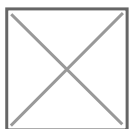


09 Pseudo-Democritus

The first writings we have on Alchemy are recipes. A little obscure philosophy, mostly instructions. This is dated first of second centuries A.D. but it could be as late as 400 A.D. Martelli puts this at 60 A.D. [Martelli, Matteo, *The Four Books of Pseudo-Democritus* (Manley Publishing: Society for the History of Alchemy and Chemistry, 2013)]

It portends to be the Greek Democritus speaking, but we know it isn't. The author is Greek. There is a blend of mysticism (aka magic) and philosophy here that puts it almost certainly in Alexandria. But already alchemy is developed much further than we generally think it would be. It is this early development which fascinates me, and is my only real proof that the ideas in the *Timaeus* and the *Meteorology* were widely spread through out the Mediterranean area well before 100 A.D. Only familiarity with those two books would make alchemy easy to adopt. It's my guess that these books were spread by Alexander's army or the traders who followed.



The following text is a nearly complete version of the translation by Robert B. Steele that appeared in *Chemical News*, 61 (1890): 88-125; a number of Steele's notes have been incorporated in the annotations. Steel is convinced that this is very early first century. I'm not convinced. Steele's comments are in [square brackets,] mine are in {curly braces.}

“ FRAGMENT OF ANCIENT INTRODUCTION

“Nature rejoices with Nature; Nature conquers Nature; Nature restrains Nature.” We (his disciples) greatly wondered at how briefly he had bound up the whole science. I come into Egypt, bearing the treatises of nature, that thou mayest cast off confused and superfluous matter.

1. *Copper is Whitened with Mercury-Amalgam or Arsenic, and is then Coloured Golden by Electrum or Powdered Gold.* Taking mercury, thrust it into the body of magnesia,[Any white body, steatite or soapstone. In later alchemical writing, magnesia has a broad range of meanings, including the quintessence or an ingredient of the philosopher's stone.] or into the body of Italian antimony, or of unfired sulphur, or of *silver spume*,[Argentiferous litharge] or of quick lime, or to alum from Melos, or to arsenic, or as thou knowest, and throw in *white earth of Venus*, and thou shalt have clear *Venus*; then throw in yellow *Luna*,[Venus and Luna stand for copper and silver, respectively] and thou shalt have gold, and it will be chrysocoral[“gold solder” or chrysocolla, a name given to a specific

mineral or minerals in ancient times] reduced into a body. Yellow arsenic also makes the same, and prepared sandarach,[red arsenic sulphide, or realgar] and well bruised cinnabar,{mercury sulfide, very easy to smelt} but quicksilver {mercury} alone makes brass shining; for nature conquers nature.

2. *Sulphide of Silver is Treated with Sulphides of Lead or Antimony, and the Resulting Alloy is Coloured Golden.* Treat silver marcasite, which is also called siderites, and do what is usual that it may be melted. It melts with yellow or white litharge, or in Italian antimony, and cleanse it with lead (not simply, say I, lest thou err, but with that from *Scissile*,[alum schist from Sicily] and our black litharge), or as thou knowest; and heat, and throw it made yellow to the material, and it becomes coloured; for nature rejoices with nature.

3. *Copper Pyrites is Roasted and Treated with Salt and Alloyed with Silver or Gold to Form Gold-Coloured Alloys.* Treat pyrites till it becomes incombustible, casting off darkness, but treat with brine, or fresh urine, or sea water, or oxymel, or as thou knowest, until it becomes as an incombustible shaving of gold; and as it becomes so, mix with it unfired sulphur, or yellow alum, or Attic ochre, or what thou knowest, and add to luna for sol, and to sol for auriconchylum;[sol represents gold; auriconchylum is gold in powder, coquille d'or] for nature conquers nature.

4. *Claudian Metal is Rendered Yellow by Sulphur or Arsenic, and Alloyed on Gold or Silver.* Taking claudianum,[a metal, named from its manufacturer. An alloy of tin and lead, with copper, zinc, &c.] thou shalt make a marble, as of custom, until it becomes yellow. Thou shalt not render the stone yellow, I say, but that which is useful of the stone. Thou shalt yellow it with alum burnt with sulphur, or with arsenic, or sandarach, or lime, or that thou knowest, and if thou apply it to luna thou makest sol,[gold] but if to sol thou makest auriconchylum; for victorious nature restrains nature.

