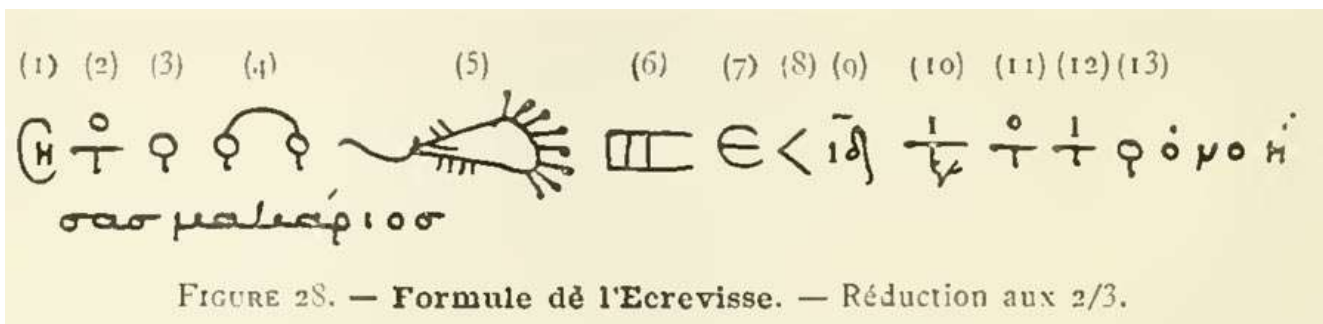
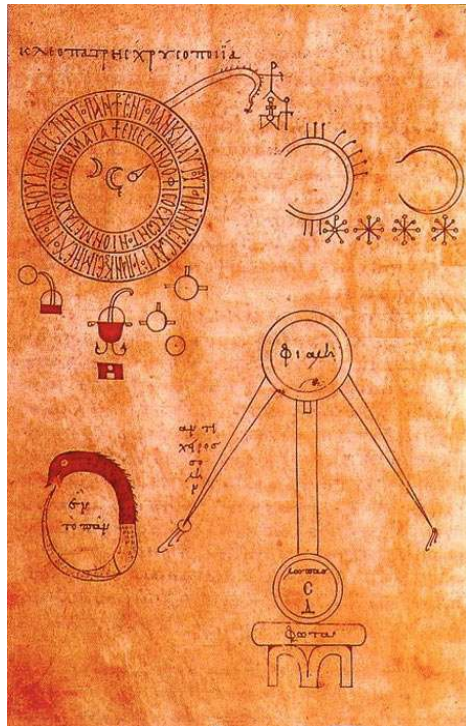


FIGURE 28. — Formule de l'Écrevisse. — Réduction aux 2/3.



It is a formula reputed to contain the secret to transmutation. It comes from the *Codex Marcianus GR. Z. 228*, written in the 14<sup>th</sup> century, but copied from an original byzantine manuscript. It is the oldest known version of the *Corpus Alchimisticum*, a collection of Egyptian and Greek alchemical texts dating to the 7<sup>th</sup> and 8<sup>th</sup> centuries, written by a Byzantine alchemist named Theodorus.

The following figure is one page of the *Codex Marcianus graecus 299*, which is a brief alchemical work, titled, the *Chrysopoeia of Cleopatra* and attributed to Cleopatra the Alchemist, which was probably written in the first centuries of the Christian era, but which is first found on a single leaf in a 10<sup>th</sup>-11<sup>th</sup> century manuscript in the Biblioteca Marciana, Venice, Italy.



*Chrysopoeia of Cleopatra, Codex Marcianus graecus 299, 10<sup>th</sup>-11<sup>th</sup> century*

It features the now famous Ouroboros serpent biting its tail, with the phrase One The All inside of it. It refers to the unity of all creation. This philosophy went together with the laboratory work, as shown by the distilling apparatus next to it.

## Arab Alchemy

A century after Muhammad's death in 632, the Islamic empire stretched from Spain to the Indus. Within it were Egypt and Syria, from which the science of Hermes was handed down. There were also contacts with Byzantium, where Stefanos taught in the 7<sup>th</sup> century, as well as two other alchemists, referred to as the Anonymous and the Christian. The Arabs arrived in Egypt to find a substantial alchemical tradition; early written documents testify that Egyptian alchemists had

developed advanced practical knowledge in the fields of pharmacology and metal, stone, and glass working.

According to tradition, it is 8<sup>th</sup> century Khalid ibn Yazid who was the first to take an interest in this science. This prince, son of a caliph, was apparently initiated by Morienus, an Alexandrian Christian and student of Stephanos. Most of the alchemical works attributed to Khalid are apocryphal and one cannot establish that he was the first alchemist. But the case is indicative of the role Egypt played in the tradition, as well as that of the Syrians and Sabaeans, whose qualities as translators were valued in the Baghdad court. The doctrines on which Arabic alchemy relied derived from the multicultural milieu of Hellenistic Egypt and included a mixture of local, Hebrew, Christian, Gnostic, ancient Greek, Indian, and Mesopotamian influences.

In the course of this first period, from the 8<sup>th</sup> to the 10<sup>th</sup> century, only tracts written by the Arabs can be found.

The second period is dominated by the figure of Geber (Jabir ibn Hayyan), or rather by the countless number of writings in his name. The catalogs credit him with nearly three thousand writings! Geber was born or lived in Kufa (Iraq) on the Euphrates, was active in the second half of the 8<sup>th</sup> century and is said to have died in 815. His drive for knowledge was so great that he is credited with giving new impetus to the import of scientific tracts from Byzantium. However, historical criticism shows that most of the texts attributed to him could not have been written by him in the form as we know them.

Geber accepted most of the Arabic alchemical theories and spread them throughout western Europe. He assumed that all metals are composed of Sulfur and Mercury, and gave detailed descriptions of metallic properties in those terms. Which metal is formed depends on the purity of the mercury and sulfur and the proportion in which they come together. By rearranging the qualities of one metal, a different metal would result. He also explained the use of an elixir (al-iksir) in transmuting base metals into gold. This elixir could also cure all diseases. His practical directions for laboratory procedures were so clear that it is obvious he was familiar with many chemical operations. He described the purification of chemical compounds, the preparation of acids (such as nitric and sulfuric), and the construction and use of laboratory apparatus, especially furnaces.

The 9<sup>th</sup> century philosopher Muhammad ibn Zakariya Al-Razi claimed that the study of philosophy could not be considered complete, and a learned man could not be called a philosopher, until he has succeeded in producing the alchemical transmutation.

