

# The Art of Deception in Alchemy

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## Recipes for Fake Silver and Gold

On a basic level, alchemy was practiced for spiritual perfection and/or for practical results, in which the transformation from base metals to silver and gold was the most well-known. This led to a lot of stories and rumors, and dubious practices. There were, of course, plenty of charlatans around too. If an alchemist really had found the secret for making gold, it was not likely that he would write about it, not even in symbolic terms. Even if there are true recipes around, there is the difficulty of deciphering the often obscure alchemical language. There was no established definition of each alchemical term, although one of the few alchemical dictionaries might help.

One of the oldest recipes for making silver and gold comes from Zosimos of Panopolis, a Greco-Egyptian alchemist who lived at the end of the 3<sup>rd</sup> and beginning of the 4<sup>th</sup> century AD. He used a *projection powder* to this end. When silver was obtained the projection powder was added to obtain gold. The entire process took 110 days. You can find the entire process in the book [Collection des anciens alchimistes grecs](#) (1888) by Marcellin Berthelot, under the heading *Sur la même eau divine on page 143*. It is a whole different matter to understand what he is writing about, and one needs to be familiar of the chemistry of that time period, and the substances they were working with.

What did he really mean with 'making silver or gold'?

The *projection powder* sometimes shows up in tales of successful alchemists. Dom Pernety in his *Dictionnaire mytho-hermétique* (1758) defines it as:

Hermetic, or powder which being projected onto imperfect metals in fusion, transmutes them into gold or silver, depending on whether the work has been pushed to white or red. The result of the hermetic work, or powder which is projected on imperfect metals.

But was it always gold that an alchemist thought he had produced? Some

alchemists knew all the physical characteristics of gold, such as color, weight and malleability, and thus could judge the validity of what was obtained. But it was possible to imitate gold by covering a metal with a golden layer, or to produce alloys that looked like gold. Copper alloyed with tin and phosphorus looks like gold and was well known in ancient times.

Since a long time, alchemist-smiths knew various procedures to create gold looking metals. Sometimes only the surface of an alloy was treated with chemicals to create a permanent golden look. Sometimes they had complicated methods to create a metal that resembled gold. An example can be found in [\*Theophili, qui et Rugerus, presbyteri et monachi, libri III. de diversis artibus: seu, Diversarum artium schedula\*](#) (page 267) by the monk Theophilus (12<sup>th</sup> century). Under the chapter *Of Spanish Gold*, he starts off with "There is also a gold called Spanish gold, which is composed from red copper, powder of basilisc and human blood and acid." After a complicated description in symbolic form he ends with "... and it takes the color of gold. This gold is proper for all work." It is typical example of alchemical work, to produce a golden looking metal.

German physician and chemist Andreas Libavius (1550–1616) recommended that the best way of producing imitation gold from brass required firing four parts of copper and one part of calamine in a large, long crucible in alternating layers, with a liberal sprinkling of glass galls (the saline whitish scum sometimes produced in the fusion of molten glass).

The copper amalgam *Aurum sophisticatum* (also known by the German term Truggold, or false gold) was prepared by cooking sulfuric acid with mercury and molten copper. Other recipes employed pyrite, otherwise known as "Fool's Gold", as the main ingredient. These are just a few examples to produce imitation gold.

There are many alchemists who claimed to be able to transmute a base metal into silver or gold. Some of these transmutations were performed in front of witnesses, often monarchs. Some monarchs were pleased, others demanded to know the secret and tortured the alchemist. Other monarchs provided a laboratory and all the equipment the alchemist needed for further experimentation. Sometimes, the monarch got tired of waiting, and executed the alchemist, if he did not escape first.

In the painting below, the Polish physician and alchemist Michael Sendivogius (1566-1636) shows a coin he has just transmuted into gold to the Polish king (wearing the black hat).



