

# Western Alchemy

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# Western Alchemy was first seen in Spain

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- Arabian invaders occupied Spain for over 700 years starting in the year 711
  - They brought with them manuscripts Alchemy texts that were translated into Latin once in Europe [8]
- 'Book of the Composition of Alchemy' by Morienus, was the first translated book into Latin in 1144
- These translations lead to the discovery of acids, alcohols, alloys and new compounds



## Albertus Magnus (1193-1280)

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- Through his alchemy work with the metals, he believed that the characteristics of the elements repeated in an eightfold cycle. [8]
- Believed that elements could pass from one into another in a cycle
- Also credited to have helped discovered Arsenic and silver nitrate

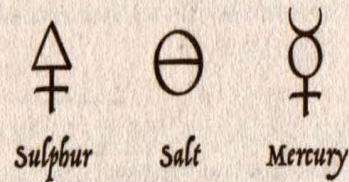
# Common Alchemical symbols

many Alchemist wrote down their works into a complicated encryption , to prevent unwanted eyes from reading them[7]

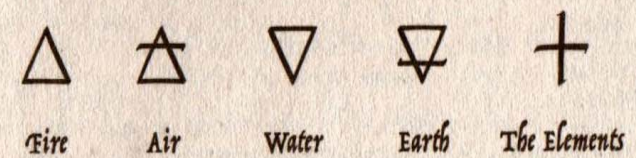


## ALCHEMICAL SYMBOLS

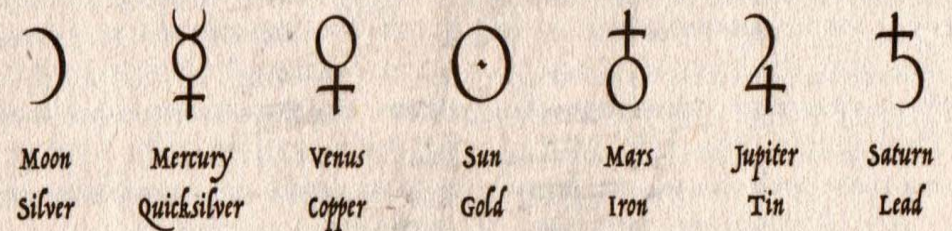
### THREE PRINCIPLES



### THE FOUR ELEMENTS



### PLANETS & METALS



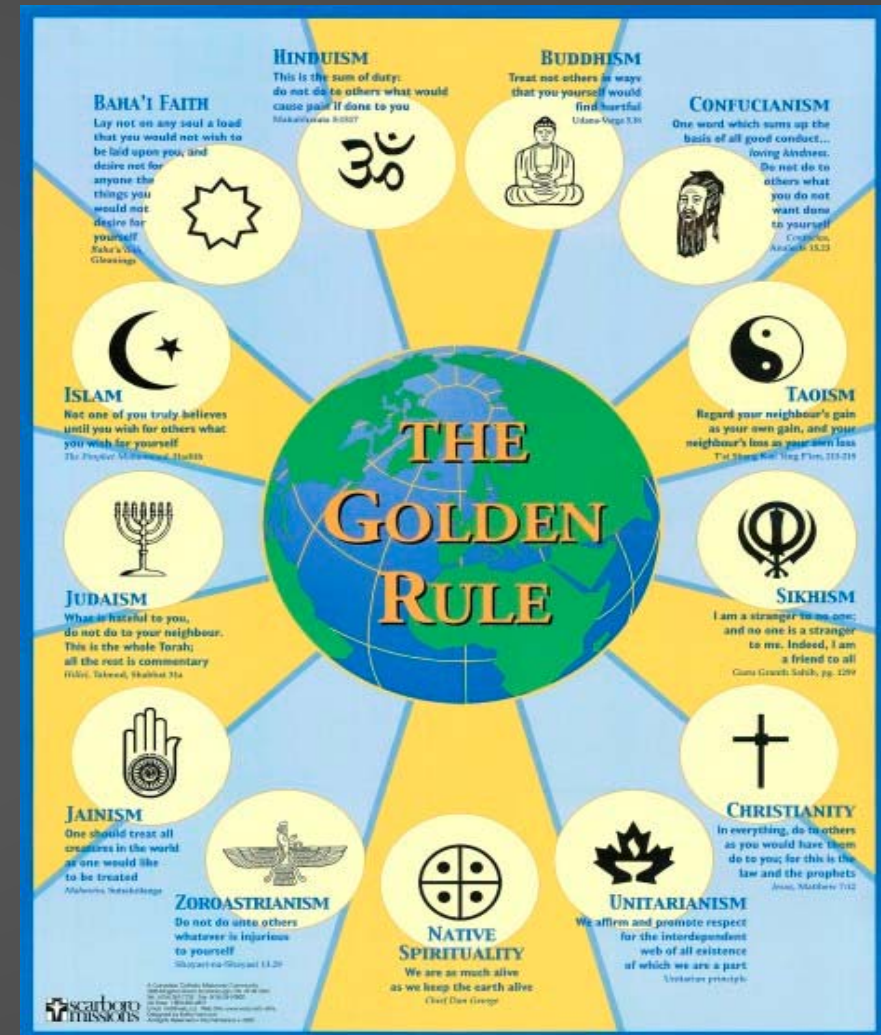
# Etymological roots

- Arabic: al-kīmiyā
- Al = The
- Kimiya = science of the Egyptians
- Egyptian roots
- Kemet = meaning from the land of the black soil
- Latin
- Alchemia, Alchemiae f. = alchemy



# Perennial Philosophy

- Has three basic principles
  1. The material world is not the only reality [8]
  2. There is a duality between the material and non-material world (Humans are a great example) [8]
  3. All humans have the ability the perceived these separate levels of reality [8]



# End goals of Alchemy

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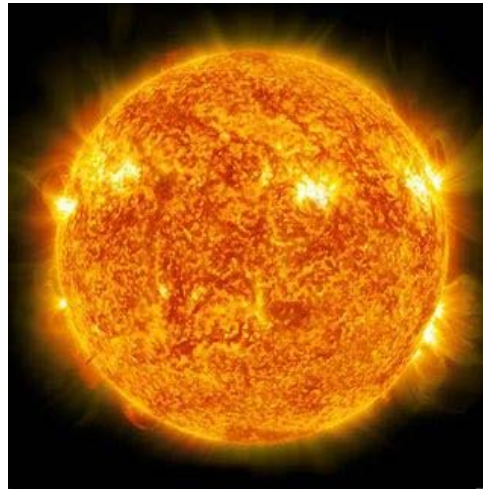
- Alkahest = universal solvent capable of dissolving everything, including gold . There are actually “Alchemical solutions” that can dissolve gold, called royal solutions which is a mixture of nitric and sulfuric acid