The 10<sup>th</sup> century, the third and most important period of Arab alchemy, was dominated by Rhazes (Abū Bakr Muhammad ibn Zakariyyā' al-Rāzī ). He was born near Tehran (Iran) and lived approximately from 865 to 925. He was also a doctor and wrote the *Book of the Secret of Secrets*, a kind of laboratory manual in which he wrote down his experiments. These emphasized Geber's methodical spirit. He made medicines, and was skeptical about transmutation:

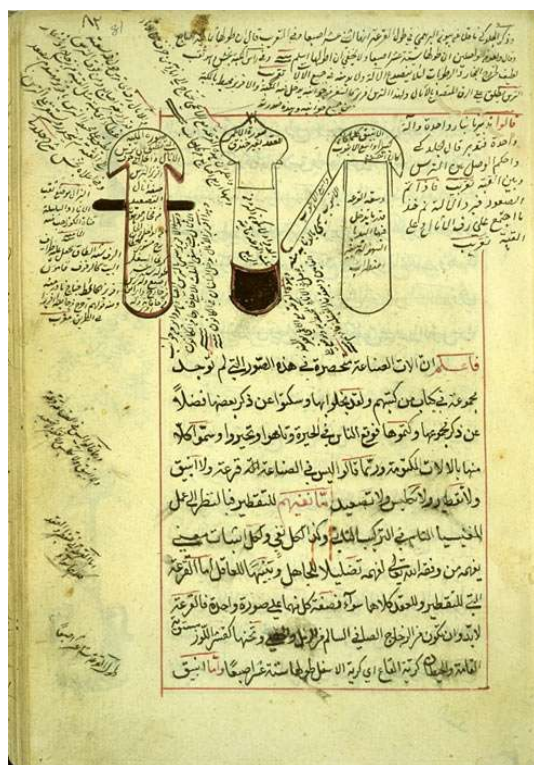
"I understand alchemy and I have been working on the characteristic properties of metals for an extended time. However, it still has not turned out to be evident to me, how one can transmute gold from copper. Despite the research from the ancient scientists done over the past centuries, there has been no answer. I very much doubt if it is possible."

He did give recipes to make silver look like gold, and for gilding other metals.

In the 11<sup>th</sup> century a divide happened among the Arab alchemists. Some thought that transmutation of metals was possible, while others denied it.

In the 12<sup>th</sup> century, Avicenna (al-Husein ibn Abdallah ibn Sinâ), a persian philosopher and alchemist and the author of many texts. He is regarded as a medical authority, but he expressed his disbelief in transmutation.

In the same century we have Ibn Arfa' Ra's who wrote *Schudhur al-dhahab*, or *Splinters of Gold*, a collection of rhyming verse. The 43 poems are didactic in style, quite typical for the time, and easy to learn by heart. What is unusual, however, is that the book describes alchemical processes using poetic language and religious imagery. The author made a clear link between religion and alchemy. It became quite popular up to the 20<sup>th</sup> century.



*Stylized illustrations of three alembics with cucurbits within the text, in a copy of Schudhur al-dhahab.*

The contribution of Arabic alchemists to the history of alchemy is profound. They excelled in the field of practical laboratory experience and offered the first descriptions of some of the substances still used in modern chemistry. Muriatic



(hydrochloric) acid, sulfuric acid, and nitric acid are discoveries of Arabic alchemists, as are soda (al-natron) and potassium (al-qali). Arabic alchemists perfected the process of distillation, equipping their distilling apparatuses with thermometers in order to better regulate the heating during alchemical operations. Finally, the discovery of the solvent later known as aqua regia, a mixture of nitric and muriatic acids, is reported to be one of their most important contributions to later alchemy and chemistry.

Their alchemical philosophy was based on several Greek philosophers, the teachings of Hermes (*Tabula smaragdina* or Emerald Tablet), religious and mystical elements, astrology, theology, pagan mythology, and doctrines of Hebrew origin in a highly symbolic writing full of allusions to the interior transformations of the alchemist's soul.

The Arab alchemists goal tried to reproduce natural processes in their laboratory, but in a shorter period. The alchemists imitated the creative power of God and this represented the highest level of knowledge attainable by humans. We find this echoed in Western alchemy where the alchemist must "follow Nature in her footsteps."

## Moorish Spain

In the 12<sup>th</sup> century a great wave of Latin translations of Arabic texts appeared in the West. following an earlier influx from Byzantium. Alchemy first arrived in Latin Europe in 1144, when Robert of Chester completed his translation of *De Compositione Alchemiae*. This manuscript consists of the teachings of the monk Morienus, as given to the Umayyid Prince Khalid ibn Yazid. According to legend, this shadowy figure assisted Khalid in deciphering a cryptic manuscript describing the making of the philosopher's stone, and then disappeared into the desert.

Arabic alchemy continued. The large number of Arabic words in the alchemical vocabulary could be measured by the effort the translators made to find a correct Latin counterpart. Some examples: alembic (al anbicq), alcohol (al khôl), elixir (al iksir), athanoor or oven (al tannur), alkali (al qali), retort or aludel ( al oetal).

The Moorish schools of Spain were famous, not only for their researches in natural history, but also for the interest they took in chemistry, then called alchemy. It is here that the later Arabian chemistry arose and flourished. Spain, therefore, during the 11<sup>th</sup> and 12<sup>th</sup> centuries, offered the first Arabic treatises to the Latin scholars. The knowledge of what had already been gained by Greek and Arabian alchemists was the first step to independent research among the Latins.

From 1182, through the whole of the following century, students labored in the translation of Moorish books on chemistry. These Latin translations found their way in the manifold collections of chemical treatises, which were arranged and copied out at the beginning of the 14<sup>th</sup> century such as the *Ars Aurifera*; the *Theatrum Chemicum* of Zetzner, and the *Bibliotheca* of Manget.



Portrait of Geber, the Latin name of Jabir ibn Hayyan, from the *Codex Ashburnhamiani 1166*, Biblioteca Medicea Laurenziana, Florence

## The Middle Ages

By the end of the 12<sup>th</sup> century, thanks to these translations, the West had absorbed the essence of Arabic alchemy and was now able to produce works of its own. The oldest translation of *Tabula Smaragdina* (Tablet of Emerald) dates from the 12<sup>th</sup> century. Yet the difficulty remains of attributing an alchemical writing to anyone with certainty. It had always been the custom of attributing a text to a former famous person. So we don't really know if alchemical texts were written by the real person, for example, Michael Scotus, Roger Bacon, Albertus Magnus and his pupil Thomas Aquinas, Arnoldus Villanovus or Raymundus Lullus.

In the Middle Ages, alchemy was never officially involved in university education, but it still had an important place in science. Alchemy was sometimes placed with the *liberal arts education* (arithmetic, geometry, music, and astronomy) or with medicine.

