METALLOGRAPHIA:

OR,

AN HISTORY OF METALS.

Wherein is declared the signs of Ores and Minerals both before and after digging, the causes and manner of their generations, their kinds, sorts, and differences; with the description of sundry new Metals, or Semi-Metals, and many other things pertaining to Mineral knowledge.

As also, The handling and shewing of their Vegetability, and the discussion of the most difficult Questions belonging to Mystical Chymistry, as of the Philosophers Gold, their Mercury, the Liquor *Alkahest*, *Aurum potabile*, and such like.

Gathered forth of the most approved Authors that have written in *Greek*, *Latine*, or *High-Dutch*; With some Observations and Discoveries of the Author himself.

By JOHN WEBSTER Practitioner in Physick and Chirurgery.

Qui principia naturalia in seipso ignoraverit, hic jam multum remotus est ab arte nostra, quoniam non habet radicem veram, supra quam intentionem suam fundet. Geber. Sum. perfect. l. c. 1. p. 21.

Sed non ante datur telluris operta subire,
Auricomos quam quis discerpserit arbore fœtus. Virg. Æneid. l. 6.

LONDON, Printed by *A. C.* for *Walter Kettilby* at the *Bishops-head* in St. *Paul's Church-yard*. MDCLXXI.

To his Highneſs

PRINCE *RUPERT*,

Count Palatine of the Rhyne,

DUKE *of* BAVARIA

And CUMBERLAND,

EARL of HOLDERNESS, &c.

Conſtable of the Royal Caſtle and Honor

OF

WINDSOR,

And KNIGHT of the Noble Order

OF THE

GARTER.

May it pleaſe your Highneſs,

I Have not preſumed to preſent this mean and ſlender Collection of Minerals unto your Highneſs view, forth of confidence

of its own worth, though there may be ſome things in it not unfit for the knowledge of ſo High and Noble a Perſon: But rather in reſpect of the tranſcendent worth of the Subject it treateth of, being the moſt abſtruſe and moſt excellent part of all Natural Philoſophy; being hereunto eſpecially moved by two reaſons. One is, That your Highneſs being a Member of the Royal Society (one of the happy fruits of His Majeſties bleſſed and miraculous Reſtauration, and that which will ſpeak him glorious to all ſucceeding Generations, beyond all his Royal Progenitors) ſtands thereby in ſome meaſure obliged to be an encourager, and cheriſher of all attempts (though of the loweſt and meaneſt perſons) that tend to the

the advancement of Experimental Philoſophy. This (may it pleaſe your Highneſs) did heighten my hopes, that I might receive the ſame candor (in ſome meaſure) that your Highneſs ſeemeth to have afforded to all. Another is the propenſion, and inclination that (as I am informed) your Highneſs bears in a particular manner to this worthy and commendable Science of Minerals and Metals. The onely thing (beſides the craving pardon for my boldneſs) is, that I humbly beg of your Highneſs, that if your ſpare hours will allow, you may ſometimes make a peruſal of it, and if your Highneſs be pleaſed to put to your helping hand, that this kind of knowledge may be more

more heedfully sought into, and promoted, and that others of far greater abilities, may communicate some part of their knowledge, it is all that is desired by

Your Highness's

most humble

and devoted Servant,

Jo. Webster.

The

The PREFACE.

COurteous Reader, Expect here no flourishing Frontispiece to allure thee to the buying of this untrim'd and unpolished piece, no not so much as the Authors Picture, who never yet was so far in love with his earthly Tabernacle, as to be at the charges to have the resemblance of it drawn, or cut in Copper. Thine own desire after this kind of knowledge, and the plainness of the Subject, are the greatest motives that I have to lay before thee, to move thee either to buy, or read. The stile is low, and plain as the nature of such a subject would bear, whose harsh and unusual terms, suitable for the most part for the Miners themselves, could not well have admitted of Rhetorick, or more polite Language, had I been furnished with any such. And though sometimes I am forced to use more nice and subtle expressions, they are such as the matter in hand did necessarily require, and cannot but be agreeable to such Readers, whose understandings are capacitated to comprehend the matters treated of.

What

What Opinions soever I offer, whether of mine own, or taken from other Authors, are not to impose upon the judgments of any, who am my self no lover of Dogmatizing, and have long wished, and am now most glad to see a way set up for the promoting of Experimental Philosophy, that Mens judgments may no longer be fettered in Scholastick Chains, nor kept always in the Prisons of Academick Opinions. Though I would not here be understood to condemn those Systems, and Methods of Arts and Sciences, that are necessary to the instructing of Youth therein, but that they are laudable and allowable, and have their proper and peculiar uses and benefits, but not so far as to set a stop to farther Discoveries by Experiment and Observation, especially in Natural Philosophy; for all the knowledge (doubtless) that is yet had, is but a small part of that which may be known, and lies yet undiscovered, or found out.

There are two main things that I have aimed at in this Work. 1. The one is, that seeing there is little extant in our *English* Tongue, concerning Metals or Minerals, the signs of finding, and discovering of them, or of

of their Generations, Growth, Properties or Differences, nor of many other things pertinent to this kind of Knowledge: I thought it might be both an acceptable and beneficial matter to communicate publickly what either by reading I had collected, by converse learned, or by observation found out, concerning Mineral or Metallick Knowledge, unto our English Miners and others that have a desire to understand these things, and yet are not capable of the Latin or German Tongues, in which the greatest part of this Knowledge is written. And this being as it were the chiefest of mine aim, I hope my Country-men will take it thankfully, and in good part, though it be wonderfully far short of what may be desired and expected about this subject.

2. Another main end that I have had in publishing of this poor piece of collected Learning, is simply (as far as I am able) to promote Metallick Knowledge, and especially to excite others that have had far better and greater advantages to instruct and inform themselves, than I that have always lived in a private, obscure, and troubled con-

dition; and doubtlesly know much more than ever I can justly challenge or appropriate to my self; which if it may occasion, or gain this end, I have a great part of my wished desires.

I have also discussed some things of the highest pitch about *mystical Chymistry*; which if I be censured for, I am contented, and shall use no other defence but silence and patience: For I too well know how that kind of Learning finds entertainment in the World: But there are none that are blessed with any measure of that noble, true, and most true Science, but they have learned little to weigh the Judgments and Censures of the ignorant and envious. And however others may judge, they that do understand will be satisfied with what particulars I have declared; and that is all that I desire or wish for.

But if any object, and say, that this is little, but only a Collection and Transcription of what others have written upon this subject: We shall confess it; for it is not possible that one private person that hath been no great Traveller, nor seen any Mines but those of his own Nation, and not the most of them neither,

neither, should be able experimentally to comprehend all that is necessary to this kind of Knowledge. Yet hath the Reader two benefits hereby: one is, that those things that lie dispersed in many and several Authors, are here as it were contracted, and for the most part brought to their heads or kinds, whereby with less labour and pains, and the sparing of much cost in buying many Authors, the Reader may come to some measure of Mineral Knowledge. Secondly, Another benefit is, That the Reader may find the marrow of what other Authors have written in other Languages, represented in his Mothers Tongue: as also, here are many things of my own Observation that may be conducible to advance this kind of Learning.

Again, I have here given an enumeration of the most considerable Authors that have written of Metals and Minerals, with a moderate Censure upon them; whereby the Reader may be enabled to make his choice of such of them as he liketh best, and may be indifferently instructed how to judge, or account of the most of them; which is a matter of no small concern.

If any ſeem offended that I have given too great Commendations to *Paracelſus*, *Helmont*, *Baſilius*, and ſome other of the Adeptiſts, they may know that it is not without juſt cauſe, though they underſtand them not: for chewed meat muſt not always be put into mens mouths, let them ſtudy to find forth the depth of the meaning of thoſe Authors, and then they will judge as I have done, and will confeſs that far leſs praiſe is given unto them than they have juſtly deſerved.

I have alſo ſometimes given the Authorities quoted in the Language and words of the Author; ſometimes have rendred them into the Engliſh, not ſo much regarding the Grammatical Order, as the ſenſe of the Author; and for the moſt part the Book and Folio noted in the Margent: ſo that however, if the Reader doubt or diſlike, he may have recourſe to the Authors themſelves, and conſult them in their own words, or in other Tranſlations, if there be any.

Laſtly, I have mentioned divers ſorts of *Ores*, that poſſibly ſome of them might be found in *England* or *Scotland*, as of Antimony, Tinglaſs, Spelter, Talk, and Cinnober; which

which if the diligent Miner would ſeek carefully after, the ways of refining and purifying of them might eaſily be found forth, and thereby no ſmall advantage be brought to the Nation in general, and to the poor Miners in particular. And this is all that I think good to offer by way of Preface, the Work may ſpeak for it ſelf without further Commendation. And I hope the Reader will take it in good part, at leaſt until ſome abler Pen ſhall publiſh ſomething concerning this ſubject in our Engliſh Tongue, that may be of greater worth and utility. Farewel.

A Regiſter of the Chapters.

The Contents.

The Contents.

AN

METALLOGRAPHIA:

OR,

An HISTORY of METALS.

John Keay

CHAP. I.

Of the usefulness and excellency of the Knowledge of Minerals and Metals, and of the antiquity of the Melting, Refining, and accommodating of them to humane use, and the causes of the non-proficiency of Metallick skill, especially in his Majesties Dominions of Great Britain.

THE usefulness and excellency of the knowledge of Minerals is fully described by that learned and industrious person *Josephus Acosta*, who saith, The Wisdom of God hath made Metals for Physick, and for defence, for ornament, and for instruments for the Work of men. What great benefit the Mineral Kingdom doth yield in the Art of Medicine, for the curing both of internal and external diseases, the Authors (as *Dioscorides* and *Matthiolus*) that have written largely *de materia Medica*, as also the whole Band of the Chymists, both mystical and vulgar, do sufficiently testifie. So

Histor. Jud. lib. 3. c. 2. p. 205.

 that

that ſome have thought that an whole Apothecaries ſhop might be furniſhed forth of *Vitriol* alone; and *Helmont* (quoting *Paracelſus*, which he ſeems to approve of) that 200 Diſeaſes (perhaps) might be cured with Preparations made forth of Lead. And for the other benefits that this knowledge hath brought to mankind, both for War (which ſince corruption entered the nature of man, could not be eſchewed, either in the offenſive or defenſive part) and Peace, are ſo many and ſo great, that there are none ſo ignorant that are not ſenſible thereof. So that in a manner the well-being of mankind would be much deficient if this Mineral skill had not been found out, exerciſed, and improved; as almoſt all Trades, Artificers, and Families can ſufficiently teſtifie.

And therefore we find this Skill was (neceſſity compelling) found forth in the firſt Ages of the
Gen. c.4. v.22. World, *Moſes* teſtifying that *Tubal-Cain* was an inſtructer of every Artificer in Braſs and Iron. And as *Junius* and *Tremellius* render it, *qui erudivit omnem fabrum ærarium & ferrarium*: and *Sebaſtian Caſtalion* gives it, *omnis ærarii & ferrarii opificii fabricatorem*: and the Vulgar Latine renders it, *qui fuit malleator & faber, in cuncta opera æris & ferri*: and *Arias Montanus* gives it, *acuentem omne opificium æris & ferri*: And the learned *Piſcator* ſeems to incline to render it *acutorem (ſeu politorem) patrem (ſive auctorem) omnis fabri ærarii ac ferrarii*. I have given theſe ſeveral Tranſlations, becauſe ſome would have *Tubal-Cain* not to have been the firſt that diſcovered Mines and Metals, nor to have found forth that part of Chymiſtry that teacheth the fuſion and refining of them, but onely to have been the Inventer and Teacher of making inſtruments forth

forth of Braſs and Iron; and then the diſcovering, digging up, and purifying of Metals muſt have been before his time, and ſo more ancient. Others aſcribe unto him both the diſcovery, digging up, and refining of them, as alſo the framing of ſundry inſtruments forth of them (which is moſt probable) as our Countryman *Joſhua Silveſter* in his Tranſlation of *The Divine Weeks and Works of the learned Du Bartas*, who ſingeth thus, Part. 4. Week 1. p. 289.

While through a Foreſt Tubal *with his Yew*
And ready Quiver did a Bore purſue,
A burning Mountain from his fiery vain,
An Iron River rolls along the Plain.
The witty Huntſman muſing, thither hies,
And of the wonder deeply can deviſe.
And firſt perceiving that this ſcalding mettle
Becoming cold, in any ſhape would ſettle,
And grow ſo hard, that with his ſharpened ſide,
The firmeſt ſubſtance it would ſoon divide.
He caſts an hundred plots, and ere he parts,
He moulds the ground work of an hundred Arts. &c.
For now the way to thouſand works reveald,
Which long ſhall live, maugre the rage of Eld. Vid. Libanii Alchym lib. 1. c. 1.
In two ſquare creaſes of unequal ſiſes,
To turn two iron ſtreamlings he deviſes.
Cold, takes them thence: then off the droſs he rakes,
And this an Hammer, that an Anvil makes:
And adding Tongs to theſe two inſtruments,
He ſtores his houſe with iron implements, &c.

So that whether way ſoever it be taken, it is apparent that the diſcovering of Mines and Metals, their

digging up, refining, and ſundry uſes of them are very ancient, if not more then many other Arts now extant in the World. And though it be not mentioned in Holy Writ, that in thoſe days Medicines were prepared forth of them, yet it is no ſolid conſequence to affirm that they were not, for many things were both invented and uſed, of which there is no poſitive mention in the Scriptures. And however *Conringius* with all his bitterneſs, the Catholick Tranſcriber and Rhapſodiſt *Athanaſius Kircherus*, with all his querks, and *Guibertus* with his ignorance and malice may imagine, it is manifeſt that Chymical or Hermetick Phyſick was very ancient, as we in a few arguments (though digreſſively) ſhall prove and evince.

1. The great queſtion is, Whether the Egyptian Learning was anciently in any great requeſt, eſpecially in this point of curing Diſeaſes. 2. And whether Chymiſtry was not ancient in reſpect of preparing Medicines forth of Metals and Minerals.

1. That the Egyptian Learning in Phyſick and Metals appeareth thus. 1. We find *Gen. c.41. v.42.* theſe words: *And Pharaoh took off the ring from his hand, and put it upon Joſephs hand, and arraied him in veſtures of fine linen, and put a gold chain about his neck:* from whence it is plain that the Egyptians in that time had either the knowledge of finding of Metals, or had them brought from ſome other Countries, but however had the skill of melting of them, and curious framing of them, elſe they could not have made (as may rationally be ſuppoſed they did) ſuch valuable, and choice things as Rings and Chains of gold. And this Art could not in a moment or on the ſudden be learned of them, or ariſen up amongſt them; for nothing

nothing is invented and perfected at one and the ſelf-ſame time; and this ſufficiently proveth that they had skill in that part of Chymiſtry that teacheth the fuſion and purifying of Metals.

2. A ſecond Argument is, in this Text, *And Joſeph commanded his ſervants the Phyſicians, to embalm his father: and the Phyſicians embalmed Iſrael. And forty dayes were fulfilled for him (for ſo are fulfilled the dayes of thoſe which are embalmed) and the Egyptians mourned for him threeſcore and ten dayes*: and *Joſeph* was embalmed alſo. From whence it is apparent that they had Phyſicians thus anciently in *Egypt*; and that they had no other skill but onely to embalm, were abſurd to imagine, or to think they were not verſed in curing diſeaſes, and ſo were furniſhed with medicines both from the Animal, Vegetable, and Mineral Kingdoms. If their Learning had not been great in this point as well as in Politicks, Arithmetick, Geometry, and Aſtronomy, the compariſon betwixt *Solomons* wiſdom and theirs had been fondly aſſerted by the Text that ſaith, *And Solomons wiſdom excelled the wiſdom of all the children of the Eaſt country, and all the wiſdom of Egypt.* From whence we may note, 1. That the Text would not have ſaid that *Solomons* wiſdom had excelled the wiſdom of the children of the Eaſt, and all the wiſdom of *Egypt*, if the wiſdom of the Eaſt, and of *Egypt* had not then been accounted the greateſt wiſdom known in the world. 2. This wiſdom of the Eaſt and of *Egypt* was not ſuch as like a *Muſhrom* muſt ſtart up in a night and an age, but muſt neceſſarily in reaſon be ſuppoſed to have had a beginning, an encreaſe long ere it could come to that height to be eſteemed the greateſt in the world, and then muſt

Gen. c. 50. v. 2, 3, 26.