- Panaceas = universal cure all for every disease
- Chrysopoeia = transmutation of base metals into gold
- Mythological stone that allows for Panaceas and Chrysopoeia

# The philosopher stone

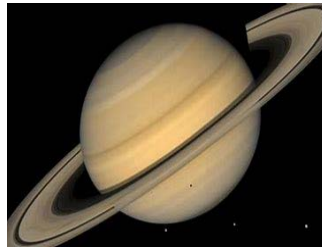
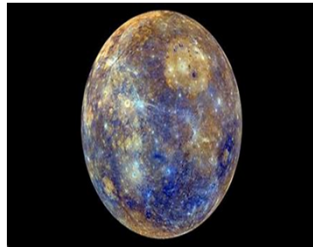
- Was identified as the 'Holy Grail' of Alchemy [8]
- Could turn any corruptible base metal into incorruptible gold
  - Was believed the stone could do the same for humans
- Originated from Eastern alchemy in Egypt but became the physical manifestation of that fundamental desire for perfection
- Philosopher stone is also the alkahest that can dissolve every substance to extract its quintessence
  - Quintessence = The 5<sup>th</sup> element that comes from the four elements



# Noble Metals



# Base Metals



# The most important invention of all time was created by an alchemist.

- The printing press was invented by a Germanic Alchemist born in the year 1468. [5]
- He used an alloy of antimony, lead, and tin to form a more durable material for the creation on the di. [5]
- He pioneered the use of oiled based ink instead of traditional variants. [5]
- Modified a cheese press to become the chassis of his printing press.[5]
- All these inventions would be described as feats of engineering or chemistry today but in the not so distant past the could have been called alchemy. [5]



# Famous Alchemists

- **Geber** : Most famous Muslim Alchemist , referred to as the father of chemistry by Europeans. His achievements include discovery of hydrochloric and nitric acids, distillation, and crystallization.
- **Paracelsus** : Most famous Swiss Alchemist, father of toxicology, famous for his use of chemical remedies in medicine, including uses of copper sulfate , which is still used in medicine today , to treat those burned by phosphorus .
- **Nicolás Flamel** : Most famous French Alchemist, also extremely popular in Modern deceptions of Alchemy, claimed to have created the philosophers stone. Least scientific Alchemist, more of a showmen



reparari simul per ignem torridum et quibus preparationibus  
sunt Rosmaria veri viribus  $\text{Zviii}$