Thomas Aquinas (c.1225-1274) considered transmutation possible. Although no alchemical treatise can be attributed to him with certainty, he is regarded as the author of *Aurora consurgens* (Rising Dawn). *Aurora consurgens* is a commentary on the Latin translation of *Silvery Waters* by Senior Zadith (Ibn Umayl). The text is accompanied by about thirty-seven fine miniatures in watercolor. The illustrations are representations of alchemical symbols depicted in human or animal form. Aquinas' ecstasies might have led him to a more visionary style in his writings.



*Aurora Consurgens* from Zürich Zentralbibliothek, Ms. Rh. 172, 15<sup>th</sup> century

Roger Bacon (c.1219/20–c.1292), being an English philosopher and Franciscan friar, placed considerable emphasis on the study of nature through empiricism. He was one of the earliest European advocates of the modern scientific method. Nevertheless, he considered the spiritual as an integral component of alchemy. Alchemy was the most important science to him. He said that because of the interconnectedness of the sciences, ignorance of alchemy was to the detriment of speculative and practical medicine, which in turn affected the general state of human affairs. Bacon argued that alchemy relied on the powers of science, which operated in accordance with nature by artificially employing and directing the potential latent energies in nature.

Bacon had a concrete mind and distinguished two forms of alchemy: a contemplative and a practical one. Contemplative alchemy teaches the generation of things from the Four Elements (Fire, Air, Water, and Earth). What arises from the Elements, Bacon said, are things like metals, salts, or precious stones, and two types of humors: the simple humors (blood, phlegm, and black and yellow bile) and the compound humors of the same names. Practical alchemy, on the other hand, applies those theoretical insights for the purposes of, say, manufacturing various items of chemical technology like precious metals or pigments.

The proportions of the Elements can be changed, and this leads to the transmutation of material substances. Bacon emphasized that alchemists should look for the philosophers' stone and the universal remedy, or Panacea. He thought alchemy should be applied to medicine, which, during his time, was a novelty. This consisted of purifying ordinary pharmaceuticals, and prolonging human life to its utmost. Bacon believed that the shortness of people's lives during his time was due not to divine plan, but to bad health regimens. Over time, these regimes had corrupted human complexion. Because this corruption arose from natural causes it was susceptible to natural remedies that would help to reestablish *equal complexion*, that is, a state of incorruptibility where the elemental qualities of a substance exist in perfect harmony according to their virtue and active power. In Bacon's mind, nature, with the help of alchemy, could produce the same result by applying appropriate means.

Raymundus Lullus, the Catalan philosopher (1232–c.1315/16), has gone through history as a famous alchemist. But in reality, he was against operative alchemy, although he thought that transmutation was possible. Legends were woven around his person, among which he made alchemical gold for Edward III, after which the monarch threw him in jail. There is a significant body of alchemical treatises falsely attributed to him, most of them composed more than fifty years after his death. The pseudo-Lullian alchemical texts have spread throughout the 14<sup>th</sup>-century.

From the second half of the 13<sup>th</sup> century, alchemy came under considerable criticism, which did not prevent its success and that its adepts were well received by the rulers. There was a perpetual remarkable interest in all the countries of the West. The critics had to differentiate themselves according to the kind of practice they disapproved of. Alchemy worked in a wide field, ranging from chemical research and the production of useful substances to philosophical speculations with fringe figures such as impostors and forgers. Franciscans and Dominicans forbade it at times among its members, not only because of the forgeries, but also because of the danger to ecclesiastical doctrines when it employed heterodox philosophical concepts.

Petrus Bonus was a late medieval alchemist. He is best known for his *Precious Pearl* (*Margarita Preciosa*), an influential alchemical text composed sometime between 1330 and 1339. He was said to have been a physician at Ferrara in Italy. Petrus Bonus was more of a philosopher, and for him alchemy was an art in part natural and in part divine or super natural. He believed that the adept alchemist could produce gold from base metals with the use of the philosophers' stone. According to Petrus Bonus, gold, the most perfect of metals, had been purified of Sulfur, leaving only Mercury (Sulfur and Mercury as inherent qualities, not the physical substances). It had thus attained in nature the stage of perfection toward which the baser metals are striving. Therefore, according to Petrus Bonus, the process of transmutation consists principally in the separation from the baser metals of the Sulfur that blackens, corrodes, or discolors the metals. This separation goes on at a slow and protracted rate in nature in the bowels of the earth. The skilled operator, who is conversant with the literature of the past and adept in the use of the philosophers' stone, can greatly hasten the separation in the laboratory. The form of gold can be introduced in the twinkling of an eye, but only with divine assistance.

Nicolas Flamellus (1340-1418) is another famous alchemist who was never an alchemist. He was a scribe and manuscript seller in Paris, France. Because of his wealth, and his many donations to the churches and the poor, he was thought to have discovered the philosopher's stone, and thus to be able to make large quantities of gold. His legend became more elaborated with time, with several alchemical texts attributed to him.

At the end of the 14<sup>th</sup> and the beginning of the 15<sup>th</sup> century, there was a collection of alchemical texts in the west that formed the basis for any subsequent texts. The manuscripts were now also illustrated, was especially

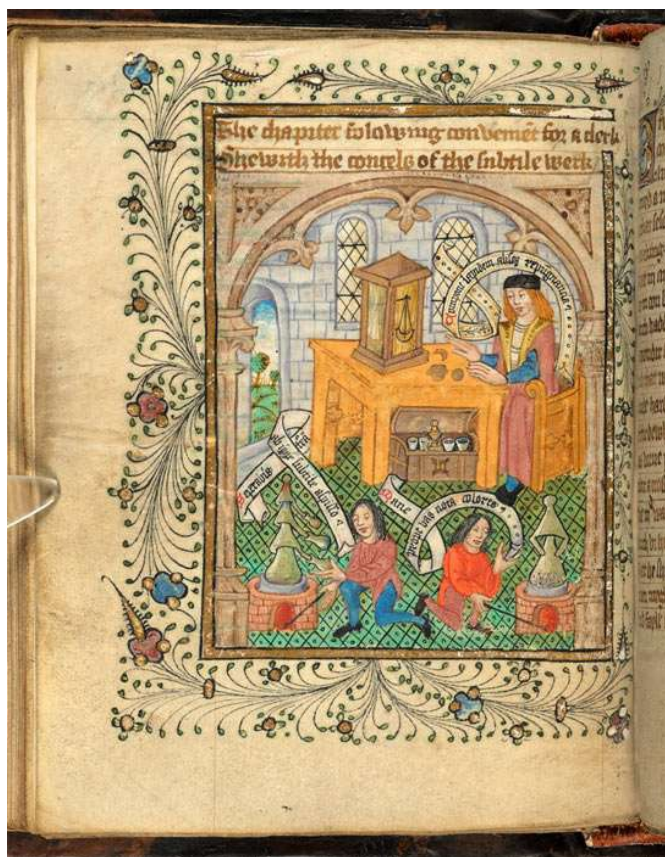
showed in the Germanic regions, where the activity of adepts was significant.