Alchemist Sendivogius and Sigismund III Vasa, by Jan Alojzy Matejko, 1867

Sendivogius said that he received news that a friend he met in Altdorf, the alchemist Alexander Seton, who claimed to know the secret of metal transmutation (the changing of base metals into gold or silver), was being held captive in Dresden by Christian II the Elector of Saxony. The elector jailed Seton to force the alchemist to reveal his secret. Sendivogius came to Dresden and managed to orchestrate the escape of Seton, who out of gratitude gave the Pole an ounce of a special powder, the use of which allegedly could turn any metal into gold. In 1604 in Prague Sendivogius he performed a transmutation into gold for Rudolph II, who was a great admirer of alchemy. The ruler was very impressed and had a tablet placed in one of the walls of his castle, which had the following inscription in Latin: "Let another do that which Sendivogius of Poland has done". Thanks to his reputation as a successful alchemist Sendivogius gained funding for his alchemical research. About 1606 he founded a laboratory in a castle in Krzepice. Unfortunately for him, his research didn't bring the financial results desired by its funders His position in Poland withered and eventually he decided to go elsewhere.

Alchemists who claimed to be able to transmute base metal into gold never seem to get rich.

### Testing the 'Transmuted' Gold

If an alchemist could perform a transmutation, the resulting gold had to be tested. Since the 15<sup>th</sup> century, the content of gold could be established by scraping it

against a touchstone. This leaves a visible streak of gold dust on the touchstone. Next, nitric acid is applied to the streak. Nitric acid will dissolve all metals that might be in an alloy. Different solution of nitric acid give a particular color to the streak. This color can be compared with a reference sheet. Metallurgists and gold smiths were knowledgeable about all these methods, and alchemy was often practiced by those people.

But this test is not sufficient for certain fraudulent transmutations. Joannes Wenceslaus Seiler of Reinburg (1648-1681) performed a transmutation in the presence of Emperor Leopold I (King of Hungary, Croatia, and Bohemia) on November 15<sup>th</sup>, 1677. The emperor had a medal cast from this alchemical gold. It probably was tested with the touchstone method and found genuine. However, in 1930, the Microanalytical Institute of the Vienna Institute of Technology performed an analysis of the medal, showing a content of approximately 43.18 % silver, 47.56 % gold and 7.56% copper. They concluded that the most likely process by which the 'silver' was 'transmuted', was that the original metal was made of an alloy of silver and gold (which would retain a silver color), which, when dipped into a nitric acid solution, would dissolve the silver content at the surface, leaving behind the gold content. A streak test of the surface of the 'gold' piece would give a 100% gold content.



Wenceslaus' Golden Medallion

*Image from Kunsthistorisches Museum Wien, Münzkabinett*

## Art from 'Transmuted' Gold

Sometimes beautiful artistic objects were made by alchemists/goldsmiths. The silver and gold were assumed to be the result of transmutations. It is not always clear if the alchemist himself claimed it to be so. Such artistic creations were considered to be of special importance. An example of this are the beautiful candlesticks of alchemist and bishop Saint Berward of Hildesheim (Germany), which were a work of alchemical art. They date from before 1022. Thangmar, his former tutor, who subsequently became his biographer, describes in eloquent terms how the saint, after performing his episcopal functions in the cathedral, would usually visit the various workshops connected with the cathedral school, and with his own hands manufactured gold and silver vessels for the enrichment of the altars.

The candlesticks also have symbolic value. They are decorated with nude men riding dragons, which could be seen as the naked soul riding the mercurial spirit. Grape vines spring up out of the jaws of lions. Grape vines are symbolic of the spirit, and lions are usually symbolic of the animal nature of man; hence it symbolizes the transformation of the animal nature of man into the spiritual man. At the bottom of the candlesticks are salamanders, the alchemical symbol for fire. The alchemical process has to be constantly fueled by the warmth of a moderate fire. There is also a spring of water issuing forth from a leonine mask. The spring is also a recurrent alchemical symbol for the Water of Life, or the Fountain of Youth. Both candlesticks have the inscription "Bishop Bernward ordered his servant to cast this candlestick in the first flowering of this art, not from gold or silver but nevertheless as you see it here." Maybe a reference to the outward appearance of gold, but not being of gold:





Monks did not only read or write books, or pray, they also did physical work, such as working with metals.