5. *Silver or Bronze are Treated with an Amalgam of Iron to Produce Gold or Electrum.* Make cinnabar white by oil, or vinegar, or honey, or brine, or alum, then yellow by misy, or sory, or chalcant, [misy: a mixture of iron and copper sulphate; sory: basic sulphate of iron; chalcant: copperas or ferrous sulphate] or live sulphur, or that thou knowest, and add to luna and it will be sol if thou colourest golden, or to bronze for electrum. Nature rejoices with nature.

6. *A Yellow Golden Varnish for Metals.* Whiten, I say, copper, cadmia, or zonytes, as of custom, afterwards make it yellow. But you will yellow it with the bile of a calf, or terebinth,[the tree that serves as the source of turpentine or – most likely in this context – the resin itself] or castor oil, or radish oil, or yolks of eggs, which can render it yellow, and add to luna, for it will be gold for gold; for nature conquers nature.

7. *The Treatment of Silver by Superficial Sulphidation to Render it Gold Coloured*. Treat androdamas[arsenical pyrites; from its silvery lustre used with silver] with bitter wine, or sea water, or acid brine, which things can attack its nature, melt with Chalcidonian antimony, and treat it again with sea water, or brine, or acid brine; wash until the blackness of the antimony goes away, heat or roast it until it begins to grow yellow, and thou shalt treat with untouched *divine* water, and lay it on silver, and when thou addest live sulphur thou makest chrysosomium *into golden liquid*; for nature conquers nature. This is the stone called chrysites.[a mixture of silver and lead, which becomes yellow on heating]

8. *An Alloy of Copper and Lead is Formed, which is turned Yellow*. Taking white earth from ceruse, I say, or *from the scoriae of silver*, or of Italian antimony, or of magnesia, or even of white litharge, whiten it with sea water, or acid brine, or with water from the air under the dew, I say, and the sun, that it, when dissolved, may become white as ceruse. Heat then this in the furnace, and add to it the flowers of copper,[small black scales of oxide of copper, which separate on cooling] or scraped rust of copper, worked up by art, I say, or burnt bronze sufficiently corroded, or chalcites, or *cyanum*;*[chalcites is copper pyrites; cyanum is blue carbonate of copper or Azurite]* then it becomes compact and solid, but it becomes so easily. This is molybdochalium.[an alloy of copper and lead] Test it therefore, whether it has cast off its blackness, but if not, blame not the bronze, but rather thyself, since thou hast not conducted the operation rightly; therefore thou shalt brighten it, and dissolve it, and add what is necessary to yellow it, and roast till it begins to grow yellow, and throw it into all bodies; for bronze colours every body where it is shining and yellow; for nature conquers nature.

9. *Copper and Silver are made Yellow by Sulphate of Iron; with a Process of Cementation*.*[the process by which one solid is made to penetrate and combine with another at high temperature without liquefaction taking place]* Rub up sory and chalcant with unfired sulphur; but sory is, as leprous cyanus, always found in misy, they call it green chalcant. Roast it, therefore, in the middle of coals for three days, until it becomes a red drug, and throw it into Venus, or Luna made by us, and it will be Sol. Place this, cut up in sheets, in vinegar, and chalcant, and misy, and alum, and sal cappadociæ,*[a variety of sal gemma or rock salt]* and red nitre, or as thou knowest, for three, or five, or six days, until it becomes a rust, and it tinges; for chalcant makes sol a rust. Nature rejoices with nature.

10. *An Alloy of Gold is Heated by Superficial Cementation*. Treat Macedonian chrysocolla, which is like the rust of bronze, by dissolving it in the urine of a young girl until it entirely changes; for the nature is hidden within. When, therefore, it is changed, dip it into castor oil, often heating it, and tinging it, afterwards roast with alum, first dissolving with misy or unfired sulphur; render it yellow, and colour the whole body of gold.