In the 15<sup>th</sup> century, two remarkable figures stand out in Great Britain: Thomas Norton and Georgius Ripplaeus (George Ripley).

Thomas Norton (1436–1513) is the author of the well-known *Ordinal of Alchemy*, a poem that contains a wealth of information about alchemy in England. He said he was 28 when he sent a letter to Ripley, who answered by inviting him to meet face-to-face to discuss the secrets of the art. Ripley promised to make him "my heir and brother in this art." Norton stayed with Ripley for 40 days. Ripley declined to give him the secret of the final stage to make the philosopher's stone (or red elixir), because of his youth, and the danger of using it improperly. Only after Norton convinced him of his integrity did Ripley at last yield up the secret. After Norton returned to Bristol his first elixir was stolen by a servant. Norton went into a deep depression and nearly gave up alchemy altogether. He made more elixir, but this time he was robbed by a woman who was said to be the wife of William Canning, the mayor of Bristol, who suddenly came into great wealth. There is no evidence that Norton became wealthy, and his friends who invested money with him took losses.

One of the illustrations in *Ordinal of Alchemy* is of elections (Electional astrology, also known as *event astrology*, is a branch found in most traditions of astrology according to which a practitioner decides the most appropriate time for an event based on the astrological auspiciousness of that time) to be used at four stages of the process to produce the philosopher's stone. They are constructed for a latitude of 52 degrees north which is a good approximation for Bristol (Norton was a merchant, mayor and sheriff of Bristol, England), and employ the then popular Alchabitius house system. However three of the figures are impossible from an astronomical point of view, and therefore the elections are unworkable; maybe just window dressing for the book rather than an attempt at serious alchemical astrology?

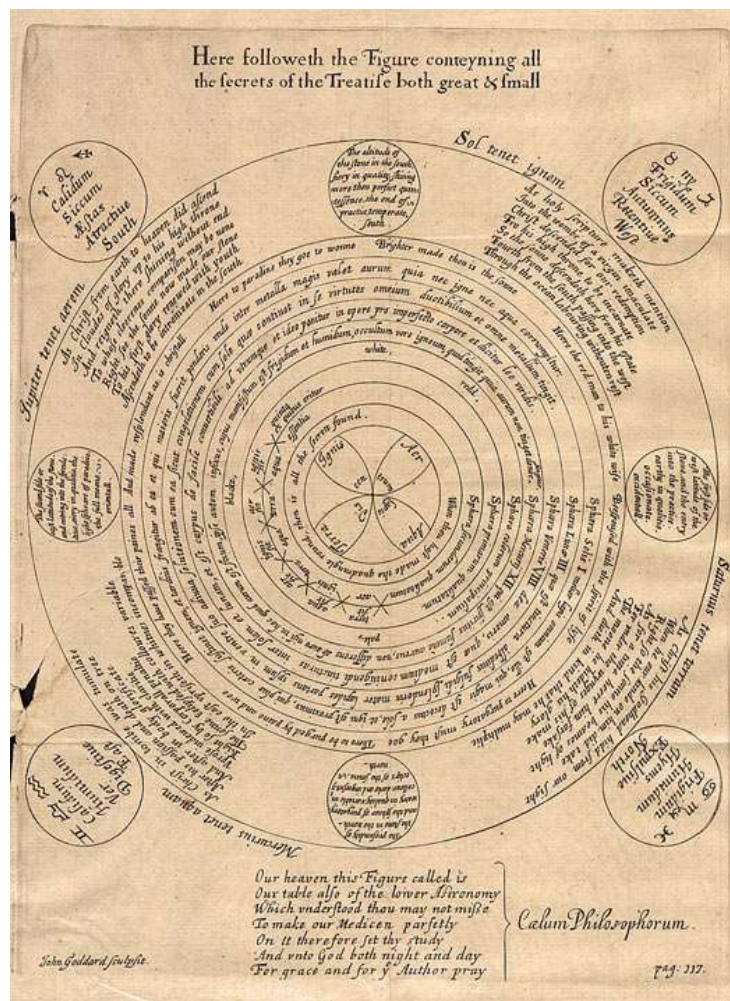




*The Ordinall of Alchymy, written, in verse, by Thomas Norton, of Bristol, 1477, held in the British Library, London*

Notice on the table is a balance in a glass enclosure to avoid air movements to influence the balance. It is the first of such a depiction of a balance.

George Ripley (c.1415–1490) was an English Augustinian canon of Bridlington in Yorkshire, author, and alchemist. Although a canon, he travelled extensively on the Continent in search of alchemical knowledge and supposedly laid the foundations for the attainment of the philosopher's stone while studying in Italy. He was renowned as author of alchemical works in rhyme. He bundled his knowledge in *Compound of Alchymy* in 1471, a long poem in Middle English. Some scholars claim that the writings of *The Compound of Alchymy* were meant to be read in light of an alchemical drawing done by Ripley called the *Wheel*:



*The Wheel, from Compound of Alchymy, 1652 edition*

The quadripartite wheel, composed of concentric spheres with captions and verses, embodies a variety of sophisticated alchemical ideas and procedures, and was therefore an important visual reference for the reader of the *Compound of Alchymy*. Within its concentric spheres, the Wheel contains information about a variety of natural philosophical and alchemical phenomena. The four Aristotelian Elements and their qualities are incorporated, along with the compass points, seasons, dimensions, signs of the zodiac, and medical virtues. Other more specifically alchemical detail is also provided, such as the four metallic bodies used in Ripley's alchemy (the Sun, Moon, Venus and Mercury, equating to gold, silver, copper, mercury), along with the proportions of each to be used in alchemical preparations, while the three inner circles includes the names of colors and primary and secondary qualities associated with various stages of metal transformation. By representing this information in the form of a circular diagram, Ripley's Wheel could also be used to explain alchemical transformations. Circular forms were familiar metaphors used to denote the squaring of the circle and the transformation of the four Aristotelian Elements. Through the substitution of their primary qualities, the Elements were considered transmutable, such that Earth (cold and dry), could become Water (cold and moist), by losing its dryness; Water

could become Air (hot and moist) by yielding to heat. Since Elements could not transform into their contraries without an intermediate step, this process was cyclical, and thus the wheel was an appropriate device to indicate this process. Similarly, the wheel was an appropriate analogy for the transformation of metals, whereby a metal could be 'rewound' to an earlier state, and then built up once more to a purer form. According to this theoretical framework, base metals could be transformed into gold through a series of rotations of the wheel.