1 King. c. 4. v. 30.

must needs have been of a long and large antiquity before the days of King *Solomon*. 3. And that it should be then accounted the greatest wisdom in the world, and yet to be defective both in that part of the Theory of Natural Philosophy, which of all is the most noble; and especially in that part of the Practick, the Art of Medicine, or Curing Diseases, and meliorating of Metals, were indeed to mutilate the wisdom of *Solomon*, and to make him not only ignorant in the most secret and noble parts of natural knowledge, but also to have been most miserable, in not being able to cure the infirmities of the body; which cure being wanting, the comfort of all other earthly joys doth vanish and flie away. 4. And what should *Solomons* skill have been accounted to excel theirs (for the excellency is chiefly put in his knowledge of natural things) being so knowing in the nature of all Vegetables, that he was able to dispute of all Plants and Trees, from the Cedar of *Lebanon* even unto the Hyssop that springs forth of the Wall: And to know the nature of all living Creatures, as Beasts, Fowls, creeping things, and Fishes: if by all this he knew not to preserve health, and cure diseases, and especially to be ignorant of the nature of the things contained in the Mineral Kingdom; or understood not the great Arcana's and Medicines that might be drawn from them, and lay hidden in them: and if he excelled them in all these (as doubtless he did) then the knowledge of the children of the East, and of the Egyptians in all these things, was not little or of small account. 5. Why should *Solomon* send to *Ophir* for gold, and to make at *Jerusalem* silver and gold as plenteous as stones: if it were for nothing but for vain glory and covetousness;

1 King. c. 4. v. 33.

2 Chron. c. 1. v. 15.

ness; what wisdom was this, any but that which was earthly, sensual, and devilish? and not that which as a blessing was given to *Solomon* by the Almighty. 6. But if we may believe that piece (though reckoned among the Apocrypha) called *the Wisdom of Solomon*, we may hear him thus confessing: *Wherefore I prayed and prudence was given me, I prayed and the spirit of Wisdom was bestowed upon me.* And he esteemed gold in comparison of it, as sand: and acknowledgeth that by it he had innumerable riches, and that thereby he knew the framing of the World, and the vertue of the Elements, and whatsoever was hidden and manifest, that he knew. From whence it is plain that he was not ignorant of the most secret vertues both of things occult and manifest, and so could not but understand the nature and vertues of the Mineral Kingdom, otherwise he had not excelled the children of the East, nor the Egyptians, whose skill could not be little in these things.

Wisd. c. 7. v. 7, 8, 9, 17, 21.

3. Another Argument appeareth from the Text. *And Moses was instructed* (or instituted from a child) *in all the learning of the Egyptians*. For though *Moses* after his nursing was brought to *Pharaohs* daughter, and brought up as her son, yet was it well known unto his Mother who had nursed him, that he was her own child; and therefore it is not rational that she, his father, and the rest of the Hebrews would suffer him to be brought up so with *Pharaohs* daughter, as thereby to destroy the principles of his Religion (in which no doubt they had a special care to instruct him) being therein as zealous as any people under heaven. And therefore his being instructed in all the Learning of the Egyptians, it is in reason

Herm. Medic. c. 11. p. 97, 98.

reason to be conjectured, that it was not in vain superstitious Magick (wherewith as *Conringius* labour-

Mat. c. 2. v. 1, 2.

eth to prove, they were much infected) but in the laudable Sciences of Arithmetick, Politicks, Geometry, Astronomy, and their Hieroglyphick learning, which doubtless contained natural and lawful Magick (such as those Magicians were partakers of, that came to worship Christ, whose learning all the Fathers and

Vid. D. Thom. Aqu. Catenam auream super loc. cit.

interpreters do justifie to be good, natural, and law-) the Art of Medicine, and knowledge of natural d artificial things, as in the next Branch we shall re at large make appear.

2. We shall now prove that Chymistry is (though p haps not under that name, for of the Original of th title we may justly doubt) but in its nature and pro rty, as an Art that taught the preparing of Medicines forth of Minerals as well as other things, thereby to cure diseases, and to preserve health.

1. And first it is sufficiently proved that the Learning of the Eastern Nations, and of *Egypt*, was great; to which we shall add some more testimonies from such ancient and approved Authors as are of the greatest authority and veracity, and then urge the Consequences, and answer the main Objections.

De Cœlo lib. 2. c. 12. p. 286.

Concerning some part of the great Learning of the Egyptians, hear *Aristotle*; who saith, speaking of the Stars: *Similiter & de cæteris stellis Egyptii & Babylonii dicunt, qui plurimis jam annis ante hæc observaverunt, & à quibus multa fide digna de singulis stellis accepimus.* And in like manner of the rest of the stars the Egyptians and Babylonians have spoken, who had many years before observed them, and of whom we have received concerning all the stars, many things worthy of credit. The

De Finibus lib. 5. p. 153.

The next Authority we shall urge, is the Testimony of *Cicero*; who saith, *Quid de Pythagorâ? Quid de Platone aut Democrito loquar? à quibus propter discendi cupiditatem, videmus ultimas terras esse peragratas?* What shall I say of *Pythagoras?* what shall I say of *Plato*, or *Democritus?* of whom, for the earnest desire of Learning, we have seen the furthest Lands travelled over. And again, *Philosophiæ denique principes ipsius, nunquam in suis studiis, tantos progressus sine flagranti cupiditate facere potuissent; ultimas terras lustrasse Pythagoram, Democritum, Platonem, accepimus. Ubi enim quid esset, quod disci posset, eo veniendum judicaverunt.* Lastly, The Princes of Philosophy it self, never could have made so great progresses in their studies, without a burning desire. We have received that *Pythagoras*, *Democritus*, and *Plato* had viewed the farthest Lands: for where there was any thing to be learned, they have judged it fit to go thither.

Tuscul. quæst. lib. 4. p. 236, 237.

Another Testimony take from *Macrobius*, who saith, That *Egypt* was the Mother of all Arts. And again, That the *Egyptians* were the Parents of all the Disciplines of Philosophy: which is confirmed by *Strabo*, an Author of unquestionable verity; by *Herodotus*, and by *Diodorus Siculus*. To these add the words of *Philo Judæus* in his Book *De vita Mosis*: who saith, that their Learning consisted in Arithmetick, Geometry, Musick, and Hieroglyphical Philosophy; *vid. Iamblic. de vit. Pythag. l. 1. c. 29. Diog. Laertium, p. 182. & Orig. Sacr. p. 122. &c.*

Macrob. lib. 1. Saturnal. c. 15.

Geog. lib. 17. Herodot. l. 2. Diod. Sic. l. 1.

From all this we shall only draw these Deductions:

1. That if the Learning of the children of the East,

and the Wisdom of *Egypt*, were in *Solomon*'s time accounted the greatest that then was known, and that *Solomon*'s excelled them both; then it cannot rationally be conceived that either of them were defective in the most noble parts, either of Natural Philosophy, or the Art of Medicine drawn from the Mineral Kingdom, nor the Art of Transmutation, but that they understood both.

2. *Aristotle*, (accounted the Prince of Learning, and of as much Antiquity as the most Authors we have) would never have so much commended the Egyptians and Babylonians for the truth of their Doctrine concerning the Stars; but if they were so well versed in the nature of things so remote as the Stars, they must (in all probability) be as much (if not better) skill'd in the knowledge of the nature of the subterraneous Kingdom.

3. *Cicero*, a person that writ above 1600 years since, would never have so remarkably taken notice of *Pythagoras*, *Democritus*, and *Plato* for travelling into the remotest Regions, and especially into *Egypt*, they knowing the height of the Græcian Learning, and being therein, by the account of all Authors, the chiefest Masters, if there had not been some excellency in the Egyptian Learning that they were ignorant of. And what could that be except the Art of Transmuting of Metals, and of curing diseases in a more perfect way then the Græcians knew; amongst whom notwithstanding the *Æsculapian* Family had been famous many hundred years before the time of *Pythagoras*, and those that followed him and their going down into *Egypt?*

4. And if *Egypt* was (according to *Macrobius* and the

the rest quoted before) the Mother of all Arts, and the Parent of all the Disciplines of Philosophy; then surely they could not be ignorant of that which is the most noble of all Arts, the Transmutation of Metals, and the curing of all diseases by an universal Medicine, which is no where to be had but forth of the Mineral Kingdom.

But their chief Objection is, that Chymistry (about which name we do not contend, but about the Art it self) is but of late invention; and that the learning attributed to *Hermes Trismegist*, is but of late years standing, and both the Author and it but forged and feigned. To which we answer,

1. *Couringius* (the most bitter Enemy that ever the Hermetick Learning, or that *Hermes* had) doth confess, that from most ancient Times the Art of Medicine was had in esteem in *Egypt*; and saith, That the Art of Medicine had been in most high esteem with the Egyptians, seeing it was manifest by the testimonies of their own Country and of others, greater then all exception. For that in the Age of the Patriarchs *Jacob* and *Joseph*, there wanted not Physicians, by whose care their dead bodies were (being embalmed) preserved from putrefaction; but that afterwards the same was practised by others, as might be gathered by those things that are related of the Egyptian Funerals, by *Herodotus* and *Democritus*. By whose confession it being granted that the Medical Art was so anciently practised there; and that according to *Pliny*, they affirmed that the Art of Medicine was invented amongst them, and all their Arts commonly attributed to *Hermes*; then it must of necessity follow, that *Hermes* (though there might be, and by the testi-

Couring. de Herm. Medic. c. 1. p. 77.

Plin. lib. 7. c. 56

mony of *Cicero* were divers of that name) was not a feigned Author, nor the Art forged, but was of such antiquity, that no vain Arguments can easily overthrow.

2. The Testimony of *Suidas*, though undervalued by *Couringius* and *Guibertus*, is not of the least validity: who relateth, That *Diocletian* had caused to be gathered all the Books that treated of Chymistry amongst the Egyptians, and caused them to be burned, lest growing rich by the Art of Transmutation, it might incourage them to rebel. Now *Diocletian* came to the Empire, or reigned about the Year of Christ, 288. or as some, 287. or as *Baronius*, 284. and *Suidas* lived about *Ann. Christ.* 1214. so that the Name and Art of Chymistry must needs have been both known before the time of *Suidas* writing. And *Cælius Rhodigines*, an Author of great authority and general Learning; the *Collegium Conimbricense* are perswaded that he writ the truth. And this testimony *Demetrius Chalcocondyles* giveth of the Writings of *Suidas*. This Book, to wit of *Suidas*, doth not onely bring manifold profit to young Students, but also great fruit and pleasure to persons of every Age. For neither doth he onely interpret the words of Historians, Orators, and of all sorts of eloquent Authors, but he also comprehendeth many and various Histories, that are not easily to be found elsewhere, because the Books of the Græcians, Romans, and Hebrews, from whence they were taken, are lost and perished. Which Testimony of the Writings of *Suidas*, the concurrent Opinion of all learned men for above the space of 400 years, is a far greater evidence then ever the authority of *Guibertus*, or *Couringius* is able to invalidate.

Libanii lib. Alchym. Transf. Defens. 2. p. 214.

Libanii ibi', p. 217.

3. *Con-*

3. *Couringius* and *Guibertus* both do confess that *Julius Firmicus* the Astrologer, who lived in the time of *Constantine* the Emperour, about the year of Christ 320. did attribute a good or bad Constellation in Heaven to the Professors of Alchymie. By which it is plain that the Profession of that Art must have been long known before; for it is a rule, that *Rei non existentis, aut incognitæ nulla est assignatio*; That of a thing not existing, or unknown, there can be no assignation. And seeing that *Firmicus* was a most ancient Astrologer, and that Astrological Observations do arise from long Experience; it must necessarily follow, that Alchymy must needs be both *Re & Nomine*, of far greater antiquity then the days of *Firmicus*.

Libanii ibid. p. 217. 218.

Couring. l. de Herm. Medic. p. 62, 93, 137.

4. *Guibertus* himself brings an example forth of *Cedrenus* of one Professing Chymistry, that was a Magician (in the worst sense he meaneth.) Now *Cedrenus* writ in the time of *Anastasius* the Emperour, who reigned about *Ann. Christ.* 491. And if then there were some that professed Chymistry, then it must needs have been of a more ancient standing. For there is no Profession that upon a sudden doth get root, and pass into an habit; but must have a time of its invention, increase, and perfection; so that it is plain that both the Art of Chymistry and the Name was very ancient. And to this might be added, That the Writings of *Hermes Trismegist* were long extant in the World before the Times of Christianity, otherwise it could not be imagined that the Christians for the advancement and defence of their Religion, should have forged suppositious pieces under *Hermes* his name, but that his Reputation and Learning had been long, and then was of great account amongst the Heathens themselves. 5. Also,

Liban. at supr. p. 242.

5. Also it is manifest that Chymistry was ancient, because it had flourished long before the times of *Avicen*, *Bulcasis*, *Mesue*, *Rhasis*, and the rest of the Arabians, who could not have mentioned it, if it had not had a beginning before their Age and Time. To this I shall onely joyn the Testimony of *Morienus* a Roman Hermit, whose Writings were translated forth of the Arabick Language into Latine, *Ann. Ch.* 1182. who learned the Art of Transmutation, or of the great Elixir at *Rome* of *Adfar* an Alexandrian, and a Christian. And afterwards *Morienus* taught it to *Calid* or *Evelid*, the son of *Gizid* the second, who was King of *Egypt* about the year of Christ 725. which doubtless *Adfar* had learned forth of the Writings of *Hermes Trismegist*; which do all plainly prove that Chymistry, for the Hermetick Learning was of sufficient antiquity, and *Hermes* himself no feigned Author.

Liban. ut supr. p.217.

6. I shall onely add the judgments of four or five Authors of unquestionable credit and veracity.

1. And first the most learned *Sennertus*, a great Chymist and Galenist, a person generally approved of by all, (though otherwise a most virulent adversary of *Paracelsus*) doth confess in these words; *Fuit enim hæc ars (nempe Chymia) jam usque ab Hermete Trismegisto sacerdotibus Egyptiis familiaris, & nota.* This Art (to wit, Chymistry) was even from the time of *Hermes Trismegist*, familiar and known to the Egyptian Priests. What can be more clear and manifest for the antiquity of this Art, and for *Hermes* himself, then this Testimony of so learned a person? And again, after a long discourse of the antiquity of Chymistry, and of *Hermes* himself, who he conceives to have

D. Sennert. Tom.1. c.1. de Nat. Chym. p.754.

have lived about the year of the World 2000. because that *Diodorus Siculus* writeth, that *Isis* had engraven in the Pillar of her Sepulchre, that she was instructed or taught by *Hermes*; he concludeth thus, *Chymiam ipsi (sc. Hermeti) notam fuisse facile concedimus: quid tamen in ea præstiterit, ex historiis non patet.* We easily grant that Chymistry was known to *Hermes*, but what he performed therein is not manifest from Histories.

Id. Tom. 3. lib. de Conf. & diffenf. Gal. & Chym. c. 3. 710. 711.

2. The second we shall commend unto the Curious, is the learned and approved *John Langius*, who in that Epistle of his of *the Original of the Art of Medicine* amongst the Egyptians, Chaldæans, Græcians, and Arabians; as also in his next concerning the Libraries of the Art of Medicine, of the Ancients and of other Faculties, doth (in this point) give most ample and full satisfaction.

Jo. Lang. Ep. Med. l. 2. p. 522 & p. 550.

3. The third that I shall name, is the judicious and learned *John Heurnius*; who saith, that the Art of Medicine was said first to spring up amongst the Egyptians: and reason agreeth thereto, because the chief axioms of the Art of Medicine did flow from them: and quoteth the Testimonies both of *Hippocrates* and *Aristotle*; unto which for brevity, I refer the Reader.

Jo. Heurn l. 1. Inst. Medic. c. 1. p. 1.

Fr. Patric. l. 1 Herm. Trism.

4. The two last I shall onely name, and those are *Franciscus Patricius*, and *Michael Mayerus*, both solid and learned persons, and have written so much (in this point) as may satisfie any unbiassed and impartial Reader.

Mich. Mayer. Symb. Aur. Mens. l. 1. p. 56. &c.

Now though the knowledge of Metals be of such benefit to the well-being of mankind, and the invention of so great antiquity, yet hath it amongst the generality

nerality of the Learned, found no great entertainment, nor has been brought on to any great perfection. For but that ſince and about the time of *Paracelſus* it hath been revived and reſtored, and now begins exceedingly to flouriſh; otherwiſe before it either was by Tradition (eſpecially the myſtical part) delivered over from hand to hand, and ſo kept lock'd up in the breſts of a few myſtical Authors or Adeptiſts; or in their Writings delivered ſo darkly and obſcurely, that the moſt were deterred from taking pains to read or ſtudy them: and of thoſe few that bent their labours that way, ſcarce one of a thouſand did perceive or underſtand their manner of Ænigmatical and Parabolical Writing and Expreſſions; ſo that for the moſt part, until the time aforeſaid, the knowledge of Chymiſtry lay buried in the Cells of the Friers and Monks, and ſo came to no great improvement nor perfection.

And the Reaſons of the non-proficiency of the knowledge of Minerals and Metals in general, we conceive to be theſe principally.

1. That whereas the Animal and Vegetable Kingdoms, in their Generations, Growth, Operations, and Properties, lay viſible and obvious, that every diligent Obſerver and Searcher might dive thereinto; yet hath the knowledge of all thoſe particulars not yet attained to any ſuch degree of perfection, but that the moſt neceſſary and ſubſtantial points are yet undiſcovered or not found out. Now the progreſs of Nature in the generation of Metals and Minerals, their properties and alterations, being a thing that lay hid in the bowels of the Earth, whereinto the ſenſes of few men could pierce; and ſo exceeding difficult to ob-

obſerve or underſtand, that it is no great marvel that ſo little progreſs is made into that kind of Knowledg; for where obviouſneſs and eaſineſs are awanting to know the Subject and the Properties thereof, men commonly have no incitements or encouragement to ſearch after the knowledge of ſuch matter, and therefore muſt needs be a great *remora* or ſtop to the progreſs therin.