Another monk, Gilbert, an abbot of Saint Omer (1246- 1264) was also engaged in alchemy. Father Gilbert was called a *magnus edificaio*, a master builder, because he built a refectory, cited as the most beautiful in the kingdom of France. He built a new church, so vast and rich, that his successors could not complete it. He was known to be "...a learned alchemist, he himself forged gold and silver, and he gave four rich candlesticks and silver leaves chiseled representing subjects, where angels were seen, and covering the text of the holy Gospels..." (source: [Histoire de l'art dans la Flandre, l'Artois & le Hainaut avant le XVe siècle](#), by Chrétien César Auguste Dehaisnes (1886), page 357.

But what looks like gold and silver might not be as such. Another text explains that when repairs were done, the silver turned out to be not real silver but an 'alchemical' silver:

It was said that he was a great alchemist because he had as much power as one who knows. I have seen in our stores certain articles of that art, which are said to have been of the vessels of Abbot Gilbert. The same abbot placed in our church four candlesticks, two large and two smaller ones, well made with a beautiful and honorable solemn triphon, and two leaves of the text of the Gospels, which will be conveyed here in double text. It is certain that it was found by me represented that they are made of alchemical silver: for in the time of lord Alelmus the first abbot, one of the four angels mentioned in the horn of the text, and one of the broken foot of the candlesticks were delivered to the goldsmith to repair it; but most immediately and quickly did not retain the form of silver, they melted in tin or lead, and vanished almost entirely from the ashes; and therefore it was necessary to make new ones, and these were made of silver... ([Documents et extraits divers concernant l'histoire de l'art dans la Flandre, l'Artois & le](#)

[Hainaut avant le XVe siècle, Volume 1](#), (1886) by M. le chanoine Dehaisnes, page 57, Latin text)

## A 1772 Report of Fraudulent Practices

The practice of fraudulent transmutations by alchemists became so widely spread that in the 18th century to such an extent that the Paris Academy of Sciences tasked Étienne François Geoffroy (1672–1731; also called Geoffrey the Elder), a French physician and chemist to investigate their fraudulent practices. In 1772 he wrote a report about the current practices at that time, that is very revealing to the extent of the deception that was going on. A quotation from Geoffroy's report, read on April 15th, 1722, summarizes most of the current practices:

"Since the main intention of the operators is usually to show gold or silver in the place of the minerals which they pretend to transmute, they sometimes use double crucibles or cupels, or they put salts of gold or silver in the bottom of them; they then cover the bottom with a paste made by mixing crucible-dust with gum-water or wax; doing it so that this false bottom shall seem to be the real bottom. At other times they put gold or silver dust in a hole made in a piece of charcoal; or they saturate charcoal with solutions of those metals and then reduce the mass to a powder, in order to project it upon the substances which they are going to transmute.

"They use rods with hollowed ends containing in the cavities gold or silver filings, and stopped up with sawdust of the same wood. Stirring their molten matter with these rods, the sticks burn, leaving in the crucible the metal with which they have been charged. In an endless variety of ways they mix gold or silver with the substances with which they work. A small quantity of gold or silver will not show in a large quantity of such metallic substances as the regulus of antimony, lead, or copper. Salts of gold and silver can very easily be mixed with salts of lead, antimony, and mercury. Grains or nuggets of gold and silver can be enclosed in lead. Gold may be whitened with quicksilver and made to pass for tin. The collection of gold and silver from the substances with which they have been mixed may be made to pass for transmutation.