Arcanum preparandi quoniam cum suo Rosmaria ad faciem  
amittendas

Rosmaria optima per se cum Diana virginis ~~amittenda~~  
et consuetudinem in corpore uno, hinc minutim et per se  
preparari quoniam meum, elaboranda simul omnia in capite  
in incorporantur optime, purgari tum per  $\square^a$  saltem  
videntur fieri, quas scorsim colligi.

Depuratio Mercurij sophilici.

Mercurium preparatum et lamina superna emundatam  
in suo proprio  $\text{XX}$  cum sua  $\text{CC}$   $\text{ta}$  [i.e. curat]  $\text{ta}$   
aliqua  $\text{Zviii}$  vel quatuor tum lava salis unius  $\text{Zviii}$   
et in  $\text{Zviii}$  cursu nullam relinquat caudam.

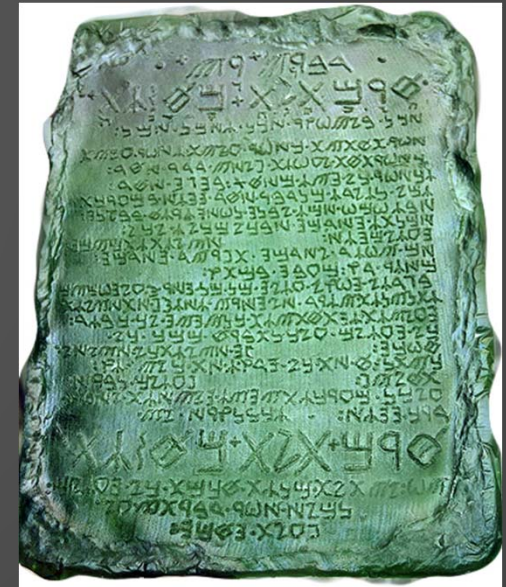


Sir Isaac Newton 1642-  
1727

- Co-inventor of Calculus
- Creator of 3 key laws of motion
- Pioneer in optics
- Discovered the gravitational constant
- Believer in Alchemy [4]

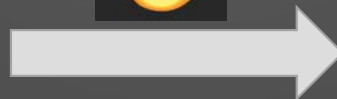
# Sir Isaac Newton

- He wrote more on alchemy than he did any other field of science [8]
- Wrote his own translation of the emerald tablet
- He feared that society was not ready to understand alchemy and went to great lengths to hid his interest
  - Robert Boyle's discovery of "special mercury"



# Antimony 'the black dragon'

- regulus of antimony, which is a star-shaped crystalline form produced when heating antimony ore to high temperatures [8]
- Alchemists named this peculiar signature of antimony after Regulus, the brilliant double star at the heart of the constellation Leo
- The 'clovis'
  - Book wrote by Newton claiming he had transmuted antimony into the long-sought Philosophical Mercury that would make gold multiply and grow



# Emperor Leopold and the alchemist

In 1677 , an embattled and financially weaken Emperor Leopold was desperate to increase his nations wealth [1]

At this time an alchemist , Joannes Wenceslaus of Reinburg, approached him with a solution to his problems : “Pay me a small fee and I’ll show you how to turn sliver into gold using Alchemical principals” [1]

The act was performed and witnessed by many members of the emperor advisors and surely enough all present claimed a sliver medal was place into a cauldron with a mysterious potion and a gold medallion was removed from the mixture. [1]

So the question is was this a miracle of alchemy or a devious trick?



# How it worked

Silver is soluble in nitric acid, whereas gold is not soluble or sparingly soluble in nitric acid. Therefore if a gold core was hidden inside of a silver exterior, when placed in the nitric acid solvent it would appear as if the silver had been transmuted into gold, when in reality the outer layer of the composite was merely dissolved to reveal its internal component. [1]



Procedure  
Dissolve an accurately weighed piece of silver metal in  
$$Ag + 2 HNO_3 (aq) \rightarrow AgNO_3 (aq) + H_2O (l) + NO_2 (g)$$
  
Equation: \_\_\_\_\_  
Silver, like copper, gold and other inactive metals, does not produce a gas with a strong acid. Instead, a poisonous yellow-brown gas, nitrogen dioxide, another product of the reaction, can stain your skin.