2. Again, Though moſt Countries that are not extremely barbarous, do produce within the compaſs of ſome circuit of years, Men learned, and ſtudious of the ſecrets of Nature; yet every Region doth not produce ſuch ſtore of Minerals, as may afford either a fit ſubject, or opportunity for ſuch diſquiſitions, and therefore ſearching minds, either diverted themſelves to inquire into other parts of Nature, more near and eaſie to be obſerved, or elſe betook themſelves to general contemplation; and ſo framed Syſtemes according to their own fanſies, rather drawing Nature to follow their Conceptions, then by travel, labour, long toil and experimental Obſervations, to order their ſpeculations according to the truth of Natures operations; or elſe fall down with that ſcantling of knowledge in theſe things that they found written by other Authors, that had preceded them. So that thereby this kind of Learning was brought to a ſtand, and had its *ne plus ultra* ſet upon it. And it had ſtood ſo ſtill, had not ſome perſons of more inſatiable deſire of the knowledge of the ſecrets of Nature, and eſpecially of her Mineral Kingdom, with *Herculean* boldneſs, and undaunted reſolution, broken through all difficulties, and adventured great dangers and long peregrinations for attaining the ſame, more (perhaps) then *Jaſon* for the Golden Fleece. And ſuch ap-

pears plainly *Basilius Valentinus*, *Bernardus Trevi-Janus*, *Johannes Pontanus*; and of late *Johannes Agricola* to have been, and especially that indefatigable person *Paracelsus*, who when under the twentieth year of his age (having seen all the Mines in *Germany*) travelled through *England*, *Scotland*, *Swedeland*, *Denmark*, *Norway*, and into *Russia*, and from thence into the Borders of the *Tartars*; where being taken prisoner, and carried to the *Great Cham*, was from thence conveyed to *Constantinople*, and from thence returned home thorow *Arabia*, and so to *Venice*. So little doth any danger fright a noble and resolute mind, when armed with the ardent desire of gaining knowledge, while other idle Lubbers that dare not adventure from the air of their own Countries, nay scarce from the smoke of their own fires, think themselves fit Judges of the labour of others, as competent Judges as *Midas* was of *Apollo*'s Musick.

Melm. Tartar. Histor. p. 334.

3. Another Reason I shall offer is, That the way and means to discover the Nature of Minerals, is not onely difficult and dangerous, but in it self is so forbid, base and troublesome, that the most men of parts, will hardly adventure themselves into the Pits or Shafts where Ores are usually gotten; nor can indure to stay there so long, that they can rightly inform themselves of any thing that may be satisfactory to their Inquiries. And the Miners or Workmen (for the most part) being but people of the most indigent sort, and such as whose knowledge and aims reach no higher then to get a poor living by that slavish Labour, regard to inform themselves of no more then what may conduce to such a poor and servile kind of living; by which means they are little able to give any learned man

man satisfaction to those necessary Inquiries that might tend to enable him to judge rightly of the Nature of the things in that subterraneous Kingdom. And to this you may add, That the Miners (or *Bergmen*, as the Germans call them) have as well as the School-men, Logicians, nay, Mariners, and other Artificers, their peculiar Idiom or Dialect, which none but themselves, or those that have long conversed with them, are able to understand; it being for the most part like Heathen Greek, or terms of Conjuring to others: and therefore no marvel if this skill have had no greater progress.

Now for the small progress that is made in Mineral things, either to profit or knowledge, within His Majesties Dominions of *Great Britain*, is not because they do not abound with diverse sorts, both of Metals and Minerals; though according to the Vulgar opinion, they lying so far in Northern Latitude, might be thought not to yield any great store; it being commonly imagined that the Southern Climates are most fertile of them; but some other special reasons we shall shew anon. For it plainly appeareth by the learned Antiquary *Camden*, that *Cornwal* and *Devonshire* have from Ages long ago abounded with most excellent Ore of Tin, which hath stored a great part of *Europe* with that Metal, accounted generally the best in the World, except that of *Corinthia* or *Pillacum*. For speaking of *Cornwal*, he saith, *Stannum enim non sine uberrimo fructu, admiranda copia effoditur, ex quo vasa domestica ducta apud omnes Europæos in mensarum usu argenteis fulgore comparantur. Incolæ passim nigros lapillos ex quibus stannum conflant, vel effodiunt, vel ex arenis lotis exi-*

Camden Brit. p. 148.

Diodor. Sicul. l. 5. c. 8. p. 142.

munt, quod in continentem à Britannis priſcis navigiis vitilibus corio circumſutis devehi ſolebat. For Tin is digged up in a wonderful quantity, not without great benefit, of which are made houſhold veſſels for the uſe of Tables through *Europe*, comparable to Silver veſſels in brightneſs. The Inhabitants do every where gather little black ſtones, out of which Tin is melted, or dig them up, or gather them forth of them: which was wont to be carried by the ancient *Britains* into the Continent in Wicker Boats covered with Leather.

Camden. Brit. p. 692. And in his Deſcription of *Cumberland*, he declareth plainly the ſtore of Copper Mines that were there, which were conceived to hold ſomething of Gold and Silver, as alſo a Mine of Black Lead, for which we yet want a Latine name, but that of late Dr. *Merrett* hath given it the title of *Nigrica*. And

Ibid. p. 497. alſo that in *Darbyſhire* not onely plenty of Lead was found, but alſo the Ore of Antimony, which the a-

Plnax rer. nat. Britan. p. 208, 209. foreſaid Dr. *Merrett* confirms; and ſo of Tin, Lead, Silver Ore, Copper Ore, Black Lead, and divers other Minerals. And if we may believe *Holingſhed* (no contemptible Author) there hath not wanted the Ore of Gold, Silver, Tin, Lead, Copper, Steel, Iron, and

Deſcript. of *England*, c. 11. p. 237. other Minerals. And Dr. *Forden* in his learned Treatiſe of Natural Baths and Mineral Waters, ſaith, In

Ibid. c. 8. p. 39. *Scotland*, three miles beyond *Berwick*, I found a red ſtone, which I take to be *Minium nativum*, ſeeing *Agricola* makes mention of it in *Scotland*; but by a miſchance could not trie it. And I my ſelf know two places in *Craven*, in the Weſt-riding of *Yorkſhire*, where formerly good Silver Ore hath been gotten:

Hiſt. 1. the one is a place called *Brunghill Moor* in the Pariſh of *Slaidburn*, where betwixt 50 and 70 years ſince, Sir

Sir *Bevis Bulmer* got good ſtore of Silver Ore, that held about 67 pound *per* Tun, as *Walter Basby* an expert Eſſay or Teſt-Maſter informed me, who was a perſon of at leaſt 76 years of age, and had (as an expert Artiſt) been in the time of King *James* ſent to the Emperour of *Ruſſia* to ſetle the ſtandard of his Coin: where he remaining divers years, and going down to the Borders of *Tartaria* to view the Mines there, was taken priſoner by the *Tartars*, and after redeemed by the *Ruſſian* Emperour, and ſent over into *England*. Where after about the year 1655. he was again brought down with ſome *Londoners*, that then had a Patent for Mines. But they being men neither of free purſes to follow ſuch a Work, nor of skill or government fit to manage ſuch an Enterpriſe, they at laſt deſerted the poor old man, whom I entertained for three quarters of a year, and got ſome of the Ore pick'd forth of the old Rubbiſh of the Works that Sir *Bevis Bulmer* had left (with whom the ſaid old Mr. *Basby* had been an Eſſay-maſter) and cauſed him to make ſeveral Trials; which yielded near to the quantity of Silver in a Tun, as is before ſpecified, though it were none of the beſt Ore.

The other place was within the Townſhip of *Rimmington* in the Pariſh of *Gisburn*, in *Craven*, in the aforeſaid Weſt-riding of *Yorkſhire*, in a field called *Skelkorn*, belonging to one Mr. *Pudſey* an ancient Eſquire, and owner of *Bolton Hall juxta Bolland*; who in the reign of Queen *Elizabeth*, did there get good ſtore of Silver Ore, and converted it to his own uſe (or rather coined it, as many do believe, there being many ſhillings marked with an Eſcalope, which the people of that Country call *Pudſey*'s ſhillings to

Hiſt. 2. this

this day.) But whether way ſoever it was, he procured his pardon for it, and had it, as I am certified from the mouths of thoſe that have ſeen it. And while the ſaid old *Baiby* was with me, I procured ſome of the ſaid Ore that had been formerly left, of which (I looking on) he made ſeveral trials, and I am ſure that I was not impoſed upon by him, nor deceived, but that it yielded in the Tun about 26 pounds. And ſince that time there hath been good ſtore of Lead Ore gotten in the ſame place: but by all the intereſt and means that I could uſe, I could never get from the Workmen any ſuch Ore as had been formerly gotten there; ſo cunning are the Miners, that if they find any Vein of Ore that may contain ſo much of Silver as would make it a Mine Royal, they will not let it be known, but preſently beat it, and mix it with their ſofter Ore, pretending the ore will not melt without the other; being with them a common trick, leſt their work ſhould be taken from them. As alſo I can ſhew the moſt ſeveral ſorts of Ore of moſt Metals (except Gold:) beſides great diverſitie of other Minerals, Stones, and Earth, ſome known, and ſome not known, whereby it may ſufficiently appear that it is not want of Minerals or Metals in his Majeſties Dominions, that hath hindred the growth of this knowledge, but ſome other reaſons, which we ſhall now ſhew.

1. The end that commonly men aim at in digging for Minerals and Metals, is gain and profit: and the impulſive cauſe that moves them to that end, is generally Poverty, Want, Indigency, and conſequently Neceſſity. Now the moſt part, if not all of his Majeſties Subjects of *Great Britain* having wherewithal to

to get a comfortable and ſufficient lively-hood, as by Paſturage, Tillage, Profeſſions, Arts, Trades, or Manufactures, have no ſuch neceſſity put upon them as to ſeek for a ſuſtentation by ſuch ſlaviſh and drudgery Work, as men muſt undergo that work in thoſe dangerous and darkſom undertakings, as is neceſſarily performed in the Mines: and therefore it is clear, that in His Majeſties Dominions, few will undergo ſuch ſervitude, that have a better means to live upon.

2. Another reaſon is, the ſmall incouragement that Undertakers, or Workmen have in our Nation, to proceed to undergo ſuch pains and hazards, as neceſſarily they both muſt run that meddle with ſuch matters. For if the Mines be Royal, then for the moſt part, they are careleſly followed, as too much experience hath often verified: and if they belong to particular Lords, then the conditions are for the moſt part ſo hard, that the Undertakers and Workmen can get little profit by them, which cauſeth them often to be deſerted and left. For it is uſual with the Workmen, that if they can hear of another place where they may find better Wages, both to leave the Work and their Maſters. And often it hapneth that either divers Lords are at variance about the ſame Mine, or that divers pretend ſeveral Grants, that while they are trying their titles, the Work is neglected, and the Workmen betake themſelves to ſome other Work. Or that where a Mine is diſcovered, that may leſſen the price of the Mineral or Metal that another gets; the Workmen of the one is hired away by the other, or ſome other ſiniſter means uſed betwixt them; as often is the overthrow of the one or other, if not of both: of which I ſhall onely give two inſtances. *Hiſt.* 3.

Sir

Sir *Bevis Bulmer* (before named) having brought the Mine at *Brunghill Moor* to great perfection, and getting great ſtore of Silver Ore (as many men yet living can teſtifie) a controverſie roſe about the ſaid Mine with Sir *Gilbert Houghton*, or his father, about the title, that grew to that height that Sir *Bevis Bulmer* was forced to give over purſuing the labour, and ſo cauſed the Workmen to throw in the Works; which have been often ſince attempted and wrought in, but the ſame rich Vein could never ſince be found.

Hiſt. 4. Another is, that Sir *Richard Houghton*, had ſet up a very profitable Mine of Allom, near unto *Houghton Tower* in the Hundred of *Blackburn*, within theſe very few years, where great ſtore of very good Allom was made and ſold; but whether ſome perſons that had Works of the ſame nature in other places, found that the ſtore gotten there, would bring down the price of that commodity; as it had all about near unto thoſe parts; or for what other cauſe I know not, a contention was raiſed againſt him about the ſame Mine, ſo that he was either compounded with, or otherwiſe forced to give it over; ſo that it is now quite left, to the loſs of the Nation in general, and to the damage of many a poor man in particular, that got their living by working there.

3. A third reaſon is, The common Diſeaſe or Condition of the Engliſh Nation, that are accuſtomed too much to dote upon foreign Commodities, and imported Wares; which makes them negligent in looking into, or improving their own native commodities, and ſuch things as their own Country yields. Which hath ſtirred up the vigilancy and induſtry of our neighbours, eſpecially the *Dutch*, who can make greater

ter benefit of our home-bred Commodities then we our ſelves, and therefore they have for many years laſt paſt brought up and tranſported all the Lead Ore they could poſſibly buy; and as I, and many other perſons have been credibly informed, did refine the ſame Ore, and thereby got no ſmall profit. And the Mine of Black Lead (or Kellow, as we call it here in the Northern parts) that is in *Cumberland*, and opened but once in 8 or 10 years, is commonly all bought by thoſe induſtrious people, of whom *Scaliger* ſaith, *animas in digitis habentes*, ſo exceeding active are they in all manual performances, while we *Engliſh* lie ſupine and idle.

Chap. II.

Of thoſe Authors that have treated of Metals and Minerals.

IF the Authors that have written of the Mineral Kingdom were to be conſidered according to their number and multitude, then a man would think that this kind of Learning had already attained its height and Zenith. But if we come to ballance them by their ſubſtance and weight, we ſhall find them for the moſt part but light, and their writings to contain very much Chaff, and but a little Corn. For a great many of them have framed large Volumes of this knowledge, and the other parts of Nature, which had no other foundation to ſtand upon, but onely the notions and fanſies of their own brains; others were

onely Transcribers of what others had written before them, but had little or no further experience, and so onely added to the bulk of those kind of Writings, but not at all to the substance or matter. Others that experimentally knew something in this occult Science, yet delivered their knowledge so darkly, that few were thereby instructed or bettered; and some few were painful and experienced men in these matters, and did as freely communicate their knowledge. And therefore amongst so great a multitude and variety, that the Reader may in some sort receive satisfaction, and know by which of them he is most like to profit, we shall propose some few (for it would be endless to enumerate all) and those we shall rank into these three orders: 1. Speculative Authors. 2. Mystical Writers, or Chymists. 3. The Authors that were experimental Observators.

1. By Speculative Writers I understand such, who by their deep contemplations, notions, and working of their brains, thought they had catched Nature in a Net, and so kept her, that they were able to understand all her operations, both hid and open, and so framed large Volumes of the whole operation of Nature, as though they had been skilled in all things, when the least individual may afford matter to stagger and baffle the greatest of Philosophers, of which we shall name some, not in the due order of the times they lived in, but as they occur to our memory.

1. We shall first begin with the Græcians, who though they were accounted the great Masters in all kind of Learning, yet hath there flowed down to us but little scantlings of this kind of knowledge. For *Plato*,

Plato, one of the most knowing amongst them, in all his Works (which are pretty large) I do meet with little concerning Metals and Minerals, except some little where he speaketh of their generation; which we shall have occasion to mention hereafter; for he was more frequent in confuting the Opinions of others, then in asserting his own; and rather adhered to dubitation then to positive affirmation.

2. As for *Aristotle* accounted the Prince of Learning, and one who would seem to be (almost) ignorant of nothing, yet what he hath written in this kind of Learning, is but in general; and far short from giving satisfaction to searching spirits, concerning all the particulars of Mineral knowledge, and that which in general is handled by him concerning their generations, is not received by the most learned, nor will hold good with Experiment and Observation. And therefore I cannot but mind the Reader of that ingenious Confession of *Zabarell* concerning *Aristotle*'s writing of Minerals; where he saith, *Non sum enim in eo communi errore, ut putem necesse esse Aristotelem ita perfectam tradidisse naturalem Philosophiam, ut nihil quod ab humano ingenio inveniri, aut cognosci queat, prætermissum ab eo potuerit.* "For I "am not in that common error, that I should think "that it is needful that *Aristotle* should have delivered natural Philosophy so perfect, that nothing which "can be invented, or known by the wit of man, was "prætermitted by him. Jac. Zabar. l. 1. c. 30. p. 84.

3. *Hippocrates*, a most famous Physician, yet in all those Works that have come down to our Age, there is little or no mention made of Minerals or Metals, so that we cannot understand what his knowledge

Gal. de Comp. Med. lib. 3. p. 1162. Id. lib. De Antidot. pag. 1280.

was in these things. And as for *Galen*, though he were a most learned and laborious person that spared no pains to come to the knowledge and attainment of good Medicaments; for it seems that yearly forth of every Nation, he took care to have the most excellent Medicaments brought unto him: as also for the same cause that he travelled into *Syria*, *Cyprus*, and *Lemnos*, and left a learned Piece behind him, of the nature of Simple Medicines; wherein he describeth the nature of many Minerals, as to their use in Physick, and did know divers that were artificially prepared; yet for any deep knowledge that he had in the generation and production of them, it is not manifest, seeing he took Quicksilver to be prepared by Art, and not produced by nature; and whether it would kill, being taken inwardly, or applied outwardly, he had not tried.