The design of the figure, featuring an inner circle nested in a series of concentric spheres, is highly reminiscent of cosmological diagrams of the period, and represents a perceived connection between the celestial and terrestrial realms. While elements could be divided and transformed into one another, they could also, through repeated cycles of transitions, produce a fifth element of celestial perfection the quintessence or Philosophers' Stone. This circling of the square was a well-established alchemical doctrine by the late 14<sup>th</sup> century and reflects the common designation of alchemy as 'terrestrial astronomy'.

Ripley's reputation was such that by 1700 a large body of alchemical works had been credited to him, including the famous *Ripley scroll*, containing alchemical information in the form of images on a large paper scroll. There are approximately 23 versions of the Ripley Scroll in existence. The scrolls range in size, color, and detail but they are all variations on a lost 15<sup>th</sup> century original. Although they are named after George Ripley, there is no evidence that Ripley designed the scrolls himself. They are called Ripley scrolls because some of them include poetry associated with the alchemist.







One of the Ripley Scrolls, from 1624, the only copy in private hands, sold on [Christie's](#) in 2017 for 584,750 British Pounds, or 774,000 USD

### Printed Texts with Illustrations

Alchemical texts began to be printed in the last quarter of the 15<sup>th</sup> century. However, it was not until the 16<sup>th</sup> century before alchemical printed matter was distributed. From the middle of this century, these tracts were also illustrated. This slowness is attributed to the reluctance of the adepts to reveal to the public



secrets carefully guarded beforehand by the rarity of the manuscripts.

An example of beautiful painted illustrations is *Splendor Solis* (the Splendor of the Sun) by Salomon Trismosinus (most likely a pseudonym). The earliest version, written in Central German, is dated 1532–1535 and is part of the Kupferstichkabinett Berlin collection at the State Museums in Berlin. It consists of 22 illuminations on vellum, with decorative borders, meticulously painted and highlighted with gold. Twenty versions exist worldwide. The symbolic process shows the classical alchemical death and rebirth of the king, and incorporates a series of seven flasks, each associated with one of the then-known planets. Within the flasks a process is shown involving the transformation of bird and animal symbols into the Queen and King, the white and the red tincture.



*Splendor Solis*, 1582 edition, held in the British Museum, London

### Introducing Hermetic Philosophy

One of the most important facts concerning the development of alchemy was the discovery of 17 Greek texts attributed to Hermes, and bundled into one work, the *Corpus Hermeticum*, which was translated by the Florentine Marsilio Ficino and published at Treviso, Italy in 1471. Thus the teachings of *Poimander*, which had already served as a source of inspiration for Greco-Egyptian alchemy, were now adopted in Western alchemical circles, and gave another interpretation of alchemy aside from medieval mysticism. Most of the texts of the *Corpus Hermeticum* are presented in the form of a dialogue, a favorite form for didactic material in Antiquity. The most well known treatise in the *Corpus Hermeticum* is its opening treatise *Poimandres*.

Hermetism, as it is related to the *Corpus Hermeticum*, is based on the belief that God is everything: the entire created cosmos, Nature and everything in it. The famous phrase "As above, so below" means that everything in the spiritual world is reflected in the material world. Hermetic alchemy is an investigation into the spiritual constitution, or life, of matter and material existence through an application of the mysteries of birth, death, and resurrection. Magical rituals is the practical aspect of the Hermetic art of alchemy. Astrology also plays a part, but only in as much as to discover the planetary influences and how to best use them. A morality of good and bad implies that one must create, one must do something positive in one's life, because God is a generative power. God, by an act of will, creates the primary matter (the prima Materia of the alchemists) that forms the cosmos. From primary matter God separates the Four Elements of Earth, Air, Fire, and Water. From there the seven heavens are created (associated with the planets). After the earth and the animals are created, God brings forth androgynous man, in his image. Man, seeing his reflection in water, fell in love with Nature and wished to dwell in it. Immediately, man became one with Nature and became a slave to its limitations.



*Pater Hermes Philosophorum, from a manuscript, Codex Laur. MS Ashburham 1166 fol. 1v., dated c. 1475, held in the Biblioteca Medicea Laurenziana, Florence, Italy*

The spreading of hermetic philosophy among alchemists might have contributed to a widening rift between practical laboratory work, the Spagyria, and the spiritual, contemplative work of the Philosophers. The term Philosophy had another meaning at that time than what we now understand by that word. Dom

Pernety, in his *Dictionnaire mytho-hermétique* (1785) describes it as such:

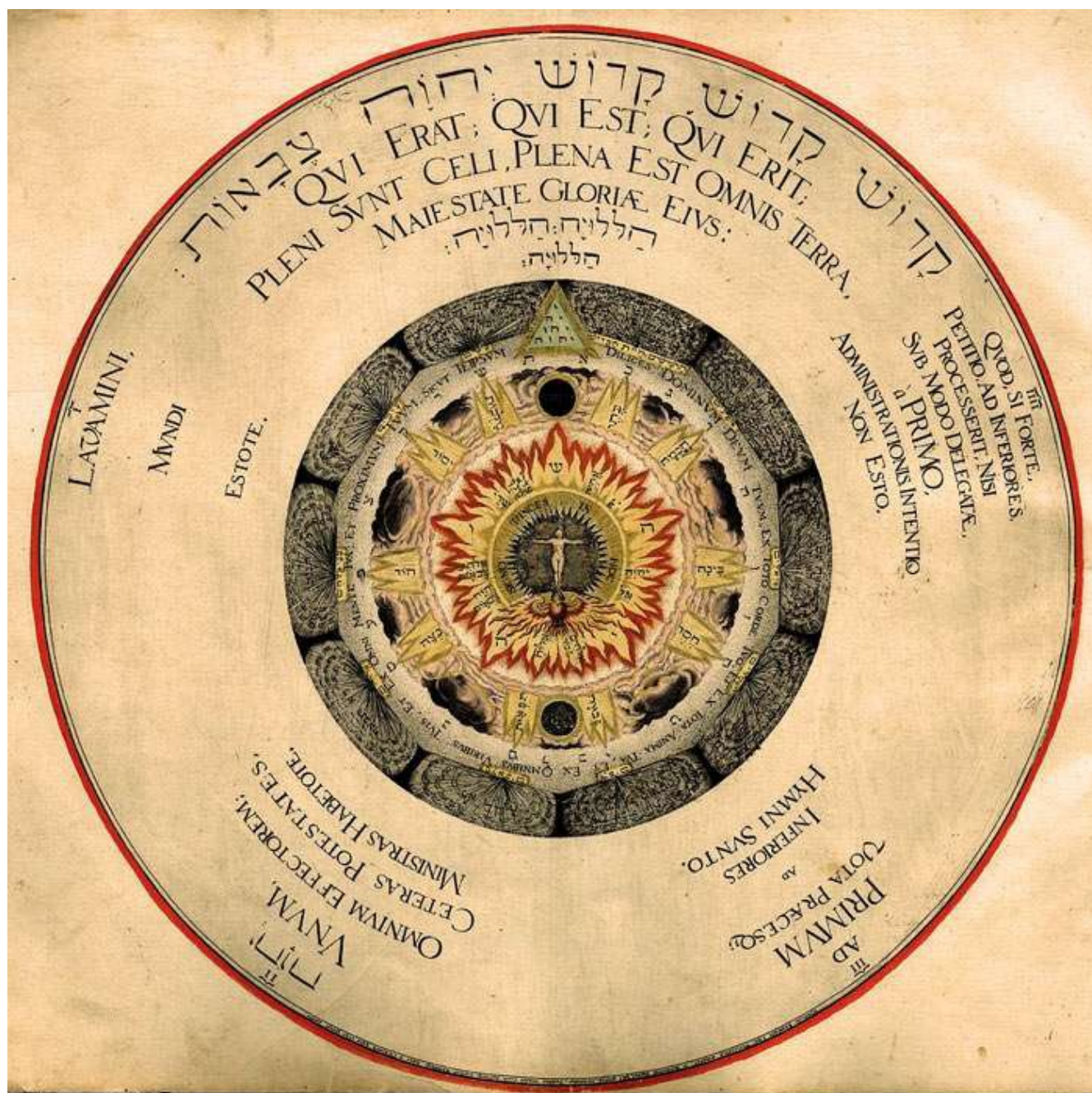
Philosopher: Lover of wisdom, who is instructed in the secret operations of Nature, and who imitates its processes to succeed in producing things more perfect than those of Nature. The name of Philosopher was always given to those who are truly instructed in the procedures of the Great Work, also called Science, and Hermetic Philosophy, because we look at Hermes Trismegistus who became the first to be well-known. They claim that only they rightly deserve this respectable name, because they claim of being the only ones who know nature inside out, and that by this knowledge they arrive at that of the Creator, to whom they dedicate their work and their homage with great attention, love and respect. They say that love is the first step that leads to wisdom. They ceaselessly recommend it to their disciples who they call the Children of Science.