11. O! NATURES, Governors of natures! O! natures, how great, conquering natures with their changes! O! natures above Nature, delighting natures! Therefore these are great natures; no others are more excellent among tinctures than these natures; none are like, none are greater, all these take effect as solutions. You therefore, *O! wise men*, I plainly understand are not ignorant, but rather wonder, since ye know the power of nature, but the young men are much in error, and will not put faith in what is written, since they are ignorant of matter, not noticing that *physicians* where they wish to prepare a useful drug, do not set about making it inconsiderately, but first test it, whether it is warming, and how much cold, or humid, or other substance necessary, joined with it will make a medium temperament. They, on the other hand, boldly and inconsiderately desiring to prepare that valuable medicine and ending of all diseases, do not learn that they are running into danger. As they consider that we speak in fables and not mystically, they display no diligence in inquiring into the species of things. For example, if this is cleansing, but that unimportant; and if this is fitted to receive a colour, but that to prepare (for receiving it); and *if this tinges the surface, or if the tincture gives off an odour from the surface, or vanishes from the interior of the metallic body; or if this resists fire, but that mixed with anything enables it to resist fire.* For example, if salt cleanses the surface of *Jove*[Jove represents tin, Venus copper] it cleanses its interior parts; and if the exterior part contracts rust after the cleansing, the interior parts do so also; and if mercury whitens and cleanses the surface of Venus, it whitens also the interior; and if it leaves the exterior, it leaves the interior also. If the young men had been skilled in this kind of knowledge, applying their minds judiciously to the actions of substances, they would have suffered less loss; they know not the antipathies of nature, that one species may change ten, as a drop of oil stains much purple, and a little sulphur burns many things. Let these things be said, therefore, of medicines, and of the extent to which what is written may be relied on.

12. *A Gold Varnish for Silver.* Let us deal with liquids in their turn. Taking Pontic rhubarb, rub it up in bitter Aminean wine[in ancient alchemical treatises, substances frequently bear the names of their places of origin, as in the references to rhubarb and wine in this passage and the crocus of Cilicia below] to the consistency of wax, and take a thin piece of *Luna* to make *Sol*, the pieces of which may be a full nail in breadth, *that thou mayest use the drug again and again*; place it in an empty vessel, which, luting on all sides, gently heat from beneath until the middle (of the leaf) is reached. Then place the leaf in the remainder of the drug, and complete the action with the aforesaid wine, as long as the liquid appears thick. In this, throw at once the uncooled leaf, and allow it to absorb, then take it and place it in a crucible; and thou shalt find *Sol*. But if the rhubarb be dried with age, mix it with equal parts of celandine, preparing it, as of custom, for celandine has a relationship to rhubarb. Nature rejoices with nature.

13. *Another Gold Varnish.* Take crocus of Cilicia, and leave it with the crocus flower, and the aforesaid juice of the vine, and thou shalt have a liquor, as is accustomed to be done. Colour silver, cut into leaves, until it seems shining to thee. But if the leaf be bronze it will be better, but first cleanse the bronze, as customary. Then taking two parts of the herb aristolochia,[a type of shrub, one species of which is the Common Birthwort] and double of crocus, and celandine, make it of the consistency of wax, and anointing the sheet, do as before, and wonder, since the crocus of Cilicia has the same effect as mercury, as also cassia with cinnamon. Nature conquers nature.

14. *Another Gold Varnish.* Taking our lead made *shining* by Chian earth,[earth obtained from the Aegean island of Chios, used as “an astringent and a cosmetic”] and *pyrites*, and alum, burn with chaff, and melt into pyrites; and rub up crocus and cnicum, and the flower *œcumenicus* with the sharpest vinegar, and make a liquid, as of custom, and dip the lead into it, and allow it to absorb it, and thou shalt find Sol but let the composition have a little unburnt sulphur; for nature conquers nature.

15. *This is the plan of Hepammenes, which he showed to the priests of Egypt, and it remains to the times of these philosophers, the matter of the Chrysopeia* .[gold-making; the art of transmutation] Nor should ye wonder if one thing performs a mystery of this kind. Do ye not see that many drugs can with difficulty, even in the progress of time, heal up *wounds produced by iron*, but human excrement succeeds in no long interval of time; and *many drugs employed for burns* produce often no good, and most in no way diminish the pain, but lime alone, when rightly prepared, drives out the ailment; and if various cures are tried for ophthalmia,[inflammation of the eye] they generally increase it, but the plant buckthorn, used to all sickness of this kind, cures perfectly. Vain and unsuitable matter should therefore be despised, but things be used according to their natures. Now therefore learn from these also, that no one has ever been successful without the aforesaid natures. But if nothing can be done without these, why do we desire a forest of many things; what is our need of the concourse of many species for the work, when one surpasses all? Let us now see the composition of the species from which silver can be made.