Id de Simp. Med. lib. 9. p. 1125.

4. *Dioscorides*, an ancient and learned Greek Author, writ six Books, *De re Medica*. Upon which *Matthiolus* hath made a large and learned Commentary: in the fifth of which there are very good descriptions of Metals and Minerals, and their Vertues; by which a diligent and heedful Reader may gain much worthy knowledge, and especially by those clear expositions that the laborious Commentator hath made upon the Text. Yet it is to be noted that the Author *Dioscorides*, had been more conversant in the Refining Shops then in the Mines, as speaking but little of the generation of Metals in the bowels of the Earth.

5. I must by no means omit *C. Plinius Secundus*, who collected and writ a Book which he calls his *Natural History*; a stupendious and laborious Piece, where

where in the 33. and 34. Book, he treateth of Metals and Minerals, according to what it seems he had gathered from the Ancients; and declareth many notable things of them, hardly elsewhere to be found in any that preceded him; and may yield singular instruction to an heedful Reader. Yet are not the things he treateth of so clear, but that later Observations have discovered divers defects in them (if not errors) which our search and industry ought rather to amend and perfect, then to censure and condemn.

6. As for the numerous, and almost innumerable rabble of the School-men, Expositors, Commentators, and followers of *Aristotle*, they have all of them (except in some small trivial points) danced after his Pipe, and added little or nothing of new discovery, but rested satisfied in following his tract. And for *Fuchsius*, *Brasavolus*, *Baccius*, and such like, they have not much deviated from the rest; though in their Writings there be some things worthy of note, and may much better the understandings of such as be ignorant, if they take care to try before they trust, and not to take every thing for a truth that they may find in them.

7. I cannot but rank *Hieronymus Cardanus* and *Scaliger* together; who (excepting their niceties, quibbles, and disputes) have many things in them that may conduce to the improvement of this kind of learning: though neither of them, in my judgment, have shewed any great solidity gained by experience or observation. Onely I shall not forget *Johannes Henricus Alstedius*, in that little Piece of his of *the Mineral Kingdom*; which, both for method and matter, may

Encyclop. Phys. par. 4. p. 487.

may serve for an Introduction to a Learner or Beginner. I cannot but here also remember, and commend the Book *De Metallicis*, set forth by *Andreas Cæsalpinus*, because it is a pretty compendious Piece, comprehending most Metals and Minerals that were then known; and seems to be a good Collection of what had been formerly written in the common way; though it have little of later Observations in it; nor tasts not much of experience or trial.

8. The Jesuite *Bernardus Cæsius* writ a Voluminous Piece of Minerologie, or Natural Philosophy; wherein, though he expatiated too far to fetch in all things that might seem any way of kinred to that kind of knowledge; and that it was but a meer Collection and heap stoln from other Authors, and hardly any thing except notions; yet is there something in it (especially concerning the signs of discovering Mines and Ores) that may advantage such a Reader, as either hath the skill, or will take the pains to sever the Tares from the Wheat, and separate the gold from the dross. But I must by no means pass in silence that universal Scribler and Rhapsodist, *Athanasius Kircherus*; who after a great many huge and barren Volumes, did promise the World a Work, by him styled *Mundus Subterraneus*, which put all the Learned into great expectations of some worthy and solid Piece of Mineral knowledge; but, alas! when it appeared, every Reader may soon be satisfied, that there is but very little in it, except the Title, that doth answer such conceived expectations, or fulfill such great promises. For excepting a few Queries sent to the Emperours Officers in *Hungary* and *Germany*, and Answers unto them, there is neither

any

any solid, or new discovery of any thing material, tending to advance Mineral knowledge; but it is fully stuffed with Scandals and Lies against *Paracelsus*, *Arnoldus*, and *Lully*, whose Art of Transmutation or Maturation of Metals he laboureth to prove to be false; of which he knows no more then a blind man doth of Colours.

2. As for Mystical Writers or Chymists, I put them in two ranks. 1. Those that knew and writ of Vulgar Chymistry. 2. Those that knew and writ of the Mystical part of Chymistry.

1. And for the first, I shall onely reckon some few, as *Quercitanus*, *Mylius*, *Beguinus*, *Sala*, *Faber*, and such like, who though they have written much in the way of preparing Minerals for Medicaments by Chymistry, yet have they done little to the discovery of the Nature and Generation of Metals: but yet some few things are here and there interspersed in their Works, that may be worth the taking notice of, and may be of very considerable use to an intelligent person, of which, in some places hereafter, we may have occasion to speak.

2. As for *Libavius*, though he would seem very knowing, and a great Chymist, yet it is manifest to all that understand aright, that though he was a great Broyler in *Gebers* Kitchin, yet he never came to enter the Closet of *Philosophick* Secrets: yet hath he (though a bitter and sworn Enemy to *Paracelsus*) gathered some very true and profitable things from the Writings of other good Authors, which are worthy to be regarded. For it is discretion in every Student and Reader, to chuse the good in any Writer, and to leave that which is bad: for there are few Authors that have not some mixture of both.

3. I

3. I cannot but commend to the ſtudious of Mineral knowledge, the *Naturæ ſanctuarium* of *Henricus Nollius*, who amongſt other things, hath methodically compriſed the Doctrine of Metals and Minerals; wherein there are many neat and witty things very worthy to be obſerved. I might here add to theſe a great number of the like, but theſe are ſufficient.

2. As for the Myſtical Authors that have treated of the Nature and Generation of Metals, though they have written ſo obſcurely, that the darkneſs of their Writing might deter the moſt earneſt deſirers from reading or ſtudying of them: but they muſt remember that, *Difficilia, quæ pulchra*; and that, *Dii ſua bona laboribus vendunt*; and that the kernel is not had, but by removing the huſk and breaking the ſhell. And I muſt aſſure them, that they above all others have written moſt truly, and experimentally of the Nature of the Mineral Kingdom, (as perhaps we may ſhew hereafter) and whoſoever ſhall come truly to know the Nature and Generation of Metals and Minerals, will then underſtand that they have not written Lies.

1. And firſt thoſe that I ſhall commend unto the Reader of them that were more ancient, are *Morienus Romanus*, *Arnoldus de Villa nova*, *Albertus Magnus*, and *Raymundus Lullius*; theſe, if rightly underſtood, will give thee a great light and entrance into the knowledge of Metals and Minerals. Neither are our Countrymen, *Roger Bacon*, *Thomas Norton*, and *George Ripley*, any way inferiour unto them. And to theſe may be joyned *Roſarius Philoſophorum*, and all the Authors contained in the *Muſæum Hermeticum*, to which might be added many others.

2. There

2. There are none more excellent (eſpecially in declaring the root and ſeminary power of Metals) then the learned *Bernardus Treviſanus*, who in his Book of Alchymy, and his learned Epiſtle to *Thomas de Bononia*, doth fully and clearly diſcover the hidden nature, generation, root, and properties of Metals; ſo that nothing can be wiſhed for more of an intelligent Reader; though he muſt note, *ut perſpicuus apparet, ita profundus delitеſcit*. To whom I may adjoyn the ſubtile Philoſopher *Michael Sendivogius*, who in his *Novum lumen Chymicum*, and his Book *De Sulphure*, hath candidly opened the ſecrets of the Metalline Kingdom; though as he adviſeth, he be to be underſtood, not according to the ſyllables, but ſenſe; and all things are to be interpreted according to the poſſibility of Nature. Neither is the acute and learned man *Michael Mayerus*, in the moſt of his Writings of leſs value and eſteem; having in many places unlocked thoſe ſecrets of the Mineral Kingdom, that lay cloſe covered in the Ænigma's and Parables of others; but to be often read, and pondered upon with ſober heed, and careful attention.

3. The next (who above all of this ſort of Authors) I do moſt approve of and commend, is the Frier *Baſilius Valentinus*; who beſides his many Writings of Metals and Minerals, and of the rare Medicines, and ſecrets contained in them, hath written an elaborate Tract of all the particulars that any way may pertain to Minerals. A work ſo abſolutely compleat, that I know not any that may juſtly be compared unto it. And though it was written in the Germain Tongue, and but lately tranſlated into Engliſh; and that he altogether uſeth the terms of the Work-

men, or Miners, which renders it more difficult to be understood; yet he that will learn this knowledge must forbear no pains, but must labour about the Pits and Groves where Metals and Minerals are got, and converse with the Labourers as well as with Books, for else their Terms and Language will not be understood; the want of which, hath caused no small stop to the progress of this knowledge.

4. I come now to that much wronged, though most experienced person, *Theophrastus Paracelsus*, who (notwithstanding the malice of *Erastus* and all his followers) did really understand more of the nature, generation, and properties of Metals, (which we shall make good in the ensuing Discourse) and of the Art of Medicine, then all those his malignant Enemies, or many hundreds besides: And had taken more pains, and made more dangerous peregrinations, even from his Cradle (being brought up under a learned Father, and the most knowing men that *Germany* in that time produced) to attain this knowledge, then any other person we know or read of; and doubtless knew and had seen more several Mines, then any one that his Enemies are able to name; as we shall have occasion to shew hereafter.

5. Let us close up this Class of Authors with that late learned, and deeply experienced person *Johannes Baptista van. Helmont*; who though he left no Treatise (that ever came to light) that was purposely written upon this Subject, yet hath he enriched his Writing with much deep Mineral knowledge. So that it is to me no small wonder, that seeing his Writings are so much read, and studied, that now an *Helmontian* seems to overtop a common *Chymist*, *Paracelsian*, and

and *Galenist*, that none hath taken the pains to gather up those Pearly drops of Mineral learning, wherewith here and there he hath watered his polite and pithy sheets; unless it be because that the most of his Followers and Readers are drawn, with too longing a desire, to obtain his Arcana's and great Medicines, thereby to purchase profit and honour, that they little regard the advancement of the Commonwealth of Mineral knowledge and learning.

3. The third sort of Authors that were mentioned, were those that I termed *Experimental Observators*, as the most of those were that I shall now recite; for either they were such as attended the Mines, or went thither to converse with the Workmen to inform themselves, or bore some Office about those places, or were those that either for curiosities sake, or to enrich their knowledge, did gather together all the Minerals they could, or used the most of all these ways to gain understanding. And therefore I commend these above all the rest before named, to be read and studied of all Officers and men belonging to any Mineral or Metallick Works; and of all young Students and Beginners that seek after Mineral knowledge: because these Authors speak not altogether by Opinion, Fansie, and Conjecture; but forth of their own experience, and the experience of those that were conversant about the Mines, and getting of Ore, and purifying and refining of them; and therefore more certain to be relyed upon for Leaders and Teachers. And more, because they have written what they knew, openly and plainly as the Subject would bear; and not in Parables, and Æniginatical expressions.

1. The first I shall offer (and not one of the least in worth) is *Georgius Agricola*, a person of great experience and laboriousness; who being born in a Country (as *Melchior Adams* asserteth) that was exceeding fertile of all sorts of Minerals, was thereby the better inabled to make a good progress towards the attainment of that kind of knowledge. To which he added industry and diligence; for coming to live in the Valley of *Joachim*, he was thereby better fitted for such a purpose: and the forenamed Author saith, That what time he had to spare from curing the sick, in attending his health, from his domestick affairs; he bestowed all that partly in inquiring of persons that were skillful in the Metallick Art, partly in reading the Writers, Greek and Latine, who had committed any thing to memory concerning Metals. But when he saw that very few things of that nature were extant, and that more were lost, he determined to write of subterraneous things; that which he had read or learned of such as were skillful in Metallick knowledge, or which he had seen in the Mines, or Work-houses.

Melch. Adam. in vit. Agricol. p. 84.

This Author therefore had all those advantages that might enable a man to be sufficiently furnished to write of Mineral knowledge. As first, his reading of what others had left upon Record. Secondly, His learning from those that were experienced in matters belonging to Fossiles and Minerals. Thirdly, That which he had seen and observed, either in the bottom of the Pits and Mines, or in the Work-houses or Shops where the Metals and Minerals were prepared, separated, and refined; three such advantages as seldom concur to promote the knowledge of one person.

2. Ano-

2. Another that I shall name, is *Johannes Mathesius*, who giving his mind to this piece of Learning, and living in the Valley of *Joachim*, where were store of Metals and Minerals; came thereby to be enabled to leave behind him that learned Piece, which he called *Sarepta*, which he writ in the German Tongue; it being an Exposition of all those places of holy Scripture, where any mention is made of Metallick matters. A Work of that worth, for declaring experimentally the nature, generation, increase and decrease, ascension and descension, perfection and decay, and other properties of Metals, that I know few can equalize it, except *Basilius Valentinus*.

3. A third is *Johannes Kentmannus*, who writ an excellent Treatise, which he styled, *A Nomenclature of such Fossiles as were especially found in* Misnia, *and also in other Regions*. A Book that sheweth not onely the Authors learning, but diligence and veracity; he chiefly writing of those things that were to be found in his own Country: and therefore he the easilier might come to the certain knowledg of them. Wherein it appeareth that he was most painful, having gotten a Repository furnished (besides many things else) with Gold, Argent Vive, Copper, Metallick Cadmia, Plumbago, Pyrites, *Plumbum nigrum, Cineraum, & Candidum*, Antimony, Iron, and Steel, that is doubtlesly the Ore of all these.

Melch. Ad. in vit. Jo. Kent. p. 128.

4. In the next place I shall name *Caspar Schwenckfeldt*, who writ a Catalogue of the Plants and Fossiles of his own Countrey *Silesia*; a Work by many much commended, (for I have not seen the Book) and is of much affinity with the Authour foregoing. Also

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Christophorus Encelius writ a Book, *De re Metallica*; wherein there is much of truth shewn, and seems to have proceeded from a candid mind, and was in part the product of his own experience. A Piece for its method and brevity, very fit for a Fresh-man in these studies. *Andreas Soleas* may well also be remembred, who is exceedingly commended by *Mayerus*; but I shall say the less of it, because I have not had the happiness to peruse it. But *Sebastianus Munster* in his Book of Geography, hath many things concerning Metals, which are very well worth reading, and a serious consideration. I should have inserted *Gabriel Fallopius* with those of the first rank, but had forgot him; yet must now commend him to the studious, as one that hath toyled sore by Arguments to promote Mineral knowledge.

5. I had almost forgot that famous Chymical Physician *Martinus Rulandus*; who, besides his excellency in the Medical Profession, and his good fortune in curing diseases, being a Master of many rare Arcana's; hath also taken no small pains to enrich his mind with the knowledge of Minerals and Metals: as his most learned Book, called by him *Lexicon Alchymiæ*, may witness. Wherein, besides his great reading in all foregoing Authors that had written of that Subject, he hath manifested extraordinary pains in getting the knowledge of most (if not all) the several Ores of Metals and Minerals, that were contained within the large Territories of the German Continent, and the names of the places where they were gotten. A Work truly worthy of eternal commendations, and of that singular use, that no person studious of Mineral knowledge, can well be expert, without the perusal and understanding thereof. 6. Last-

6. Lastly, I shall commend unto all diligent inquirers into the knowledge of Metals and Minerals, the Writings of that learned Chymist and great Traveller *Johannes Agricola*, his two Volumes upon *Humerus Poppius* Book of Antimony; wherein is contained many rare observations about the generation of Metals, that are hardly elsewhere to be found or read. As also those curious pieces concerning Chymical preparations, and the nature and properties of Minerals, written by *Johannes Pharamundus Rhumelius*: wherein is contained the description of the *primum ens auri*, and of some other rare Minerals that scarcely any other Author hath named, or made mention of. And though both these Authors were written in the High-Dutch Language, and not yet (that I can understand) translated, yet I thought good to mention them, because it may stir up some others (of more abilities then my self) to procure and peruse them, and perhaps of rendring them into our *English* or the *Latine* Tongue.

To these may be added that Elaborate Piece of *Olaus Wormius* which he calls his *Musæum*; wherein is not onely contained many rare Ores of Metals and Minerals, but a succinct History of all that belongs to the Subterranean Kingdom.

CHAP.

Chap. III.

Of the generation of Metals, and whether they grow, and have Vegetability, or not.

IT is the general Opinion, not onely of the Vulgar, but also of most of the Mine-men that I have conversed withal, (which have been no small number) that Metals do not grow in the Earth, but were all at once created of God; and so have no seminary principle to propagate themselves by. Which fooliſh Conceit the moſt part of learned men have rejected; nay, even the *Collegium Conimbricenſe* it ſelf; and therefore it is needleſs to waſte time in the confutation thereof.

Now though the whole ſtream of Myſtical Authors, or Adeptiſts, have aſſerted the generation and growth of them; yet have they rather left it as a Principle to be granted, and believed of their Diſciples, or handled it ſo darkly, that few have been able thorowly to underſtand it. And therefore (as a point moſt material and neceſſary) we ſhall labour as much as in us lies, to make it clear, both by reaſons, and obſervations from credible Authors.