Soon after the introduction of hermetic philosophy, we have Philippus Aureolus Theophrastus Bombastus von Hohenheim, better known as Paracelsus (1493–1541). Being a Swiss physician, he was also an alchemist. Paracelsus sought a universal knowledge that was not found in books or faculties. For this purpose he traveled all over Europe. When he went to Germany he became a physician. He criticized the other physicians and apothecaries for relying on their books instead of learning from their patients. He wrote a book about medical philosophy, *Opus Paramirum* in 1531. His *Astronomia magna* (also known as *Philosophia sagax*) was published in 1571. It is a treatise on hermeticism, astrology, divination, theology, and demonology. The *Opus Paramirum* contains the alchemical trinity of Sulfur, Mercury and Salt, that are the basic qualities of every substance. Salt represented the body; Mercury represented the spirit (imagination, moral judgment, and the higher mental faculties); Sulfur represented the soul (the emotions and desires). By understanding the chemical nature of the Tria Prima, a physician could discover the means of curing disease. With every disease, the symptoms depended on which of the three principals caused the ailment. Based on the hermetic idea of Universal Harmony, Paracelsus saw health and disease as a result of harmony or disharmony in the body. Disharmony could be cured by (alchemical, or spagyric) medicines, but also by applying astrology, because health/disease is also related to the influence of stars and planets, because everything in the universe is connected.

Paracelsus had a great influence on a large number of people, physicians and alchemists. Among them is Heinrich Khunrath who sought to find the secret *prima materia* that would lead man into eternal wisdom. He also held that experience and observation were essential to practical alchemical research. His most famous work on alchemy is the *Amphitheatrum Sapientiae Aeternae* (Amphitheater of Eternal Wisdom), 1595, a work on the mystical aspects of alchemy. The book had four circular elaborate, hand-colored, engraved plates heightened with gold and silver which Khunrath designed. By this book, Khunrath showed himself to be an adept of spiritual alchemy and illustrated the many-staged and intricate path to spiritual perfection. The plates serve as an invitation to the viewer to engage in a meditation on the nature of the universe and on the



links between the earthly and the divine, the corporeal and the spiritual.



*The Cosmic Rose , one of the plates in Amphitheatrum Sapientiae Aeternae, 1595*

## Practical Chemistry

When we enter the 16<sup>th</sup> century, a technical and practical chemistry developed that did not always include any philosophical or hermetic ideas. The French alchemist Bernard de Palissy (c.1510–c.1589) developed a unique ceramics that brought him a good financial basis. Georgius Agricola (1494–1555) was a German mineralogist and metallurgist who published his *De re metallica* in Basel in 1546,

"a comprehensive and systematic study, classification and methodical guide on all available factual and practical aspects, that are of concern for mining, the mining sciences and metallurgy". In Italy, Vanucio Biringuccio (c.1480–c.1539) published *De la pirotechnia*, that dealt with minerals, semi-minerals, assaying, smelting, the separation of gold from silver, alloys, the art of casting metals, and alchemy. In regards to alchemy, he scorned the beliefs of alchemists, but accepts the practical accomplishments in their science.

Alchemy continued to be questioned. Ben Jonson (1572–c.1637), an English playwright and poet, wrote the comedy *The Alchemist* in 1610. *The Alchemist* is considered Jonson's best and most characteristic comedy. In 1710, an anonymous composer made an arrangement of music written by George Friedrich Handel to revive Ben Jonson's play.

At the same time the topic of alchemists, became popular in the numerous paintings, portrayed in their respectable procession, but even more so as deluded puffers (so named because of the bellows they used).



*The Alchemist, by David Teniers the Younger (1610-1690)*

Alchemy was not totally discarded. In Italy, the grand-dukes Francesco I de' Medici (1574–87) and Ferdinando I de' Medici (1587–1609) established laboratories of art and alchemy together, in order to set up a rich collaboration between artists and scientists. It was primarily a collaboration between goldsmiths, jewelers, cabinetmakers, sculptors, painters, semi-precious stones cutters, who all exchanged not only equipment, but also theoretical and technical knowledge with the alchemists. The aim was to produce objects of art, nowhere else to be made or found, as a means to make de Medici name more famous; but also to produce a viable economy by producing exclusive products, under strict secrecy in regards to way of manufacture of course.