## Similar deceptions

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- There are instances similar to this where waxed in used to hide the to be transmuted metal, however in these recounting of alchemical schemes the alchemist is usually punished by the loss of a hand.

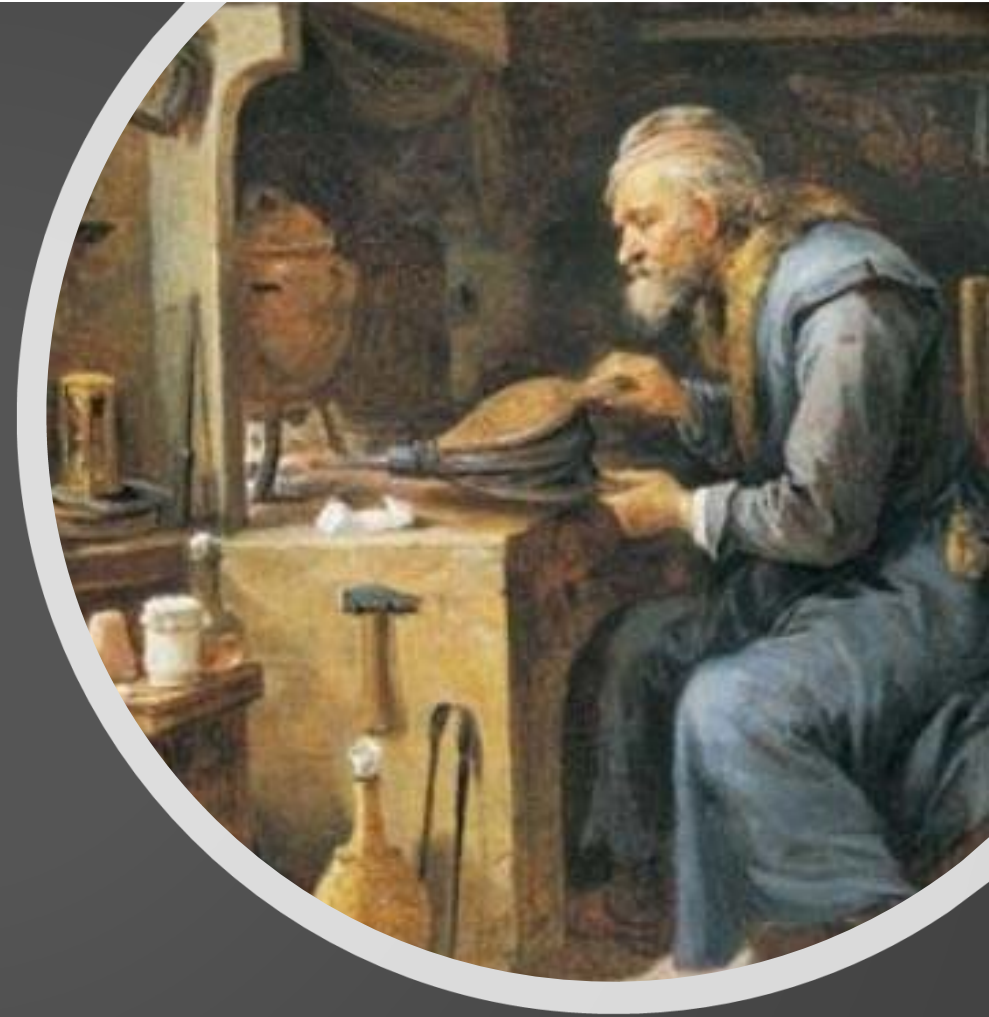
# Particulars vs Universals

- Both are agents of Transmutation, but particulars only control one type of alchemical reaction i.e. bronze to silver, whereas universals converted any substance to any other substance.
- Converting things into gold was seen as the chief use of any newly discovered universal i.e. the philosopher's stone, for obvious financial reasons.