Reaſ. 1. Our learned and ingenious Countryman Doctor *Forden*, giveth this Reaſon for the generation of Metals: and ſaith, "It appears in *Geneſis*, that Plants "were not created perfect at firſt, but only in their ſe- "minaries: for *Moſes*, *Chap.* 2. gives a reaſon why Plants "were not come forth of the Earth; *ſcil.* becauſe (as "*Tremellius* tranſlates it) there had as yet neither any "rain

L. of Nat. Bath. &c. c. 11. p. 51.

"rain fallen, nor any dew aſcended from the earth, "whereby they might be produced and nouriſhed. "The like we may judge of Minerals, that they were "not at firſt created perfect, but diſpoſed of in ſuch "ſort, as they ſhould perpetuate themſelves in their "ſeveral kinds. And to this ſame purpoſe the pro- "found *Sendivogius* ſaith, *Et quam prerogativam ve-* "*getabilia præ metallis habent, ut Deus illis ſemen inde-* "*ret, & hæc immerito excluderet? nonne ejuſdem digni-* "*tatis metalla apud Deum cujus & arbores? Hoc pro* "*certo ſtatuatur, nihil ſine ſemine creſcere, ubi enim* "*nullum eſt ſemen, res eſt mortua.* And what pre- "rogative have Vegetables above Metals, that God "ſhould put ſeed into them, and undeſervedly exclude "theſe? Are not Metals of the ſame dignity with "God that Trees are? This may be ſet down for cer- "tain, that nothing doth increaſe without ſeed; for "where there is no ſeed, that thing is dead.

No. lum. Chym. tract. 6. p. 30.

Reaſ. 2. A ſecond reaſon is alſo given by the laſt named Author; who ſaith, "*Neceſſe eſt ergo, ut vel qua-* "*tuor elementa creent ſemen metallorum, vel ea pro-* "*ducant ſine ſemine: ſi abſque ſemine producuntur,* "*tunc perfecta fieri non poſſunt, ſiquidem res omnis ſi-* "*ne ſemine imperfecta eſt, ratione compoſiti.* There- "fore it is of neceſſity, that either the four Elements "ſhould create the ſeed of Metals, or that they ſhould "produce them without ſeed. If they be produced "without ſeed, then they cannot be made perfect; "ſeeing every thing is imperfect without ſeed, in "regard of the Compound.

Ut ſupr.

Reaſ. 3. A third reaſon I take to be this, To prove that Metals are generated: That whoſoever hath diligently conſidered the manner how moſt Metals do lie in their

wombs, or beds, which for the moſt part are hard Rocks, Cliffs, and Stones, or things equivalently as hard as they, as lank and ſpare, muſt neceſſarily conclude, that they could never have penetrated the Clefts, Chinks, and porous places of ſuch hard bodies, but that before their entrance into thoſe cavities, they were in *principiis ſolutis*, either in form of water, or vapours, and ſteams. And then were thoſe ſteams, or that water produced before their induration into a Metalline form, and after concocted and maturated into ſeveral forms of Metals; which is an analogous, if not an univocal generation; otherwiſe they could never be found in ſuch ſtreight paſſages, and narrow cavities, as all experience doth teſtifie they are.

Reaſ. 4. The laſt reaſon, though ſome may account it light, yet I hold it (and ſo will all perſons that underſtand the Philoſophers grand Secret) to be very cogent; and that is, that either the maxims of the great Maſters of abſtruſe Philoſophy, is falſe; as that Natures ultimate labour is in time to bring all Metals to the perfection of Gold: which ſhe would accompliſh, if they were not unripe and untimely taken forth of the bowels of the Earth; or elſe it is falſe that Metals do not grow, and have vegetability. For thoſe unripe ones, as Quick-ſilver, Lead, Tin, and others, have been by the ocular teſtimony of *Helmont*, who confeſſeth that he had divers times had the Gold-making powder in his hands, and of other Authors of unqueſtionable veracity, and ſome others yet living, have been maturated into Gold; which muſt of neceſſity be falſe, if Metals, by reaſon of their Analytical Homogeneity, which in all is Mercurial, had not an intrinſecal power of vegetability; for then Art (which is nothing but by its

its help, an acceleration of the work of Nature; and performing of that in a ſhort time, which Nature only, without the help of Art, could but accompliſh in many years) could never bring to paſs. For though that the producing of Glaſs forth of Sand and Aſhes, be done by Art, and the force of the fire, and ſo is as it were the product of Art, and in a manner a new creature; yet if Nature intrinſecally had not contained it in its power, Art could not have produced that effect. So that it is clear, that either Metals have an analogous kind of vegetability in them, or elſe the Art of tranſmutation of Metals is falſe, and all the grounds of the more abſtruſe Philoſophy, without verity.

Now we ſhall prove by the obſervations of Authors of credible veracity, that Metals have growth and vegetability. And firſt we ſhall begin with our Countryman Doctor *Forden*, who ſaith thus, "Our "Salt-petre men find, that when they have extracted "Salt-petre out of a floor of earth one year, within "three or four years after, they find more Salt-petre "generated there, and do work it over again. The like "is obſerved in Allom and Copperas. *Obſerv.* 1. Of Nat. Bath. &c. c. 11. p. 51, 52.

"And for Metals, our Tinners in *Cornwall* have ex-"perience of Pits which have been filled up with "Earth, after they have wrought out all the Tin they "could find in them, and within thirty years they have "opened them again, and found more Tin generated. "The like hath been obſerved in Iron, as *Gandentius* "*Merula* reports of *Ilna*, an Iſland in the *Adriatick* "Sea, under the *Venetians*, where Iron breeds con-"tinually, as faſt as they can work it; which is con-"firmed alſo by *Agricola* and *Baccius*. The like we

"read of at *Saga* in *Lygiis*, where they dig over their "Iron mines every tenth year. And of *Ilna* it is "remembred by *Virgil*, who saith, *Ilnaque inexhaustis* "*Chalybum generosa metallis*. *John Matheſius* gives "us examples almoſt of all ſorts of Minerals and Me-"tals, which he had obſerved to grow and regene-"rate. The like examples you may find in *Leonardus* "*Thurniſſerus*; *Eraſtus* affirms that he did ſee in *S. Joa-*"*chims* dale, ſilver grown upon a beam of Wood "which was placed in the Pit to ſupport the Works; "and when it was rotten, the Workmen coming to "ſet new timber in the place, found the ſilver ſtick-"ing to the old beam. Alſo he reports that in *Ger-*"*many* there hath been unripe and unconcocted ſilver "found in Mines; which the beſt Workmen affirmed "would become perfect ſilver in thirty years. The "like *Modeſtinus*, *Facchius*, and *Matheſius*, affirm of "unripe and liquid ſilver; which when the Work-"men find, they uſe to ſay, *We are come too ſoon.*

In Sarept. Concl. 3. 11, &c. n Alchym. magn De Me-tallis p. 17. & 19.

And in the ſame place before quoted, I find *Eraſtus* to have this relation. "I have (he ſaith) two ſtones "of Iron, one of an Ironiſh colour, the other of the "colour of the ſhell of a ripe Cheſnut; altogether "ſoft and fatty, that they may like butter be wrought "with the finger; from which notwithſtanding, hard "and good Iron was extracted by the fire.

Obſerv. 2. And to confirm this that Dr. *Forden* hath ſaid, we know certainly that in many places of this Nation where perſons make a kind of a trade to draw forth Salt-petre, they keep Earth (fit for that purpoſe) in Cellars, where once in three or four years (though formerly all the Salt-petre hath been extracted) it will renew it ſelf, and be fully impregnated with more Salt,

Salt, as is moſt likely, from the Atoms of Salt diſperſed in the air, or *æther*, which ſome hold to be nothing elſe but pure volatiz'd Salt.

It is alſo common in the Northern parts of *England* to dig up certain ſorts of bituminous earth to burn, which is much of their firing where there is want of Wood and Coals, and they commonly call them *Peats*, being digged two or three yards, and ſometimes leſs or more deep, forth of the ground; which places they call *Peat-pits* and *Moſſes*, of which they have divers. And when they have digged ſome, that there is no more of that ſort of bituminous Earth left, they uſually leave one depth of a Spade-graft of that Earth, and ſo cover them with the ſoil, or firſt graſſie Earth that they cut up, and ſo leave them for certain time, as twenty or thirty years, and they will be filled, and grow up with the ſame ſort of Earth again. And though it may be ſaid, that the being filled up again is no great matter, becauſe the wind blows duſt, and the rain doth bring down mud and ſand from the higher places, by which again they are ſoon filled. Yet this will not ſolve the buſineſs, for what ſhould turn the duſt, mud, and ſand into that kind of bituminous Earth, that when they dig there again, they find them as good as before, and as fit for burning; ſo that doubtleſs that kind of Earth doth grow, and is generated. And it is as plain that ſtones do grow and increaſe, and though they may alledge, that it is but by *juxtapoſition* (as *Fallopius* feigned the term) if they mean by aggregation and appoſition of Atoms, or ſmall corpuſcular particles we ſhall concede; for ſo we imagine the moſt of thoſe we call generations (which indeed are but accretions and augmentation of

Gabr. Fallop. de re Metal. c. 6. p. 276.

ſmall

ſmall and minute bodies, already framed in their ſeveral ſeminaries, matrixes, or ſeed-husks) to be brought to perfection. But if they mean meerly by appoſition of more to that which was already gathered, onely an increaſe in the bulk, and nothing elſe, then it is falſe; for in Vegetables there is a ſeminal ſpirit, vapour, or ſteam, that doth tranſmute, and aſſimilate the juice of every Plant into this or that individual, as of a Pear into that kind of Plant, a Roſe into that kind, and ſo of the like: and in ſtones there is a petrifying quality, vapour or ſteam, that doth turn the matter aggregated, into the nature of this or that ſtone; as in flint, to flint; in greet, or free-ſtone, to the like. And that the generation of all ſorts of thoſe ſtones we call ſand-ſtones, is ſuch, by ſome liquor, vapor, or ordor, coagulating, (or as *Avicen* learnedly ſpeaketh) conglutinating the ſmall ſandy particles together, is manifeſt in thoſe ſoft red greet-ſtones that they build their houſes with, at and near *Cheſter*; for the ſand there is of the ſame colour and nature: and the ſtones may even with ones hands be crumbled to ſand and powder; and often with the ſaid greets may be obſerved great numbers of ſmall pebbles (ſilices) far more hard, and of another nature in the coagulation, cemented and incloſed in them. Which may be alſo noted in our free-ſtone (which is of a far harder nature, and ſmoother grain) in the moſt of the North parts of *England*. So that if Earth renew it ſelf with Salt regenerated; and that bituminous Earths have their increaſe, and ſtones their growth and augmentation, we may well believe that other Minerals and Metals have the like; and from hence *Sendivogius* doth draw this concluſion: *Inde*

Avic. de congel. & congl. lapid. in l. Art. Aur. p. 240.

fit

fit quod hodie reperiantur mineræ in locis, ubi ante mille annos nullæ fuerunt. From hence it come to paſs that Minerals may be found in places, where before a thouſand years ſince, there have none been.

Nov. Lum. Chym. Tract. 4. p. 314.

And that Metals do grow even like other Vegetables, is manifeſt from divers examples. For the honourable Mr. *Boyle* from the teſtimony of *Gerhardus* the Phyſick Profeſſor, telleth us in theſe words; *In valle Joachimaca* (ſays he) *argentum graminis modo & more è lapidibus mineræ velut è radice excreviſſe digiti longitudine, teſtis eſt D. Schreterus, qui ejuſmodi veras aſpectu jucundas & admirabiles domi ſuæ aliis ſæpe monſtravit & donavit.* In the vale of *Joachim*, Dr. *Schreter* is a witneſs, that ſilver in the manner and faſhion of graſs, had grown out of the ſtones of the Mine, as from a root, in the length of a finger; who hath ſhewed theſe Veins very pleaſant to behold, and admirable at his own houſe, and given of them to others.

Obſerv. 3.

Scept. Chym. p. 360.

And *Rulandus* telling of ſilver that is found pure, *quod ſtatim ſuum eſt*, as is their proper diſtinction of it from other ſorts, ſaith; *Sed hoc argentum purum tenuiſſimis bracteis amplectitur lapidem. Interdum etiam præſe fert ſpeciem capillorum, interdum virgularum, interdum globi fert ſpeciem, quaſi filis convoluti candidis aut rubris: interdum præſe fert ſpeciem arboris, inſtrumenti, montium, herbarum, & aliarum rerum.* And this pure ſilver doth imbrace the ſtone with moſt tender leaves, plates, or ſpangles. It ſometimes alſo beareth the ſhape of hairs, ſometimes of little twigs, ſometimes it beareth the ſhape of a globe or round ball, as though wrapped about with threds white, or red. Sometimes it beareth the ſhape of a

Lex. Alchym. p. 56.

Tree,

Tree, mountains, an instrument, herbs, and of other things.

Decad. 3. c. 8. p 139

To these add that most remarkable passage of *Peter Martyr*, Counsellor to the Emperour *Charles* the fifth, who relateth thus: "They have found by experience "that the Vein of gold is a living Tree, and that the "same by all ways spreadeth and springeth from the "root, by the soft pores and passages of the Earth, "putteth forth branches, even to the uppermost part "of the Earth; and ceaseth not until it discover it "self unto the open air: at which time it sheweth "forth certain beautiful colours in the stead of flowers, "round stones of golden Earth in the stead of fruits, "and thin plates in stead of leaves. These are they "which are dispersed throughout the whole Island (he "is speaking of *Hispaniola*) by the course of the Ri-"vers, eruptions of the Springs out of the Mountains, "and violent falls of the floods. For they think such "grains are not engendered where they are gathered, "especially on the dry land, but otherwise in the Ri-"vers. They say that the root of the golden Tree ex-"tendeth to the center of the Earth, and there taketh "nourishment of increase: for the deeper that they "dig, they find the trunks thereof to be so much the "greater, as far as they may follow it, for abundance "of water springing in the Mountains. Of the bran-"ches of this Tree, they find some as small as a thred, "and other as big as a mans finger, according to the "largeness or streightness of the rifts and clefts. They "have sometimes chanced upon whole Caves, sustain-"ed and born up as it were with golden pillars, and this "in the ways by which the branches ascend: the "which being filled with the substance of the trunk "creep-

"creeping from beneath the branch, maketh it self "way by which it may pass out. It is oftentimes "divided by encountring with some kind of hard "stone; yet is it in other Clifts nourished by the ex-"halations, and virtue of the root.

Now these signal observations seem fully to evince, that it is no feigned fable of the Mystical Philosophers, nor (however Ignorants may scoff and snarl) of that profound and learned Poet *Virgil*, that there is a gold-bearing and metallick Tree, as he famously hath sung,

——Latet arbore opaca
Aureus & foliis, & lento vimine ramus.

Æneid. l. 6. p. 345.

And after,

——Primo avulso non deficit alter
Aureus, & simili frondescit virga Metallo.

The deep and serious consideration of which, as also that learned description that the profound Chymist *Augurellus* gives of that noble Mineral or metallick Tree, called by him *Glaura*, so well known unto, and whose sulphur above the sulphurs of all other Minerals, is so much extolled by the experienced *Helmont*; I faithfully commend unto all the cordial lovers of Mineral knowledge, to seek for, and inquire after. And shall shut up these testimonies with that golden sentence of the golden Tree, mentioned by *Paracelsus*; where speaking of the sulphur of gold, he saith, *Hoc sulphur, si quale in aurifera arbore, & ad hujus radicem in montibus est, Alchymistæ invenire & adipisci possent, esset certe, de quo effuse gauderent.* This sulphur, if the Alchymists could find out and attain, as it

Jo. Aur. Augurel. Chrysop. l. 2. p. 36.

Par. 1. de Min. Tr. 1. p. 347.

is in the gold bearing Tree and at the root of it, in the Mountains, it would certainly be a thing of which they might fully rejoyce.

Observ. 4. Further (besides what to the same purpose hath been shewed above) it will appear that Metals may be (and have often been) found in a soft and liquid form or substance; as the forementioned honourable and worthy person Mr. *Boyle* hath instanced from *Gerhardus*, in these words: *Item aqua cærulea inventa est Annebergæ, ubi argentum adhuc erat in primo ente, quæ coagulata, redacta in calcem fixi & boni argenti.* Also that at *Anneberg* a blew water was found, where silver was yet in its first being or ens, which coagulated, was reduced into the powder or calx of fixed and good silver.

Scept. Chym. p. 360.

Theatr. Chym. Arcæ Arcan. p. 318.