*Murano glass vase, late 17<sup>th</sup> century, held in Museum of Glass in Murano, Italy*

## Dissemination of Alchemical Texts

The most remarkable phenomenon in alchemy in the second half of the 16<sup>th</sup> century was the publication of a number of anthologies that brought the classical texts within everyone's reach: *De Alchimia opuscula* in 1550, *Ars chemica* in 1566, *Artis chemicae principes* in 1572, *Artis auriferae* in 1593, *Aureum venus* from Trismosinus in 1598 and finally the most complete collection, *Theatrum chemicum*, in 1602. These publications, which are counted among the most interesting, would perhaps be nothing but apocryphal texts inspired by the theories of Paracelsus. It is clear that such dissemination of texts, which had until then been kept in libraries of abbeys or princes, fostered a vulgarization of alchemy, which certainly explains the then busy quackery as well as the caricature figure of the alchemist in literature and art. But at the same time, this wider dissemination of the experiments was a positive development of the research that would form the basis for chemistry.

Apart from practical laboratory work and commercial production, there was also a surge of gullible, misguided and fraudulent alchemists. Several alchemists traveled around Europe and found others who claimed they had discovered the philosopher's stone, or who had obtained it from another alchemist. John Dee and Edward Kelley were some more renowned alchemists, who were also interested in divination and hermetic philosophy. They traveled through Europe visiting royal courts, but were involved in a lot of questionable activities.

Alexander Seton claimed that he could perform transmutations, and he proved so several times in the presence of witnesses. He performed such a transmutation before Christian II, the young elector of Saxony. The obtained gold withstood all the tests available at that time. The elector wanted to know his secret, but Seton refused to disclose it. Seton was locked up and tortured, but to no avail. He was rescued by another alchemist, Michael Sendivogius. The story is more elaborate, and one wonders if it is true at all, because it reads like a novel.

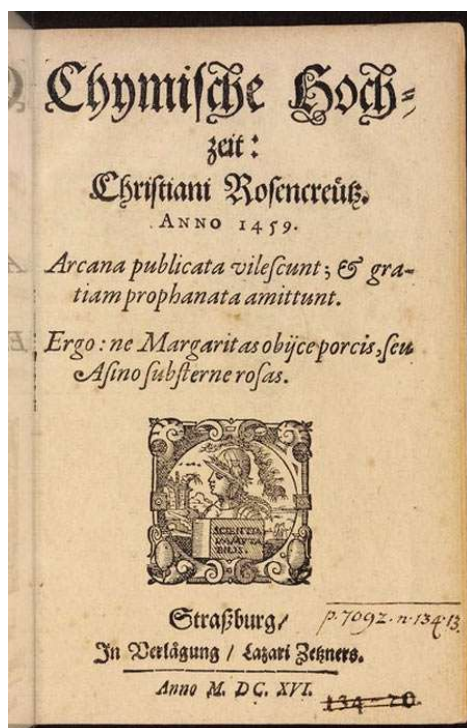
## Esoteric Development

While some alchemists were ruining their lives trying to produce the philosopher's stone, and fraudulent alchemists took advantage of powerful monarchs, other alchemists distanced themselves from the laboratory work and developed the more esoteric aspects of alchemy.

Adepts devoted exclusively to mysticism and philosophy wanted to isolate themselves from the crowd of explorers. The rise of the Rosicrucians is significant in this regard. Their first manifesto, *Fama fraternitatis*, appeared at Kassel, Germany, in 1614 and was the origin of a tremendous development of this doctrine, which derived the essential of its symbolism from alchemy. The Fama tells the story of the C.R.C. (not identified in the text, but later thought to be the initials of Christian Rosenkreuz) and his pilgrimage to Jerusalem; his subsequent tutelage by the secret sages of the East, the wise men of Damcar (Dhamar) in Arabia, from whom he learned the ancient esoteric knowledge which included the study of physics, mathematics, magic and kabbalah; his return through Egypt and Fes, and his presence among the alumbrados (practitioners of a mystical form of Christianity in Spain during the 15<sup>th</sup>-16<sup>th</sup> centuries) in Spain. Rosenkreuz's pilgrimage seems to refer to transmutation steps of the alchemical Great Work. After his arrival to Germany, Father C.R.C. and other Brothers established an esoteric Christian Fraternity.

In 1615 the *The Confessio Fraternitatis (Confessio oder Bekenntnis der Societät und Bruderschaft Rosenkreuz)* appeared in the same city. It is the second anonymous Rosicrucian pamphlet, declaring the existence of a secret brotherhood of alchemists and sages.

A year later, in 1616, a book was published in Strasbourg, Germany, under the title of *The Chymical Wedding of Christian Rosenkreutz (Chymische Hochzeit Christiani Rosencreutz anno 1459)*. Although completely different, it is considered the third anonymous Rosicrucian manifesto.



*Title page of the Chymische Hochzeit Christiani Rosencreutz Anno 1459, published in Straßburg, 1616*

In his autobiography, Johannes Valentinus Andreae (1586–1654), a German theologian, claimed that he had written the book in his youth by way of a fun story. His claim is controversial, although he had knowledge of alchemy, as his father was involved with alchemy and his mother had knowledge of pharmaceuticals. His tutors were chosen less for their academic abilities than for their alchemical leanings, and the young Johann Valentin must have become thoroughly familiar with the language of alchemy.

According to his own account, at about 1605 he wrote the first version of *The Chymical Wedding of Christian Rosenkreutz*. That would be 9 years before the appearance of the first manifesto. Maybe he was behind the creation of the first two manifestos, as it appears that he was a prominent member of the Protestant utopian movement. But he seems to have given up the social change he envisioned, and later on he criticized both alchemy and the Rosicrucians.

A Rosicrucian order probably did not really exist at that time, but it generated great interest, and it can better be seen as a collection of many people interested in the Rosicrucian ideal. Robert Fludd (1574-1637), an English physician with extensive esoteric background including alchemy, defended the Rosicrucian thoughts as expressed in numerous manifestos and pamphlets. Alchemist Michael Maier (1568-1622) made several references to the Rosicrucians in his later works, showing that he was very interested in their ideas.

## The Split of Alchemy and Chemistry

The 17<sup>th</sup> century saw an immense amount of alchemical works. Pierre Borel (c.1620–1671), a French chemist, alchemist, physician, and botanist, compiled a catalog of alchemical works and estimated their number at 9000. His bibliographic inventory was later supplemented by several collections: *Musaeum Hermeticum* (1625) by a publisher specializing in alchemy, Lukas Jennis, *Theatrum Chemicum Britannicum* (1652) compiled by Elias Ashmole, *Bibliothèque des Philosophes Chimiques* (1672-73) attributed to William Salmon, and finally *Biblioteca Chemica Curiosa* (1702) by Jean Jacques Mangei, a Genevan physician, and other lesser known collections.

However, the alchemical stronghold began to crack under the pressure of the evolution of research that had been stripped of philosophies and it already announced another epoch. One of the most learned Jesuits of the time, Athanasius Kircher (1602-1680), who, among other things, undertook an attempt to decipher hieroglyphs, was not always kind to the alchemists of his time. He divided them into three categories: the disappointed, the counterfeiters, and the gullible who claimed to obtain gold through the philosopher's stone. However, he admitted that the transmutation might one day be possible.