## Puffers [8]

- A new type of alchemist that arose in the middle ages
- Given their name from constantly “puffing” into their fires to increase the temperature for their alchemy ‘experiments
- When this failed, they turned to trickery
  - Claimed to turn metals into gold and silver
- Punishment through prison or execution



# Created a divide

## Pseudo-chemist

- Like mentioned before, would use clever trick to make it appear that they have created gold/silver
- While they were using trickery, they started to discover true chemical principles



## True-chemists

- Initiated alchemist that combine philosophy and spirit into their alchemy experimental work



# Alchemy -> chemistry

- Late 1600's century alchemy was in a disarray [8]
- Beginning of the 1700's century 'Puffers' were being referred to as chemists [8]
- They were labelled to be practicing 'chymistry' [8]
  - Were the term 'chemistry' arises from
- By the 1800's century the two fields were distinctly separate, thanks to some alchemist turned chemist [8]





Some famous scientist who helped transition alchemy -> chemistry [8]

- Andreas Libavius (1595)
- Jan Bantista van Hellmont (1577 -1644)
- Robert Boyle (1601)
  - Boyle's Law
- Johann Glauber (1604-1668)
- Antoine Lavoisier (1787)
  - Father of modern chemistry
- John Dalton (1803)

# Links between Alchemy and Chemistry

- There are many differences between modern chemistry and Alchemy, chiefly, chemistry recognizes such things as gold as chemically pure elements that cannot be broken down further, there are certain similarities
- For example some terminology from chemistry has been carried over from Alchemy such as atom, lime, and bismuth
- Some Alchemists developed instruments that were used by further chemists for example certain type of glassware
- Techniques : distillation, and crystallization



## Nuclear Transmutation

Most of the "artificial elements" have been created by adding particles to large atoms.



# Alchemy and the law

- Alchemy was banned by Pope John XXII in 1317. This effectively made alchemy illegal in all Christian and hence, western countries. The name of this decree in Latin is *De Crimine Falsi Titulus VI. I Joannis XXII.*
- These prohibitions were not as strong in Islamic countries. Sufi mystics for example were heavily involved in alchemy [6]



Sufism: The  
Alchemy of the  
Heart

Waley, M. I.

Note: This is not the actual book cover



## Alchemy and the Law

- With the rise of pseudo-chemist claiming to be producing gold, countries feared their economy would go under [8]
- To stop this they outlawed Alchemy
  - Henry IV of England outlawed alchemy in 1404, but later he started issuing licenses in alchemy in 1440 and a certain percentage of gold must have come from alchemist. [8]



# Alchemist created paper money?

- Paper money already existed, But Alchemy helped to popularize it in Europe
- Edward III passed laws that a certain amount of coins must come from alchemist [8]
- Trusted alchemist such as Issac Newton, Raymond Lully, and Jacque le Cor were appointed the heads of national mints to oversee the processes [8]
- Later The French prince of Orleans was continuing this tradition of paying off his debts with alchemist gold when John Law approached him with a new idea [8]
  - Suggested he print paper money with his signature on it to legitimize it

# Western adoption of Islamic alchemy

## ARABIC ALPHABETS

kh-aa خ	H-aa ح	j-eem ج	th-aa ث	l-aa ت	b-aa ب	a-lif ا
S-aad ص	sh-een ش	s-een س	z-aa ز	r-aa ر	dh-aal ذ	d-aal د
q-aaf ق	f-aa ف	gh-ain غ	3-ain ع	Dh-aa ظ	T-aa ط	D-aad ض
y-aa ي	w-aaw و	h-a ه	n-oon ن	m-eem م	l-aam ل	k-aaf ك

- While alchemy has its roots in Islamic culture, there is a variable mountain of evidence to show that much of Islamic or eastern alchemy was been adopted or at least studied by Westerners.
- For example the text *Alchemiae Gebri Arabis philosophi solertissimi libri, cum reliquis, ut versa pagella indicabit* or in English, *The books on Alchemy by Geber the Arab, the most skillful philosopher, with remaining material as the next page indicates* published in 1545 is a clear case of the work of an islamic alchemist Geber being translated into the quitessentially western language, Latin.[2]

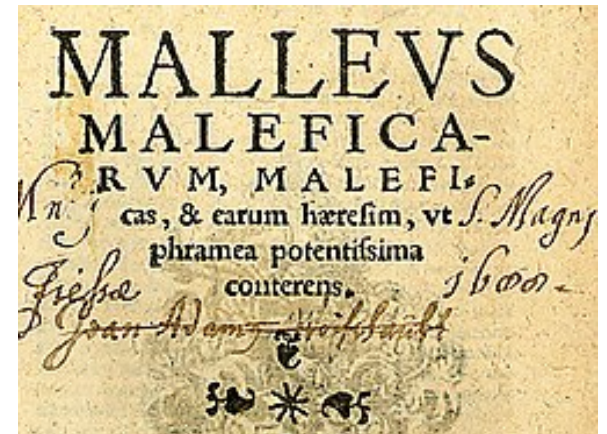
# Links Theological / poetical of Alchemy