The Author *Arcæ Arcan.* from *Lully* and *Matheſius* tells us this: "*Materiam, priusquam in metallicam formam congelatur, esse instar lactis coagulati butyri, quæ in butyrum diducitur, quam* Gur *vocat, quam ego quoque in fodinis in quibus natura plumbum paravit inveni.* That the matter (*viz.* of Metals) before it be coagulated into a metallick form, is like unto Butter made of the Cream of milk, which may be clamed or spread as Butter, which he (he meaneth *Matheſius*) calleth *Gur*; which I also (saith the Author quoted) have found in the Mines, where Nature hath produced Lead. To ratifie this, and to put it forth of doubt, I shall relate what I my self have found, and now have some pounds of it by me. Inquiring after this *Gur* of all persons that I could hear of that wrought in Mines, there could some of them tell me, that often in the sudden breaking of some stone, there would a liquor spurt forth bright and shining,

Hist. 1.

shining, which they regarded not, because they knew no use nor benefit to be made of it, nor knew how to save or keep it. At last, meeting with an ingenious young man, whose Father had all his days been experienced in working in the Mines of Lead in *Darbyshire*, and he therein also had been trained up from his young years: one whom I had formerly much imployed in seeking and procuring for me, several sorts of Oars, Minerals, Stones, and Earths, wherein I had found him very faithful and diligent; and discoursing with him about what liquid juyces or waters he had ever observed in digging in the Mines, and instructing him in all that I understood of such things, according as I had read in *Paracelsus*, *Helmont*, or other Writers, he thought the thing might be feasible. So according to my directions, providing himself of some woodden dishes to take with him, it was not very long ere he brought me a large quantity, found in a trench; where then he got good store of Lead Ore, such as the Miners account the best for their purpose; that is, such as will most easily run, or melt, and yield the most Lead: the description of which I shall here give as fully as I am able. It was (as he most faithfully affirmed) when he first broke the hard stone in which it was inclosed, some of it especially very thin and liquid, so as he could hardly preserve it; and the other as soft as Butter, and the inmost part of that he brought was as soft as Butter, to my touch and feeling, and the outside more hard; for the longer it lay to the air, the harder it grew. It was of a greyish or whitish colour, and would spread with ones finger upon a table, or smooth piece of wood, as like Butter as could be, but not so fatty, or greasie: and as *Hel-*

mont saith, was like unto soft soap, but most of it something harder, for he had brought it near two miles to me, and though he had made haste, yet it had hardened by the air in the way. He also brought divers of the pieces of the hard grey stone, in whose holes and cavities it lay, and some of it in the midst, little pieces of Lead, bright and pure Ore. So that if a man may give any reasonable conjecture, one would verily imagine that the piece of Lead inclosed in this soft matter, did in continuance of time change, or ripen it into its own Nature; which I will not positively affirm, but commend it to further trial and inquiry, for there had need be many careful experiments, before an Opinion be raised from them. But I remember that the Colliers and those that seek for Coal-mines, do usually before they find the Mine of Coals, find in their boring or other working, such matter as they call Crow-stone, Coal-stone, and Soap-stone; the last of which is a black substance like fat Clay, and will (as the *Gur*) spread like Butter, but will soon harden in the air, into an hard matter that will hardly be cut with a knife, and somewhat harder then the other will do, which I take to be true *Gur*; and this as a common thing I do but onely name, to illustrate the other by: which both makes me more and more admire the skill and knowledge of *Paracelsus* and *Helmont*, and to wonder at our ignorance in these things.

An observation agreeable to this (as I conceive) that I have related of mine own experience, is that of *Helmont*, which he gives us thus. "*Non raro nempe* "*contingit, quod metallarius in fodinis, saxa diffrin-*
"*gens, dehiscat paries & rimam det, unde tantillum*
"*aquæ*

"*aquæ subalbidæ virescentis manavit, quod mox con-*
"*crevit instar saponis liquidi* (Bur *voco*) *mutatoque* Intr. oport.
"*deinceps pallore subviridi, flavescit, vel albescit,* p. 157.
"*vel saturatius viridescit.* For it often happeneth "that a Mine-man in the Pits breaking stones, the "wall is opened and shews a chink from whence a "water hath flowed of a somewhat whitish greeness; "which by and by hath thickned, like soft Soap (I call "it *Bur*) and forthwith the somewhat greenish pale-"ness being changed, it groweth yellowish, or whi-"tish, or more fully greenish. This I would have the Reader to consider seriously of, in comparing it with the former relation; and to note, that whereas he calls it *Bur*, I suspect the Print is false, and that it ought to be read *Gur*.

Now we shall come to what *Paracelsus* hath left written in relation to this very particular, wherein I must needs say, that in despite of all gainsayers, or ignorant haters of him, it will appear to all judicious persons, that he truely knew more then the most of all those that went before him: and first special notice may well be taken of that remarkable passage, where he saith; "*Sciendum est, metallum quodvis;* Rer. Natur. l. 9. "*quamdiu in primo ente adhuc latet conditum, peculia-* p. 113.
"*ria sua astra habere. Quamprimum autem ad suam*
"*perfectionem venerunt, & in fixum metallicum*
"*corpus coagulantur, ab illorum quolibet sua astra re-*
"*cedunt, & corpus suum relinquunt mortuum.* It is "to be known that every Metal, whiles yet it lyeth "hid in its first being, or *ens*, hath its peculiar "stars. But as soon as they come unto their perfe-"ction, and are coagulated into a fixt metallick body, "their stars do go back from each of them, and leave

"their

Vid. Parac. l. de Rev. & Restaur. p. 43, 44, 45. & Chir. mag. p. 243, 244, & 117.

"their body dead. He likewise in other places (that I shall not recite at large, because I shall have occasion to do it more fully in another place) doth make mention of the first being, or the *primum ens auri*, in form of a red water, and to be had before it be coagulated into an hard metallick body; as also of Antimony and of Quicksilver; to which I refer the Reader, for brevity sake.

Observ. 5.

Scept. Chym. p. 357, 358.

We shall now go to prove the growth of Metals from a fuller testimony of that honourable and learned person Mr. *Boyle*, who saith: "And as for Metals themselves, Authors of good note assure us, that "even they were not in the beginning produced at "once altogether, but have been observed to grow; "so that what was not a Mineral or Metal before, became one afterwards: of this it were easie to alledge many testimonies of professed Chymists. "But that they may have the greater authority, I shall "rather present you with a few borrowed from more "unsuspected Writers. *Sulphuris mineram* (as the "inquisitive *P. Fallopius* notes) *quæ nutrix est caloris "subterranei fabri seu Archæi fontium & mineralium, "infra terram citissime renasci testantur Historiæ metallicæ. Sunt enim loca è quibus si hoc anno sulphur "effossum fuerit, intermissa fossione per quadriennium, "redeunt fossores, & omnia sulphure, ut antea, rursus "inveniunt plena.* *Pliny* relates, *In Italiæ insula "Ilna, gigni ferri metallum. Strabo multo expressius; "effossum ibi metallum semper regenerari. Nam si effossio spatio centum annorum intermittebatur, & iterum illuc revertebantur, fossores reperisse maximam "copiam ferri regeneratam.* Which History not only "is countenanced by *Fallopius*, from the Income "which

"which the Iron of that Island yielded the Duke of "*Florence* in his time; but is mentioned more expresly "to our purpose, by the learned *Cesalpinus*. *Vena* "(says he) *ferri copiosissima est in Italia, ob eam nobilitata Ilna Tyrrheni maris insula incredibili copia, "etiam nostris temporibus eam gignens. Nam terra "quæ erultur dum vena effoditur tota, procedente tempore in venam convertitur.* Which last clause is "therefore very notable, because from thence we may "deduce, that Earth by a metalline plastick principle "latent in it, may be in process of time changed into "a Metal. And even *Agricola* himself, though the "Chymists complain of him as their adversary, acknowledgeth thus much and more; by telling us "that at a Town called *Saga* in *Germany*, they dig up "Iron in the fields by sinking Ditches two foot deep; "and adding that within the space of ten years the "Ditches are digged again for Iron since produced. "As the same Metal is wont to be obtained in *Ilna*. "Also concerning Lead, not to mention what e"ven *Galen* notes, that it will increase both in bulk "and weight, if it be long kept in Vaults or Cellars, "where the air is gross and thick, as he collects from "the swelling of those pieces that were imployed to "fasten together the parts of old Statues. Not to men"tion this, I say *Boccacius Certaldus*, as I find him "quoted by a diligent Writer, hath this passage "touching the growth of Lead. *Fesularum mons* "(says he) *in Hetruria Florentiæ civitati imminens, "lapides plumbarios habet; qui si excidantur, brevi "temporis spatio, novis incrementis instaurantur*, ut "(annexes my Author) *tradit Boccacius Certaldus, "quid compertissimum esse scribit. Nihil hoc novi est;*

sed

" *ſed de eadem Plinius, lib. 34. Hiſt. Natur. cap. 17.*
" *dudum prodidit, inquiens, mirum in his ſolis plumbi*
" *metallis, quod derelicta fertilius reviviſcunt. In*
" *plumbariis ſecundo lapide ab Amberga dictis ad Aſy-*
" *lum recrementa congeſta in cumulos, expoſita ſolibus*
" *pluviiſque paucis annis, reddunt ſuum metallum cum*
" *fœnore.*

Obſerv. 6. The laſt thing that I ſhall obſerve to prove the generation of Metals, ſhall be from the quotations of *Libanius*, which I do not ſo much for the credit that I give unto him, as to the Authors that he citeth; of which I ſhall cull forth ſome, and give their meaning in *Engliſh*, that I may not be too tedious. The ſame (of which he had ſpoken before) he ſaith *Maiolius* doth record, *colloq. 19. Tom. 1. Canicul.* and is confirmed in the hiſtory of *Pannonia*. In *Pannonia*, near the City *Firmicum*, hard by the Vines, in the Spring, golden Sprigs do ſhoot forth themſelves, and of them for that cauſe money is much coined there. Alſo *Fulgoſus* (he ſaith) doth bring ocular witneſſes, *lib. 1. Fabricius ex 4. Geneallum dierum Alexandri Neapolitani.*

Liban. Alchym. Tranſmut. def. p. 207.

The ſame *Alexander* hath found by certain and faith-worthy Authors in the nearer *Germany* between *Danubius*, that there are Vines, which do ſprout forth little branches, and for the moſt part whitiſh leaves, of pure gold, which are given to Kings and chief Commanders for a rare gift, *&c.* Further, He ſaith that *Kentman* doth deliver, that of the recrements of Iron, divided into heaps, or banks made of them that are ancient, that a new Iron is excocted forth of them, *Agric. lib. 5. de ortu ſubterraneorum, cap. 1.* That Metals are generated, Iron is an inſtance, that in the Metals

tals of *Ilna*, the moſt approved Writers have committed to memory, that it doth grow again. For that to the ſame Lead ſet in a moiſt place there is increaſe, of which thing *Galen* is witneſs. Certainly thoſe Lead coverings, with which we ſee the roofs of the houſes of Noble men to be overlaid, they find to be much more heaviy after certain years, then before, when they had tried their weight; and ſo far forth that they are very often forced to change them for brazen ones. *Matheſius Concion. 3. Sareptana proponit & deducit tria.* 1. That Metals even in his time, and then, did increaſe in the Veins and Mines. 2. That one Mineral in time, did change into another that was better. 3. That a perfect Metal, unleſs it be digged up, is conſumed of the ſubterraneous fumes and heat.

Obſerv. 7. There is another remarkable obſervation quoted by the forementioned Mr. *Boyle*, which I ſhall give you in his own words, which are theſe: 'The other 'two relations I have not met with in Latine Authors, 'and yet they are both very memorable in themſelves, 'and as pertinent to our purpoſe. The firſt I meet 'with in the Commentary of *Johannes Valehius* upon 'the *Klein Baur*, in which that induſtrious Chymiſt 'relates with many circumſtances, that at a Mine-town '(if I may ſo Engliſh the German Bergſtadt) eight 'miles or leagues diſtant from *Strasburg*, called *Ma-'ria Kirk*, a Workman came to the Overſeer and 'deſired imployment; but he telling him that there 'was not any of the beſt ſort at preſent for him, added 'that till he could be preferred to ſome ſuch, he might 'in the mean time, to avoid idleneſs, work in a Grove 'or Mine-pit thereabouts, which at that time was lit-'tle eſteemed. This Workman after ſome weeks la-

Scept. Chym. p. 361, 362, 363.

'bour, had by a crack appearing in the ſtone upon a 'ſtroke given near the wall, an invitation given him 'to work his way through; which as ſoon as he had 'done, his eyes were ſaluted by a mighty ſtone or 'lump, which ſtood in the middle of the Cleft (that 'had a hollow place behind it) upright, and in ſhew 'like an armed man; but conſiſted of pure fine ſilver 'having no Vein or Ore by it, or any other addita-'ment; but ſtood there free, having onely underfoot 'ſomething like a burnt matter: and yet this one 'lump held in weight above 1000 marks, which ac-'cording to the Dutch account makes 500 pound 'weight of fine ſilver. From which and other cir-'cumſtances my Author gathers, that by the warmth 'of the place, the noble metalline ſpirits (ſulphureous 'and mercurial) were carried from the neighbouring 'Galleries or Vaults, through other ſmaller cracks and 'Cleſts, into that cavity, and there collected as in a 'cloſe Chamber or Cellar, whereinto when they 'were gotten, they did in proceſs of time ſettle into 'the forementioned pretious maſs of Metal.

'The other German relation is of that great Tra-'veller, and laborious Chymiſt, *Johannes* (not *Geor-'gius*) *Agricola*; who in his Notes upon what *Pop-'pius* hath written of Antimony, relates, that when he 'was among the *Hungarian* Mines in the deep Groves, 'he obſerved that there would often ariſe in them a 'warm ſteam (not of that malignant ſort which the '*Germans* call *Shwadt*, which (ſays he) is a meer poy-'ſon, and often ſuffocates the Diggers) which faſtned 'it ſelf to the walls; and that coming again to review 'it after a couple of days, he diſcerned that it was all 'very faſt and gliſtering. Whereupon having col-'lected it and diſtilled it *per Retortam*, he obtained 'from it a fine ſpirit; adding that the Mine-men in-'form'd him that this ſteam or damp of the Mine (re-'taining the Dutch term) would at laſt have become 'a Metal, as Gold or Silver. And afterwards he ad- Ib. p. 371.
'deth, I remember that a very skillful and credible 'perſon affirmed to me, that being in the *Hungarian* 'Mines he had the good fortune to ſee a Mineral that 'was there digged up; wherein pieces of Gold of the 'length, and alſo almoſt of the bigneſs of a humane 'finger, grew in the Ore, as if they had been parts and 'branches of trees. And doth make full recital of p. 364, 365.
'Earth renewing it ſelf with Salt-petre; as alſo of 'the Ore of Vitriol growing into Vitriol it ſelf. Add Sebaſt. Munſt.
'to this that which *Munſter* tells us, that Nature doth Geogr. p. 7.
'figure pure ſilver into the form of Trees, Rods, or 'Hairs, &c.

I have been the more large in this point, to prove the growth and vegetability of Metals and Minerals, becauſe it is not of the leaſt concern in the promoting of Mineral knowledge: and I could have added more teſtimonies, but theſe being from moſt approved Authors, I hold to be ſufficient: Onely I ſhall commend ſome particulars deduced from hence, to be inquired of by all perſons that love metallick knowledge, and have opportunities and abilities to ſearch after the ſame. As alſo to all thoſe that travel where any Mines are, and eſpecially to all ingenious perſons that are Overſeers of Mines, or imployed about them, or work in them, to take notice of theſe few Inquiries.

1. To obſerve whether Earths, of any ſort, or Stones do grow and increaſe, and after what order and faſhion?

2. And that all thoſe in our own Nation, or elſewhere, that work about Allom and Vitriol, would obſerve how their Ores do lie and are found, and whether they increaſe or not?

3. And ſeeing our Nation hath ſtore of Tin and Lead Mines, that they would obſerve, whether their Ores grow, or not, and in what manner?

4. And in Tin and Lead Mines, and all other, as of Copper, Silver, Gold, Quickſilver or Cineber, and of Iron, whether any ſuch liquid matter may be found as the *Germans* call *Gur*, or not; and of what colours and qualities, as it ſeems the water found at *Anneberg* that yielded Silver, was blew; and that which *Paracelſus* calls the *primum ens auri*, was like red water; and that of Quickſilver he calls blood, or not?

5. That inquiry may be made whether any ſteams ariſing in Mines, do grow into a metalline ſubſtance, or not?

6. Laſtly, and to inquire, whether where Ores are wrought out, that they do after ſome years renew and grow again, or not?

CHAP.

CHAP. IV.

Of the Cauſes aſſigned by the moſt approved Authors for their generations, both efficient and material, and the manner thereof.

FOr the material and efficient cauſes, and manner of the generation of Metals; We ſhall enumerate ſome opinions of the chief Authors, and leave the Reader to chuſe which he judgeth moſt probable, or moſt true; becauſe we mean not to dogmatize nor impoſe upon any, but rather to move all men to a diligent ſearch after the things of this nature, that (if poſſible) the truth of their generations may be found forth, and diſcovered.

In the firſt place we ſhall give the opinion of the *Ariſtotelians*, and to eſchew tediouſneſs, ſhall tranſcribe what Dr. *Forden* hath written in that caſe, with his cenſure upon it, and his own opinion adjoyned; becauſe that little Tract of his may be in few mens hands, and hard to be got; who relateth it thus: 'For 'the manner of generation of Minerals, although it be 'alike in all, yet it differs from the generation of ani- 'mate bodies, whether animals or vegetables, in this, 'that having no ſeed, they have no power, or inſtinct 'of producing other individuals, but have their ſpecies 'perpetuated, *per virtutem ſeu ſpiritum ſemini Ana- 'logum*, by a ſpiritual ſubſtance proportionable to 'ſeed, which is not reſident in every individual, as it 'is in animals and plants, but in their proper wombs. 'This (ſaith he) is the judgment of *Petrus Severinus*, 'how-

Of Nat. Bath, &c. c. 11. p. 53, 54, 55, 56, 57, 58, 59.