"All that goes on in the hands of these people should be watched. For the *aqua fortis* or *aqua regia* which they use is often already charged with solutions of gold or silver. The papers in which they wrap their chemicals are sometimes loaded with salts of these metals; and the pasteboards they employ may conceal such salts in their thickness. Glass has been known to come out from furnaces charged with portions of gold which had been admittedly slipped in while it was molten.

"Some alchemists have imposed on their spectators with nails half of iron and half of gold or silver. They make believe that they effect a real transmutation of half of these nails by dipping it into a pretended tincture. Nothing is more seductive at first; but it is, after all, only a trick. The nails,

which seemed to be all iron, were really in two pieces neatly soldered, the gold or silver to the iron, and washed with an iron-colored wash, that disappeared when they were dipped into a suitable liquid. Of this character was the gold and iron nail formerly to be seen in the cabinet of the Grand Duke of Tuscany; of like nature are those half-silver and half-iron nails which I present to this society today. Such also was the knife which a monk once presented to Queen Elizabeth of England, in the earlier years of her reign, the end of the blade of which was of gold; as well also those knives, half silver and half iron, which a famous quack scattered a few years ago over Provence. It is true that they say that this last performer operated on knives that were given him, and which he gave back after a time with the ends of the blades silvered. But there is reason for supposing that the change was made by cutting off the end of the blade and soldering on a similar end of silver.

"There have been also pieces of money and medals half gold and half silver. Such pieces were said to have been originally all silver, half of which was turned into gold by dipping them half-way into the philosopher's mixture, without the outer form or the engraved designs being essentially changed. I say that no such medal was ever all silver, but that they were in two pieces, one of silver the other of gold, so soldered together as to preserve the proper arrangement of the characters. The thing could be easily done by having several silver medals of the same kind, a little worn, and making molds of them in sand for casting copies in gold. The sand would not even have to be very fine. Then let the medals be cut exactly to rule, fitted by filing, and the complementary halves soldered together with care, to have the designs precisely correspond. Any trifling flaw could be mended with the graver. The part of the medal that is of gold, having been cast in sand, looks a little grainy and is rougher than the silver part, which was pressed; but this fault was given out to be an effect or a proof of the transmutation; because a given quantity of silver, having a larger volume than a like quantity of gold, the silver shrunk some in changing into gold, leaving the pores or spaces that constituted the grain. The operator, besides, took pains to make the golden part a little thinner than the silver, to keep up the semblance; and to use only as much or not quite as much gold as there was of silver. A second medal was prepared in the same way.

"They also took a silver medal, filed down one half of it on either side, without touching the other half, till they reduced it to about the thickness of a playing-card. Then, taking half of a medal of gold, they split it, and reducing the two parts in the required proportions, adjusted the outside parts over the silver core, preserving the proper arrangement of the designer. They then had a whole medal, half silver and half gold, but with the gold part stuffed with silver. This, they said, was a silver medal which had not lain long enough in the elixir, and had only been partly transmuted.

"Half of a third medal was superficially gilded with an amalgam of gold, and represented a piece which, having been merely dipped into the elixir, had

only begun to turn.

"When this game was played, the golden parts of the three pieces were whitened with mercury, so as to look as if they were all silver. To make the deception more complete, the performer, who should' have a knack for conjuring, exhibited three genuine silver pieces that had not been tampered with, and permitted the audience to examine them. Taking them back, he slyly substituted his prepared pieces for them; fixed these in his glasses, poured in as much of his elixir as suited him, and withdrew them at the lapse of the designated intervals of time. He threw them into the fire and left them there long enough to drive away the mercury with which the gold was masked. Then he took them out, looking as if they were half of silver and half of gold; but with the difference that, in cutting the parts that seemed to be of gold, one was merely gilded on the surface, another was gold filled with silver, and the third was gold all through.

"Chemistry furnished these tricksters with other most subtle means of carrying out their deceptions. It was also possible to introduce another, lighter metal into gold, which, while reducing its weight to that of an equal volume of silver, would not change its color, or separate from it in any part of the process."