

A Chemical Interpretation of Alchemy

John C. Schroeder

44 W. Longden Ave., Arcadia, CA 91006

The alchemists were impressed with the growth and reproduction of plants and animals, and they sought to apply the same principles to the inanimate world of metals (1). This resulted in a philosophy based upon the conjunction of opposites. Thus, the preparation of the Philosopher's Stone could be regarded as essentially the union of masculine and feminine principles (1, p 133). This union resulted in a hermaphrodite, which was sometimes described as the Hermetic Androgyne, or Rebis (Two-Thing) (1, pp 133-34).

These two opposites were often described as fixed and volatile. A fixed metal resisted the action of fire, and gold was exceptional in this respect. Conversely, mercury readily evaporated in the fire, and therefore was the most volatile metal. Indeed, it appears that an amalgam of gold and mercury constituted the *prima materia* of the Great Work, or preparation of the Stone.

In his *Open Entrance*, Philalethes reveals (2) that

When the gold has putrefied in the mercury, there arises out of the decomposition of death a new body, of the same essence, but of a glorified substance. Here you have the whole of our Philosophy in a nutshell.

A. E. Waite mentions that Philalethes "is supposed to have been the most lucid of hierophants, and the *Open Entrance* to be the clearest of all his works" (2, Vol. 1, pp x-xi).

"*Solve et coagula*" (dissolve and coagulate) is a great maxim which runs through much of the alchemical literature. Glauber summarized the preparation of the Stone with a poem (1, p 138):

Dissolve the Fixt, and make the Fixed fly,
The Flying fix, and then live happily.

This idea may be traced back to the earliest Greek alchemical writings, and is attributed to Hermes (3): "If you do not disembody the bodies and embody the things without body, nothing which is expected will take place."

This process of disembodiment and embodying seems to be a graphic reference to the continuous evaporation and condensation of the amalgam. The process of returning a distillate to its residue and then redistilling was called cohobation or imbibition, and is now referred to as reflux distillation (1, p 139).

The Greek alchemists employed the kerotakis apparatus for this purpose. The nearest modern analogy to the kerotakis is the reflux extractor (4). Later alchemists used an oval glass vessel with a neck capable of being hermetically sealed. It was known as the Philosopher's Egg or Vase of Hermes (1, p 104). The heat apparently volatilized the mercury, which condensed on the cooler top of the vessel and then trickled down to the bottom, where the process was repeated, thus setting up a circulation.

The Ouroboros (Tail-eater) Serpent, an ancient Egyptian symbol, was adopted as a talisman by the later alchemists. It probably represented this circulation within the closed vessel (5). The two-tone color scheme of this design perhaps symbolized the fixed/volatile polarity of the *prima materia*. Likewise, the ascending and descending mentioned in the Emerald Tablet of Hermes is also suggestive of circulation (1, p 55).

The various stages necessary for the accomplishment of the Great Work were said to be marked by a sequence of color changes, that is, black, white, yellow, and red (1, p 146). Noble metals do not cause fouling of mercury. However, when a base metal, such as lead or tin, is dissolved in pure mercury the mirrorlike appearance disappears and it turns black on the surface.

This phenomenon was held to signify complete putrefaction and solution, and it was symbolized by the crow or raven (1, pp 146-47). It is caused by an oxide skin on the surface that forms because the atoms of the base metal oxidize as they reach the surface. As little as one or two parts in 10 million will cause this contamination, so it was impossible for the alchemists to avoid it (6).

If most of the mercury is driven off to the top of the vessel, the matter appears white, owing to the presence of a residue of mercury droplets. When dry, it becomes yellow, the color of metallic gold. However, as the process is continued, the gold becomes oxidized and turns red.

Finally, it attains a violet or purple color, the Greek alchemists referred to this final stage as *iosis* (5, p 97). The Ts'an T'ung Ch'i of Wei Po-yang (ca. 142 A.D.) also mentions this color change from red to purple (1, p 145).

It appears that the alchemists succeeded in producing gold oxide (Au_2O), which is gray-violet (7). According to Basil Valentine (2, Vol. 1, p 348), "This Tincture is of a color intermediate between red and purple, with something of a granite hue, and its specific weight is very considerable." It should be noted that granite is usually gray.

Philalethes described the Stone as a species of gold (1, p 129). Sendivogius (2, Vol. 2, p 99) admitted that "The Stone or Tincture is nothing other than gold digested to the highest degree." Maier (2, Vol. 1, p 312) attests that "If thou knowest the substance and the method, it is enough, and thou knowest all."

The process of transmutation was called projection. This was usually performed on mercury. On strong heating, gold oxide is entirely decomposed into metallic gold. It seems that during projection the mercury evaporated, leaving behind the metallic gold, and it was thought that a transmutation had occurred.

Sometimes lead was used instead of mercury. When melted, lead is readily oxidized and tends to draw off to the edge of the crucible. Thus, the result was the same as before: metallic gold was left behind, thereby giving the appearance of a transmutation.

It should also be noted that high heat causes the lead oxide to become glazed. Dr. Helvetius observed this phenomenon, and he erroneously concluded that the Stone had changed his lead into glass (2, Vol. 2, p 287).

The Stone was also regarded as an elixir of life. This idea is based on sympathetic magic. The alchemists observed that gold did not tarnish or rust. It was an immortal metal and therefore able to impart immortality to man if administered as a medicine (8).

Gold salts have been used in the treatment of arthritis since the 1930's. However, no one really knows how the gold works (9). The alchemist would have smiled knowingly.