Cap. 2.

'however he doth obscure it by his *Platonical grandi-*
'*loquence*. And as there is not *vacuum in corporibus*,
'so much less *in speciebus*; for that the species are
'perpetuated by new generations, is most certain,
'and proved before: that it is not out of the seeds of
'individuals, is evident by this, that if Minerals do not
'assimilate nourishment by attraction, retention, con-
'coction, expulsion, *&c.* for the maintenance of
'their own individual bodies; much less are they
'able to breed a superfluity of nourishment for seed.
'And how can they attract and concoct nourishment,
'and expel excrements, which have no veins nor fibres,
'nor any distinct parts to perform those Offices with-
'al? Moreover they are not increased as Plants are,
'by nourishment; whereas the parts already genera-
'ted, are extended in all proportions by the ingression
'of nutriment, which fills and enlarges them: But
'onely are augmented externally upon the superfi-
'cies by superaddition of new matter concocted by
'the same virtue and spirit into the same *species*.

'The matter whereof Minerals are bred, is much
controverted; *Aristotle* makes the humidity of water
and the dryness of earth, to be the matter of all Mine-
'rals: the dryness of earth to participate with fire, and
'the humidity of water with air; as *Zabarella* inter-
'prets it: so that to make a perfect mixt body, the
'four Elements do concur: and to make the mixture
'more perfect, these must be resolved into vapour or
'exhalation, by the heat of fire, or influence from the
'Sun and other Planets, as the efficient cause of their
'generation: but the cause of their congelation to
'be cold in such bodies as heat will resolve.

Erastus.
Cæsalpinus.
Martinus.
Moresinus.
Fachius.
Magyrus.
Libanius.

'This vapour consisting partly of moisture, and partly

partly of dryness; if all the moisture be spent, turns to
'earth, salt, or concrete juices, which dissolve in moi-
'sture. If some moisture remain before congelation,
'then it turns to stone. If this dry exhalation be unctu-
'ous, fat, and combustible, then Bitumen, Sulphur, and
'Orpiment are bred of it: if it be dry and incombusti-
'ble, then concrete juices, *&c.* But if moisture do a-
'bound in this vapor, then Metals are generated, which
'are fusible and malleable. And for the perfecting of
'these generations, this exhalation is not sufficient;
'but to give them their due consistence, there must
'be the help of cold from Rocks in the earth, to con-
'geal this exhalation. So that here must be two ef-
'ficients, heat and cold. And for the better effecting
'of this, these exhalations do insinuate themselves into
'stones, in the form of dew or frost, that is, in little
'grains: but differing from dew and frost in this, that
'these are generated after that the vapour is conver-
'ted to water; whereas Minerals are generated be-
'fore this conversion into Water. But there is doubt
'to be made of frost, because that is bred before the
'conversion of the exhalation into Water, as may
'appear, *Meteor.* 1. According to this assertion,
'there must be two places for the generation of Mi-
'nerals: the one a matrix where they receive their
'essence by heat, in form of an exhalation; and from
'thence they are sent to a second place, to receive
'their congelation by the coldness of Rocks. And
'from this matrix come our Mineral waters, and not
'from the place of congelation.

Meteor 3. c. ult. Cæsalp. l. 3. c. 1.

Liban. de Nat. Metall. c. 14. Caretius. 178.

'This is the generation of Minerals, according to
'*Aristotle*; but it is not so clear, but that it leaves
'many scruples, both concerning the matter and effi-
'cients.

Septal. in Hyp. de aere, aqu. &c.

'cients. For the matter, it ſeems not probable that 'water and earth ſhould make any thing but mud and 'dirt; for you can expect no more from any thing 'then is in it, the one is cold and dry, the other cold 'and moiſt; and therefore as fit to be the matter of 'any other thing, as of particular Minerals. And wa-'ter, whereof principally Metals are made to conſiſt, 'is very unfit to make a malleable and extenſible ſub-'ſtance, eſpecially being congealed with cold, as we 'may ſee in Ice. But ſome do add a mineral quality 'to theſe materials, and that ſimple water is not the 'chief matter of Metal, but ſuch as hath imbibed 'ſome mineral quality, and ſo is altered from the na-'ture of pure water. This aſſertion doth preſup-'poſe Minerals in the earth before they were bred, 'otherwiſe what ſhould breed them at the firſt, when 'there was no mineral quality to be imparted to wa-'ter? Again, this mineral quality either gives the 'water, or the vapour of it the eſſence of the Mineral; 'and then it is not the effect of water, but of the mine-'ral quality, or the potential faculty to breed it. If 'the eſſence, then this metalline water or vapour, muſt 'have the form of the Metal, and ſo be fuſible and mal-'leable. If it have onely the power and potential fa-'culty, then the generation is not perfected, but muſt 'expect further concoction. This concoction is ſaid 'to be partly by heat, and partly by cold; if by heat, it 'muſt be in the paſſages of the exhalation, as it is carri-'ed in the bowels of the earth. For afterwards, when 'the exhalation is ſetled in the ſtones, the heat is gone. 'Now if the concoction be perfected before the ex-'halation be inſinuated into the ſtones, as it muſt be, 'if it be like dew, then it is perfect Metal, and neither 'is

'is able to penetrate the ſtones, nor hath any need of 'the cold of them to perfect the generation. If by 'cold, it is ſtrange that cold ſhould be made the prin-'cipal agent in the generation of Metals, which gene-'rates nothing; neither can heat be the efficient of 'theſe generations. Simple qualities can have but 'ſimple effects, as heat can but make hot, cold can but 'cool, &c. But they ſay that cold doth congeal Me-'tals, becauſe heat doth diſſolve them. I anſwer, the 'rule is true, if it be rightly applied; as we ſee Ice 'which is congealed by cold, is readily diſſolved by 'heat. But the fuſion of Metals cannot properly be 'called a diſſolution by heat, becauſe it is neither re-'duced to water or vapour, as it was before the con-'gelation by cold; nor is it permanent in that kind 'of diſſolution, although after fuſion it ſhould be kept 'in a greater heat then cold could be which congealed 'it. For the cold in the bowels of the Earth cannot 'be ſo great, as it is upon the ſuperficies of the Earth, 'ſeeing it was never obſerved that any Ice was bred 'there. Wherefore this diſſolution which is by fuſion, 'tends not to the deſtruction of the Metal, (but doth 'rather make it more perfect) as it ſhould do accor-'ding to the former rule rightly applied. And there-'fore this diſſolution by fuſion, doth not argue a con-'gelation by cold: which being in the paſſive ele-'ments, doth rather attend the matter then the effi-'cient of generations: for it is apt to dull and hebe-'tate all faculties and motions in Nature, and ſo to 'hinder generations, rather then to further any. It 'is heat and moiſture that further generations, as *Ovid* 'ſaith, *Quippe ubi temperiem ſumpſere humorque ca-'lorque conciplunt.*

Valeſius Sac. Philoſ. c. 49.

Singularium, l. 1. part. 1.

'And thus much, he ſaith, for *Ariſtotles* generation 'of Minerals; where the vapours or exhalations do 'rather ſerve for the collection or congregation of 'matter in the Mines, then for the generation of them, 'as *Libanius* doth rightly judge. *Agricola* makes the 'matter of Minerals to be *ſuccus lapideſcens metalliſi-* 'cus, *&c.* and with more reaſon, becauſe they are 'found liquid in the earth. *Gilgill* would have it aſhes, '*Democritus* lime: but theſe two being artificial mat-

De nat. Metal. c. 10.

'ters, are no where found in the earth. The Alchy- 'miſts make Sulphur and Mercury the matter of Me- 'tals; *Libanius* Sulphur and Vitriol. But I will not 'ſtand upon diſcourſing of thoſe materials, becauſe 'it makes little to my purpoſe. It is enough for my 'purpoſe to ſhew the manner of theſe generations; 'which (ſaith he) I take to be this.

'There is a ſeminary ſpirit of all Minerals in the 'bowels of the Earth, which meeting with convenient 'matter, and adjuvant cauſes, is not idle, but doth 'proceed to produce Minerals, according to the na- 'ture of it, and the matter which it meets withal: 'which matter it works upon like a ferment, and by 'its motion procures an actual heat, as an inſtrument 'to further its work, which actual heat is increaſed 'by the fermentation of the matter. The like we ſee 'in making of Malt, where the grains of Barley being 'moiſtned with water, the generative ſpirit in them 'is dilated, and put in action; and the ſuperfluity of 'water being removed, which might choke it, and the 'barley laid up in heaps, the ſeeds gather heat, which 'is increaſed by the contiguity of many grains lying 'one upon another. In this work Nature's intent is 'to produce more individuals according to the nature 'of

'of the ſeed; and therefore it ſhoots forth in ſpires; 'but the Artiſt abuſes the intention of Nature, and 'converts it to his end; that is, to increaſe the ſpirits 'of his Malt.

'The like we find in Mineral ſubſtances, where 'this ſpirit or ferment is reſident, as in Allom and 'Copperas Mines; which being broken, expoſed, and 'moiſtned, will gather an actual heat, and produce 'much more of thoſe Minerals, then elſe the Mine 'would yield; as *Agricola* and *Thurniſer* do affirm, 'and is proved by common experience. The like is 'generally obſerved in Mines, as *Agricola*, *Eraſtus*, '*Libanius*, *&c.* do avouch out of the dayly experi- 'ence of Mineral men, who affirm, that in moſt pla- 'ces, they find their Mines ſo hot, as they can hardly 'touch them. Although it is likely that where they 'work for perfect Minerals, the heat which was in fer- 'mentation whileſt they were yet in breeding, is now 'much abated, the Minerals being now grown to 'their perfection. And for this heat, we need not 'call for the help of the Sun, which a little cloud will 'take away from us; much more the body of the 'Earth, and Rocks; nor for ſubterraneal Fire. This 'inbred heat is ſufficient, as may appear alſo by the 'Mines of Tin-glaſs, which being digged, and laid 'in the moiſt air, will become very hot. So Anti- 'mony and Sublimate being mixed together, will grow 'ſo hot as they are not to be touched. If this be ſo Carer p. 212. 'in little quantities, it is likely to be much more in 'great quantities and huge rocks. Heat of it ſelf d- 'fers not in kind, but onely in degree, and therefore 'is inclined no more to one ſpecies then to another, but 'as it doth attend and ſerve a more worthy and ſupe-

'riour faculty, such as this generative spirit is. And 'this spirit doth convert any apt matter it meets 'withal to its own species by the help of heat; and 'the Earth is full of such matter, which attends upon 'the species of things. And oftentimes for want of 'fit opportunity and adjuvant causes, lies idle, without 'producing any species; but is apt to be transmuted 'by any mechanical and generative spirit into them. 'And this matter is not the Elements themselves, but 'subterraneal seed placed in the Elements; which 'not being able to live to themselves, do live unto 'others. This seminary spirit is acknowledged by 'most of *Aristotles* Interpreters, (and *Morisinus* calls 'it *Elphesteria*) not knowing how otherwise to attri-'bute these generations to the Elements. And this 'is the cause why some places yield some one mine-'ral species above another. *Quippe solo natura sub-'est. Non omnis fert omnia tellus.* The seminary spirit 'hath its proper wombs, where it resides, and forms 'his species according to his nature, and the aptness of 'his matter. But as *Severinus* affirms of animal seeds, 'that they are in themselves Hermaphroditical, and 'neither masculine nor feminine, but as they meet 'with *supervenient* causes. So it is in these Mineral 'seeds and species, which in one womb do beget 'divers sorts of Minerals, either according to the apt-'ness of the matter, or the vigour of the spirits.

Fachius. Martinus. Morisius. Magyrus. Libani. Velcurio. Valesius. Carerius. Braslus, &c.

Thus far this learned Author, whose reasons we shall not censure, nor confute his opinion, which may pass with as much probability as any others; but leave every one to his own liberty in judging. Onely we shall note one thing to the Reader to be considered of; and that is, where he makes Plants to be nourished and augmented by the ingression of nutriment, which fills and inlarges them; but that Minerals are onely augmented externally upon the superficies, by superaddition of new matter concocted by the same virtue and spirit into the same species. Of this we shall offer these things:

1. As for Plants we take it for a probable truth (though some may look at it as a new fansie and paradox) that the true and proper generation of the most (*if not of all*) Plants, is in the former generant Plant that did produce the seed in its husk or covering; and that the seeds contain in them a Plant of its own kind, as that was of that did produce the seed, though not to be discerned by our senses, nor, perhaps, by the best microscopes, because in many the little Plant contained in that husk or covering, is in so extream minute parts, and artificial means not yet found forth, to cause them to open themselves; nor due observations had from time to time as they open and display themselves in their several wombs in the Earth. And that after they are fallen, or cast into fit wombs in the Earth, that the warm and moist vapours, or steams of the Earth, as an external and adjuvant cause, doth soften and dissolve the husk, covering, or shell, and excite and stir up that heat in the seed, or little Plant (which is the true agent and efficient cause of its increase and growth) that before lay as it were idle, and asleep; by which means that little *embrio* doth open and expand it self, and receives in by its pores, or cavities of those parts ordered for roots (whether by attraction, or propulsion of its heat and moisture by the steams of Earth and its saline atoms, I shall not here determine) the fit warm vapours, and assimilates it to

to its own nature. And as this is (as we conceive) the growth of Plants, though commonly called their generation; so we commend this to be inquired of by all industrious persons, that if Nature (as is most probable) contain in her Cabinet the secret seeds of Minerals, then why may she not, meeting with fit matter and adjuvant causes, have those small seminary particles stirred up and put into motion, grow and expand themselves in the manner of Plants, and by taking in new matter grow and increase. This I onely offer as fit to be noted and considered of.

2. The other thing that I would note is, That though Plants when young, may receive their nutriment, by the matter having ingression by their pores; yet when they are grown older, and their trunks great and hard, it is probable that then their growth is by superaddition of more matter to their outward parts, and assimilating it into their species. For it is generally in the North parts of *England* (especially in old Oaks) that yearly great store of sap ariseth betwixt the bark and the trunck, which afterwards hardens into wood, like unto the other: and if this be a truth, as all our Carpenters, and buyers of Timber affirm, if Metals do but increase by addition of new matter to the superficies, then in some sort it differs not from the increase of Trees when grown great and old. But if the relation given by *Galen*, and approved of by *Agricola*, be true; that Lead being placed in a moist Cellar or subterranean rooms, where the air is gross and turbid, will be increased both in bulk and weight; then it must probably be by taking in some parts of that gross air, or the mineral particles contained in it, by which it makes protrusion of its parts, and

Gal. de Simp. Med. fac. p. 2124.
Agric. de ort. & caus. subter. p. 519.

and getteth an increase in weight. By all which we may learn to observe:

1. That it may be that the seeds of Metals rising in steams, may sometimes, finding a fit room or vault, setle together, and in time become an hardned and metalline substance.

2. Or that other-sometimes those mineral seeds may become setled in some holes and cavities of rocks, in the form of water, or of that thicker substance that the *Germans* call *Gur*, and so in continuance of time grow to be a Metal.

3. Or that after they be hardned into a metalline substance, if the place will give leave, may protrude it self further and further (as the roots of Vegetables do in hard Rocks and old Walls) by virtue of the mineral steams, piercing from the root, through insensible pores, or at least may ripen from one degree of perfection to another; as from Lead to Silver, and the like. For my self and divers other ingenious persons have observed, that in the late Wars, when many Castles and other old buildings were dismantled or demolished, that the Leads that were taken from off them, would have sold dearer then any other Lead; and I have heard divers persons of credit affirm, that it would yield very considerable quantities of silver, and the longer it had laid, the more. Which (if true) is an evident argument, that either by long lying, the Lead being the softer part, wasted away with the Sun and Weather, and so left more of silver in the same bulk of matter, then the same bulk of Lead contained, when newer and fresher; or else that the Silver in the Lead (as all Lead contains some more or less) did maturate some part of the Lead into its own more noble

noble Nature, or got increaſe from the beams of the Sun, or particle in the Air, or both. And theſe noble hints I onely give, as worthy to be conſidered of, and inquired after.

Now we ſhall come to the other opinion of the cauſes and manner of the generation of Metals, which is that of the myſtical Authors, learned Chymiſts, and expert Mineraliſts, which we ſhall handle fully and at large. And for order ſake, we may conſider: Firſt the matter, of which they hold they are generated. Secondly, the efficient cauſe of their generation. Thirdly, the manner how they are generated.

1. The ancient Chymical Philoſophers held, that the matter out of which the Metals were generated, were Sulphur and Mercury; but *Baſilius Valentinus*, *Paracelſus*, and the later Chymiſts have added Salt as a third; which notwithſtanding though they ſeem to make them three in number, and properties, yet they intended but one Homogeneous ſubſtance or eſſence; and the moſt of them joyned Salt with the Sulphur, ſo that in effect they held but two. And this Sulphur and Mercury they did not mean of thoſe that are vulgar, as the moſt of their adverſaries have too groſly miſtaken; and therefore it will be neceſſary in the firſt place, to clear what they underſtand by Sulphur, and Mercury, and how thoſe two are firſt generated.

No. lum. Chym. Tr. 3. p. 309.