THE BOOK OF SILVER

16. *The Surface of a Copper Alloy is Whitened by an Arsenical Compound.* Fix quicksilver from arsenic, or sandarach, or that thou knowest, as of custom, and mix *Venus* with iron treated with sulphur, and it will be whitened; but whitened magnesia is also excellent, and *sublimed* arsenic, and calcined cadmia, unfired sandarach, whitened pyrites, and ceruse roasted with sulphur. Thou dissolvest iron by throwing into magnesia, or the half of sulphur, or a little of loadstone, since that has affinity with iron. Nature rejoices with nature.

17. *A Composition for Amalgamating the Surface of Alloys.* Taking the aforesaid vapour, heat it with castor or radish oil, mixing with a little alum; then taking tin, purge it with sulphur, as of custom, or *marchasite*, or what is known to thee, and throw it into the vapour, mixing the whole. Roast, covered with coals, and thou shalt see this medicine formed, like to white lead, which whitens all (metallic) bodies, but by anointing. Mix with it Chian earth, or Asterites, or Aphroselinum,[asterites is arsenical pyrites (identical with androdamas); aphroselinum is selenite, sulphate of lime] or that thou knowest, since Aphroselinum associated with mercury whitens all (metallic) bodies. Nature conquers nature.

18. *The Same Applied to Orichalium Alloy.* Take white magnesia; thou shalt whiten it with brine and alum, in sea-water, or citron juice, or with the smoke of sulphur; for the fume of sulphur, when it is white, whitens all things. But others say that the fume of cobathia[arsenical fumes of furnaces] whitens it. Mix with it, after whitening, equal parts of lye, that it may become white enough. Taking of whitish bronze, of orichalium, I say, 4 ounces, place it in a crucible, placing under it little by little 1 ounce of previously purged tin, agitating until the substances unite; it will be frangible. Throw on, therefore, the half of white medicine, and it will be the *chief*; for whitened magnesia does not render bodies fragile, or allow the blackness of bronze to come forth. Nature restrains nature . . .

24. *Another Tincture of Amalgamation.* Take 1 ounce of arsenic, and half an ounce of nitre, and 2 ounces of the cortex of the tender little leaves of *Persea* ,["A sacred fruit-bearing tree of Egypt and Persia"] and half (an ounce) of salt, and 1 ounce of mulberry juice, and equal parts of scissile, rub with vinegar, or urine, or of *unslaked lime of urine*, until a liquid is formed. Immerse in this *glowing leaves of Venus* growing black, and thou takest away the blackness. Nature conquers nature. Thou hast all things which are required for gold and silver, nothing is left out, nothing is wanting, except the elevation of the vapour and of water.[suggesting the process of distillation] But these I have omitted of purpose, seeing that I have dealt with them freely in my other writings. In this writing farewell.

The Alchemy Reader (pp. 38-43). Cambridge University Press. Kindle Edition.

The phrase, used many time, "or as thou knoweth," is enlightening. It means to use whatever you know will work. And how can there be so many reagents to accomplish the process? The author must be a follower of Aristotle, where altering the properties of one substance causes it to become a different one. For example, if the manipulation of the properties by the process introduces 99.9% of the final properties, leaving but 0.1% of the original properties, why not start with anything you want?

This is not chemistry in any form, where matter is conserved beginning to end. This is the manipulation of found ores and metals to change the appearance. One would think that surely the difference could be easily seen between real gold and whatever you get using these recipes; but these are philosophers following Plato, and they know that what is reasoned out is more true than what they observe. How they communicated that to the person buying the "gold" they created I have no idea. This is probably also the beginning of charlatanism in alchemy.

Many of these materials are obtained via the trade routes, and the locations where they are mined is mentioned. We have none of these mines any more, which makes the attempt at duplicating these "experiments" difficult or impossible. Some minerals named are unknown to us; we don't know what they are.

Crysopoeia: a Greek word meaning the making of gold by transmutation. This early gold-making was a central goal of alchemy, but not why you'd think. Alchemists were not trying to get rich. They are trying to perfect a philosophy proposed by Aristotle: that Nature makes gold in the interior of the earth from fumes of differing hotness and wetness, and so can we, but with sufficient skill we can do it faster. But only by following the example set by Nature.

"Nature rejoices with Nature; Nature conquers Nature; Nature restrains Nature." This is another central concept of alchemy. We can only follow Nature's path; forcing ingredients to make gold would be fruitless, because it could not create from them real gold.

Also here is the first discussion of the healing properties of some substances created. Medicine will be a constant in alchemy, and a central aspect of alchemy in 1600 AD.

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