The position of Johann Kunckel (1630-1703), a German chemist, to whom science owes some favorable developments, was the most categorical. This scholar initially ran the laboratory of the Elector of Saxony, Johann Georg II in Dresden, before becoming professor of chemistry at the University of Wittemberg in 1677. He exposed some tricks of counterfeiters to tamper with the metal during their projection performances.

The division between chemistry and alchemy was not always clear. Thus Johannes-Baptist Van Helmont (1577-1644), one of the thinkers who contributed to the formation of a new scientific mindset and to whom medicine and chemistry owe some important discoveries, was enthusiastically fascinated by the transmutation. Such was the case with Isaac Newton (1642-1727), the inventor of the laws of gravity. Newton spent about 30 years trying to assemble all he could on the research of previous alchemists

When one reads Johann Joachim Becher (1635-1682), a German physician and alchemist, whose was comfortable in both traditional alchemy and the new emerging chemical science, it is noticeable that some sought a compromise between tradition and the new attitude. But the mentality that had supported alchemy up to that point showed definite cracks with the emergence of a movement that replaced traditional dogmatic authority with the power of reason and experiment.

Robert Boyle (1627-1691) in *The Skeptical Chymist* (Oxford, 1680) criticized the basic theories of alchemy, namely that there were Four Elements in every body and three principles (Mercury, Sulfur and Salt): "I would like want to know how gold is decomposed into sulfur, mercury, and salt, and I would pay anything for such an experiment. I, for my part, confess that I never succeeded".

In England, meetings were held from 1645 on the initiative of the eminent Robert

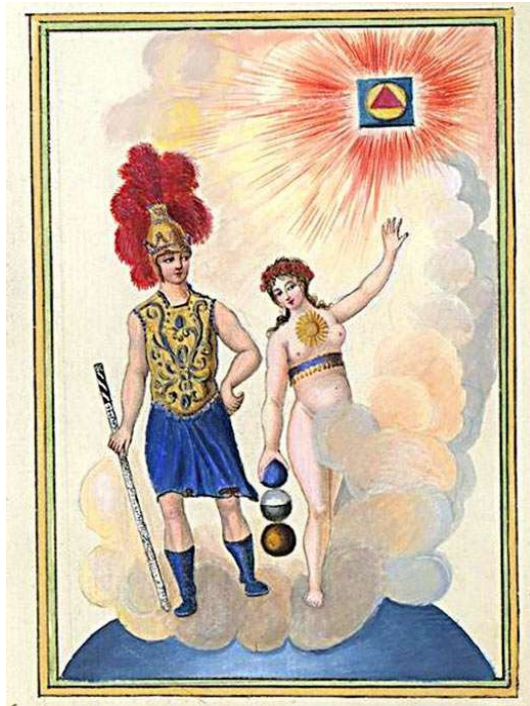
Boyle. They were at the origin of the scientific Royal Society of London, founded in 1662. The *Academie royale des Sciences* in Paris was founded in 1666 by Colbert. His work has been published in *Journal des savants*, among others. In this and also in *Memoirs de Académie* Etienne François Geoffrey the Elder (1672-1731) raged vehemently against the work of the alchemists under the title *Des supercheries concernart la pierre philosophale* (The deceptions about the philosopher's stone).

## Alchemy Continues

But alchemy continued to exist. A few scientists still held to alchemical philosophies, and were conducting alchemical experiments. But mostly alchemy survived in esoteric circles such as the Rosicrucians. An example of this we find in the 18<sup>th</sup> century manuscript of *La Très Sainte Trinosophie*, allegedly written by the Count of Saint Germain.

In the 1700's the illustrious Count of Saint Germain was running around and achieved prominence in European high society. The Prince Charles of Hesse-Kassel, in Germany, outfitted a laboratory for him for alchemical experiments, where among others things, among other things, they created gemstones and jewelry. In the late 18<sup>th</sup> century, a book under his name appeared, *La Très Sainte Trinosophie* (The most Holy Trinity), although it is very questionable if the Count of Saint Germain was the real author. It is an allegorical initiation, based on alchemy, but also includes cabbalistic mysteries. It includes several colorful illustrations. *La Très Sainte Trinosophie* was most likely used as a basis for initiation in an esoteric order. It would require an adept to explain the details of each segment in the text with each initiation step.





*One of the illustrations in La Très Sainte Trinosophie, held at MS 2400 at the Library of Troyes, France*

On the other side, a few scientists continued to perform alchemical experiments. Armand Barbault (1906-1974) was a French lab alchemist and professional chemist, who focused on applying the principles of the pictorial alchemical manuscript *Mutus Liber*, first published in 1677, as he envisioned it. Barbault's aim was the production of a medicine.



*One of the first plates of Mutus Liber, 1677, showing the alchemist and his wife wringing out the dew they gathered with sheets*

He started the process in 1948. This involved saturating plant material with dew and performing a complex series of cyclical distillations. Barbault wrote openly about his process in his "Gold of a Thousand Mornings", first published in French in 1969. On publication, Barbault enraged the scientific community.



*Armand Barbault and his wife collecting the dew*

At an auspicious astrological time, he collected four pounds of peat, living earth that they felt was specially charged with life forces. For 12 years, Barbault, his wife and their son, Alexandre, worked with this philosopher's peat until transforming it into a golden liquid, called vegetable gold. Barbault ingested this liquid, and his son, who became a physician, credited it with prolonging his life. To collect dew, the Barbaults dragged a canvas over grass before sunrise on a cloudless morning in spring. It took 50 yards of dragging to collect a quart of dew. According to Barbault, the dew contained valuable etheric forces. The wet canvas was wrung out into a container. It was not allowed to touch the ground, lest its etheric forces return immediately to the earth. The alchemist harvested plants by selecting them and mentally ordering the plants to draw greater life forces out of the ground. The plants were harvested the next day before sunrise. The peat, the dew, and the plants were then left to ferment in an ALEMBIC for several months at 40°C (104°F). The mixture was reduced to ash by burning at 800°C (1,500°F), and the ashes were sifted. Ash, dew, and powdered gold were mixed in a round oven, boiled for four hours, and cooled for four hours, a process repeated seven times. The vegetable gold, or *liquor of gold*, was filtered out. Barbault said that when the Elixir was perfect, a symbolic star floated upon its surface. Barbault sent his elixir to a pharmaceutical laboratory for analysis. The

report yielded "very positive results" when used upon terminal patients. Problems arose due to the cost and length of time of production.



*Armand Barbault showing the Liquor of Gold to his son.*