- There are certain Alchemical texts that read in a similar way to theological texts . For example the alchemical text Aphorismi Urbigerani reads like the book of proverbs or psalms i.e. the writing is poetic and allegorical. This is in sharp contrast to the earlier variants of alchemy which were much more based in chemical type science.
- Finding you, dear sons , who have thro our means attain'd to the true knowledg of our first. Master, wort by to receive our father Instructions in the remainder of the process to extirpate all such ambiguities , as you may have conceiv'd in our absence , to facilitate your labors , and to precaution you in the bringing your work to its highest perfection. [3]
- Whatever you do, work at it with all your heart, as working for the Lord, not for human masters.

## Links between theology and alchemy continued

- “Distinguishing the worthy from the unworthy , and at the bringing of men to leave their unnecessary forms , by instructing them in the true way of serving God , being the only means to render them happy both in this world and the next” [3]
- Alchemy’s strong link to theology were probably forged out of necessity rather than a genuine belief in the powers of faith , as during the time of writing of this text , Christians in France were still burning heretics at the stake. An Alchemist purporting to do such super human tasks as , converting lead into gold , healing all diseases etc... without a strong connection to the church may have readily been accused of witch craft.



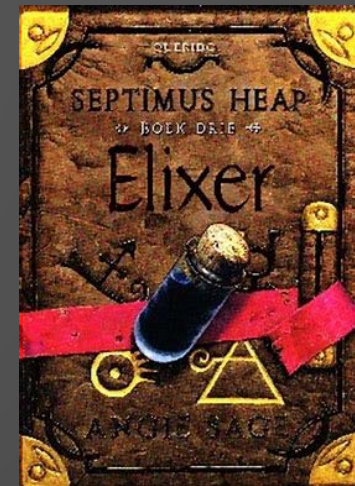
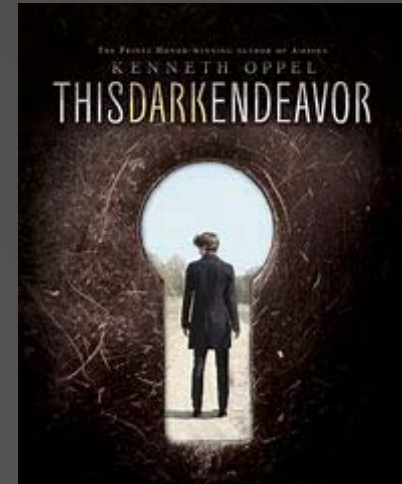
## Chapters heading in the above mentioned text

- The chapter headings for the 1545 primary text can give us much insight into the science of 15<sup>th</sup> century alchemy
- Chapter III classification of obstacles [2]
- Chapter VI on external obstacles of this art that impede the work [2]
- Chapter XXVI on the natural principles of metallic bodies according to the opinion of the ancients [2]
- Chapter XXII the arguments of those who deny the art of extracting the spirit or the supposed dominion of fire, in the same place [2]
- Chapter XIII refutation of the preceding arguments [2]



# Alchemy in pop culture

- Full metal alchemist series
- Featured as a skill in many videogames
- The Harry Potter series feature the philosopher stone
- This Dark Endeavour book series
- Septimius Heap book series



# Modern Alchemy

## **Spiritual Alchemy [8]**

- The gold of this type of alchemist is not physical metal gold, but an inner 'spiritual gold'

## **Psychological Alchemy [8]**

- Alchemy gave rise to modern psychology by being the first to claim treat psychological problems as chemical imbalanced

# Modern Alchemy

## **Artistic Alchemy [8]**

- Artist that use metal, glass, enamels, perfumes, and other media consider themselves part of the alchemical tradition

## **Social Alchemy [8]**

- These alchemist try to change negative social situations into positive

# Modern Alchemy

## **Practical Alchemy [8]**

- Deals with the production of tinctures, tonics, oils, compounds, and elixirs that capture healing energy

## **Therapeutic Alchemy [8]**

- disciplines like homeopathy, herbology, naturopathy, ayurveda, Chinese medicine, aromatherapy, and reflexology trace their origins in ancient alchemical teachings

# References

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- 8. Hauck, D. W. (2008). The complete idiots guide to alchemy. New York: Alpha, a member of Penguin Group (USA) Inc.