1. Their Sulphur and Mercury they variouſly deſcribe, as *Sendivogius* ſaith: *Prima materia metallorum, & principalis eſt, humidum aeris caliditate mixtum, hanc Philoſophi Mercurium nominarunt, qui radiis ſolis & lunæ gubernatur in mari Philoſophico.* The firſt and principal matter of Metals is, the humidity of the

the Air mixt with calidity; this the Philoſophers have named Mercury, which is governed with the rayes of the Sun and Moon in the Philoſophers Sea. *Secunda eſt terræ caliditas ſicca, quam vocarunt Sulphur.* The ſecond is the dry calidity of the Earth, which they have called Sulphur. And again he ſaith, *Quatuor elementa in prima operatione naturæ ſtillant per Archæum naturæ in terræ centrum vaporem aquæ ponderoſum, qui eſt metallorum ſemen, & dicitur mercurius propter ejus fluxibilitatem, & uniuſcujuſque rei conjunctionem, non propter eſſentiam, aſſimilatur Sulphuri propter internum calorem, & poſt congelationem eſt humidum radicale.* The four Elements in the firſt operation of Nature, do diſtill by the *Archæus* (or Workman) of Nature, into the centre of the Earth, a ponderous vapour of Water, which is the ſeed of Metals; and is called Mercury, becauſe of its fluxibility and its conjunction with every thing, not becauſe of its eſſence; it is likened to Sulphur becauſe of its internal heat, and after congelation is the radical moiſture. *Treviſan* defines Sulphur thus: *Sulphur enim aliud nihil eſt, quam purus ignis occultus in mercurio, qui longo ſucceſſu temporis excitatur, atque movetur motibus corporum cæleſtium, digeritque frigiditatem & humiditatem in mercurio pro varietate graduum decoctionis, & alterationis in diverſas formas metallicas, &c.* For Sulphur is nothing elſe then pure fire hid in the Mercury, which in long continuance of time is excited, and moved by the motions of the celeſtial bodies, and doth digeſt the coldneſs and humidity in the Mercury, according to the variety of the degrees of decoction and alteration, into divers metallick forms. Elſewhere he hath called Sulphur the maſculine agent

Ibid. ut ſupr.

Ib. Tr. 6. p. 329, 331.

Alchym. p. 766, 767.

fire and air, which in the metallick ſeed doth maturate and digeſt the two feminine paſſives of Earth and Water: becauſe that heat is an intrinſick and eſſential part of the Mercury it ſelf; to wit, the two more active elements in it, that is to ſay, the Air and Fire.

Vid. Correct. Rich. Augl.

And again, becauſe Sulphur is no other thing then the pure act of the Air and Fire making hot, digeſting, or decocting the Earth and Water proportionable to it ſelf, and Homogeneous in the Mercury. And *Geber* ſaith, it is nothing elſe but light and tincture; and others call it the moſt ripe part of the Mercury. And the ingenuous and candid *Nollius* defines it thus: The Sulphur, with which *Argent vive* is impregnated, is not the vulgar Sulphur, but fire placed in the *Argent vive*, by which it is excocted into a Metal in the Mines by the intervening of Motion.

Phyſ. Herm. p. 308.

2. Theſe two are not diſtinct, as though Mercury were one thing, and Sulphur another, as extraneous bodies one to another. For *Treviſan* ſaith, Sulphur is not ſomething ſeparate by it ſelf, without the ſubſtance of the Mercury, neither common Sulphur; otherwiſe the matter of Metals ſhould not be Homogeneous, which is repugnant to the opinion of all Philoſophers. Likewiſe *Morienus* and *Aros* ſay: Our Sulphur is not vulgar Sulphur, but fixt and not volatile; of the nature of Mercury, and not of any other thing whatſoever. And *Treviſan* again ſaith: Some perſons do judge amiſs, that in the procreation of Metals ſome Sulphureous matter doth intervene; but it is manifeſt on the contrary, that Sulphur is included in his Mercury when Nature doth operate.

Ut ſupr.

Ib. ut ſupr.

3. Now for the generation of their Mercury or viſcous fatneſs, they deſcribe it thus: *Æthereus mundi ſpiritus,*

ſpiritus, quem animam appellitant, duo elementa aquam & terram inter ſe commiſcit, atque ex utriſque conjunctis ſpiritum quendam prolicit unctuoſum, eumque in centrum terræ demittit, ut ex eo ſurſum elevetur, & in matricem deferatur debitam, ac in ea in argentum vivum ſulphure, & ſale naturæ impregnatam concoquatur. The Æthereal ſpirit which they call the ſoul, doth commix betwixt themſelves the two Elements, Water and Earth; and of them both being conjoyned, doth draw forth a certain unctuous ſpirit, and doth dimit it down into the centre of the Earth, that from thence it may be lifted upwards, and be carried into a fit matrix, and in it may be concocted into *Argent vive* impregnated with the ſulphur and ſalt of Nature.

Noll. Phyſ. Herm. l. 8. c. 3. p. 313.

And *Sendivogius* thus: *Res omnes naſci ex aere liquido vel vapore, quem elementa perpetuo motu in viſcera terræ ſtillant, hunc poſtquam naturæ Archæus accepit, per poros ſublimat, & unicuique loco ſua ſagacitate tribuit, & ſic locorum varietate, res etiam proveniunt, & naſcuntur variæ. Quando enim ex terræ centro ſublimatur vapor ille, tranſit per loca vel ſicca, vel calida. Si igitur tranſit vapor per loca calida & pura, ubi pinguedo ſulphuris parietibus adhæret, vapor ille quem Philoſophi mercurium Philoſophorum dixerunt, accommodat ſe & jungitur illi pinguedini quam poſtea ſecum ſublimat, & tunc fit unctuoſitas relicto nomine vaporis, accipit nomen pinguedinis.* That all things do grow of the liquid air or vapour, which the Elements do diſtil by a perpetual motion into the bowels of the Earth, which after the *Archæus* (or Workman) of Nature hath taken, he doth ſublime it through the pores, and doth diſtribute to every place by his ſagacity; and ſo by the variety of places, various things

Nollium Chym. Tr. 6 p. 320.

do come and grow. For when this vapour is sublimed from the centre of the Earth, it passeth by places either drie or hot. If therefore the vapour pass by places hot and pure, where the fatness of Sulphur doth cleave to the walls, that vapour which the Philosophers have called the Mercury of Philosophers, it accommodateth it self, and is joyned to that fatness; which afterwards it sublimes with it self, and then it is made an unctuous thing, the name of vapour being lost, it receiveth the name of fatness.

Now having described their Sulphur and Mercury, and how they are generated, and how they differ only in property, and not in homogeneal essence, which they hold to be the matter of the generation of metals. We shall more distinctly handle it in order, and from what is already said, and to be shewed, deduce their fuller meaning.

They make the matter of the Minerals threefold. 1. The most remote matter, which they call the first; and this *Nollius* doth call the Æthereal spirit, which doth commix the two elements of Water and Earth, and draws a certain mineral spirit forth of them. And *Trevisan* saith it is the four Elements. *Etenim elementa quatuor æque sunt ad informationem asini vel bovis apta, ac ad metalla.* For the four Elements are equally fitted for the information of an Ass, or Oxe, as they are for Metals. And *Sendivogius* saith, that the Elements do continually distil down into the centre of the Earth, a ponderous vapour or water, which is again sublimed into divers matrixes.

2. The remote matter they establish to be this vapour mixt with the Sulphur that stuck to the Walls, growing into a middle substance like to fat or glutinous water.

3. The

3. The third is the *proxime*, or next matter of Metals, and that is this fat and glutinous substance, grown more thick, and may be that which before we have named *Gur*: which *Trevisan* thus excellently defines. *Apprime sciendum materiam primam esse rem ipsam, in quam immediate specifica forma introducitur, uti prima hominis materia, est utrumque viri semen & mulieris.* First of all we are to know, that the first matter (to wit of Metals) is that very thing, into which immediately the specifick form is introduced, as the first matter of a man, is both the seed of the man and woman. And this is it they call their metallick seed, in the neareſt power; for after it be conceived and brought to this, it cannot then be changed into any thing, but into some kind of Mineral. From all which, we may note these things.

1. That the sperm of Metals (to wit in its first production) is not different from the sperm of other things, to wit, an humid vapour.

2. This metallick seed is not like the animal and vegetable seed, easily to be known or had; for they say of it: *Semen minerale vel metallorum creat natura in visceribus terræ, propterea non creditur tale semen esse in rerum natura, quia invisibile est.* Nature doth create the mineral or metallick seed in the bowels of the Earth, therefore it is not believed that there is such a seed in the Nature of things, because it is invisible. And again, The Mineral seed is known of the Philosophers. And lastly: *Semen autem metallorum filii tantum doctrinæ noverunt.* But the Sons of Art have onely known the seed of Metals. Nolium Chym. T. 6. p. 319.

3. This metallick seed is but one, and not divers; for so he witnesseth, *Sunt qui opinentur, Saturnum habere* Ib. Th. 4. p. 313.

structibilitatis. There is therefore in Mercury it self (meaning metallick Mercury) as in the Elements, the neareſt cauſe or reaſon of indeſtructibility. And that Metals were generated forth of the Element of Water, I find *Plato* holding that opinion, who ſaith, *Aquæ genera duo ſunt præcipua, unum humidum ὑγρὸν, alterum fuſile χυτὸν.* There are two chief ſorts of Water, one moiſt, the other fuſile, or to be poured forth. And a little after, he ſpeaketh thus of the Water he calleth fuſile: *Ex his vero quas aquas fuſiles appellavimus, quod ex tenuiſſimis leviſſimiſque fit denſiſſimum, uniforme, ſplendidum, flavumque, pretioſiſſima res eſt, aurum floreſcens per petram compactum eſt.* But of theſe waters which we call fuſile, (or to be melted) gold flowering through the Rock is compacted, becauſe it is made of moſt tenuious, moſt ſoft (or tender) things, moſt denſe, uniform, ſplendent, yellow, and is a moſt pretious thing. The reſt may be ſeen more fully in the place quoted. And that *Paracelſus* was of opinion that Metals had for their material cauſe Water, is manifeſt; for he ſaith, *Sic ergo mirabili conſilio Deus conſtituit, ut prima materia naturæ eſſet aqua, mollis, levis, potabilis: & tamen fœtus ſeu fructus ipſius eſt durus; ut metalla, lapides, quibus nihil durius eſt.* So therefore God hath ordered by a wonderful counſel, that the firſt matter of Nature ſhould be Water, ſoft, gentle, potable. And notwithſtanding the off-ſpring or fruit of it is hard; as Metals, Stones, then which nothing is more hard.

Timæ. Plat. p. Græc. 488. Latin. 718.

Lib. de Miner. Tr. 1. p. 342.

And that Water was the matter out of which Metals and all other mixt bodies were framed, ſeems not altogether diſliked by that honourable and learned perſon Mr. *Boyle*, who ſaith; Yet thus much I ſhall tell

Sceptical Chym. p. 118.

habere aliud ſemen, aurum quoque aliud, & ſic conſequenter metalla reliqua, ſed vana ſunt iſta; unicum tantum eſt ſemen, idem in Saturno, quod in Auro invenitur, idem in Luna, quod in Marte. There are thoſe that imagine that *Saturn* hath one ſort of ſeed, and Gold another; and ſo conſequently the reſt of the Metals: but theſe are vain, there is onely one ſeed, the ſame in *Saturn* that is found in Gold, the ſame in *Luna* that is in *Mars*. And *Baſilius Valentinus*, far more fully, ſaith thus; Therefore obſerve and take notice, that all Metals and Minerals have onely one root, from which generally their deſcent is; he that knoweth that rightly, needs not to deſtroy Metals to extract the ſpirit from one, the ſulphur from a ſecond, and the ſalt from a third. For there is a nearer place yet, in which theſe three, Spirit, Soul, and Body, lie hid in one thing, well known, and may with great praiſe be gotten. He that knoweth exactly this golden ſeed, or this magnet, and ſearcheth throughly into its properties, he hath then the true root of life, and may attain unto that his heart longeth for. Wherefore I intreat all true lovers of Mineral Science, and Sons of Art, diligently to inquire after this metallick ſeed or root, and be aſſured that it is not an idle *chimæra* or dream, but a real and certain truth.

Elucidat. of the 12 gates, p. 117.

Sometimes (and perhaps not untruly) they affirm the Metals to be generated of the element of Water; as *Helmont*, who proves not onely that metallick bodies, but alſo all other Concretes to have their riſe from thence, and demonſtrateth the immutability of elemental Water, as well as of the homogeneous Mercury of Metals: Who ſaith, *Eſtque ideo in ipſo Mercurio, prout in elementis, ratio propinqua indeſtructi-*

Progym. Meteor. p. 70.

tell you at present, that you need not fear my rejecting this opinion for its novelty; since, however the *Helmontians* may in complement to their Master, pretend it to be a new discovery; yet though the Arguments be for the most part his, the opinion it self is very ancient, as there he further proveth at large: to which for brevity sake, I remit the Reader.

But no Author (in my judgment) hath more fully, plainly, and truly described the matter, manner, and order of the generation of Minerals, then that learned and most experienced Chymist *Helmont* hath done; and therefore we shall give you his opinion at full, though some part of it hath been recited before; who saith: 'Magn.oport. p.157. *Non raro nempe contingit, quod metallarius in fodinis, saxa diffringens, dehiscat paries & rimam det, unde tantillum aquæ, subalbidæ virescentis, manavit, quod mox concrevit instar saponis liquidi* (Bur. *voco*) *mutatoque deinceps pallore subviridi, flavescit, vel albescit, vel saturatius virideſcit.* The *English* of it you have before. And from thence he draweth these conclusions. 'Sic enim visum est, quod 'alias intus absque saxi vulnere fit. Quia succus ille 'interno efficiente perficitur. Est ergo prima seminis 'metallici vita, in condo, sive promptuario loci, homini 'plane incognita. Ac ubi semen in lucem, liquore vestitum prodit, & Gas incæpit sulphur aquæ inquinare, 'vita est seminis media, ultima vero cum jam indurescit. So that it seemeth, it is made otherwise within, without the breach (or wound) of the stone. Because that juice, or liquor, is perfected by an internal efficient. Therefore the first life of the metallick seed is in the cup, hole, or little cellar of the place, altogether unknown unto man. But when 'the

'the seed doth appear unto light invested, or cloathed, 'with the liquor, and the Gas hath begun to stain, or 'corrupt the sulphur of the Water, it is the middle 'life of the seed; but is the last life when it beginneth 'to harden. To this we shall onely add the opinion of the Author of the *Arcæ Arcani artificiosissimi apertæ*, who saith thus. Which, because it is large, I shall onely give in *English*. 'Therefore it is to be 'known, that Nature hath her passages and veins in the 'Earth, which doth distil Waters, salt, clear and turbulent. For it is always observed by sight, that in 'the Pits, or Groves of Metals, sharp and salt Waters 'do distil down. While therefore those waters do 'fall downwards; (for all heavy things are carried 'downwards) there are sulphureous vapours ascending from the centre of the Earth, that do meet them. 'Therefore if the waters be saltish, pure and clear, 'and the sulphureous vapours pure also; and that they 'embrace one another in their meeting, then a pure 'Metal is generated; but in defect of purity, an impure 'Metal: in elaborating of which, Nature spreadeth 'near, or about a thousand years, before that she can 'bring it to perfection; which cometh to pass either 'by reason of the impurity of the salt Mercurial 'waters, or of the impure sulphureous vapours. When 'these two do embrace one another, shut up close in 'the rocky places; then of them a moist, thick, fat 'vapour doth arise by the operation of natural 'heat, which taketh its seat where the air cannot 'come (for else it would fly away) of which vapour 'then a mucilaginous and unctuous matter is made, 'which is white like Butter; which *Matheſius* doth call *Gur*, which may be clam'd like Butter; which Theatr. Chym. Vol. 6. p. 305.

'I (saith this Authour) can also shew in my hand, a-'bove the Earth, and forth of the Earth. The La-'bourers in the Groves do often find this matter 'which is called *Gur*; but of it nothing can be prepa-'red, because it is not known what was the intention 'of Nature in that place; for a Marchasite, as well as 'a Metal, might equally have been made of it.

2. In the next place we come to the efficient cause of their generation; which *Aristotle* and his followers have made external, some of them hot, and some of them cold, and some both; vainly holding that the efficient cause in natural generations, did not enter the compound, being seduced (as is most probable) by the similitudes taken partly from artificial and manual operations, as the Painter, or Statuary, being the efficient cause of the Picture or Statue, were external and separate from them, after they were wrought and finished: Not considering that these, and the like, make no alteration intrinsecally in the compound, but onely are conversant about the figuring, and altering the dimensions of quantity: partly from humane, animal, and vegetative generations, wherein they conceive the male and female to be efficient causes of generation, and so to be external and separate from the thing generated. Which is merely false, for the male and female are but instrumental, or artificial causes of moving and ejaculating the seeds into the due matrix: which seeds being joyned together, become agent, and patient (being excited by the heat of the matrix, as an adjuvant cause) and the intrinsecal efficient cause is contained in them, which we call the *Archæus*, or seminal *Idea* that doth form and organize the body, according to the species from whence it was

was derived, if the matrix be proper, and of due kind for it. And the male and female in this do no more then the husbandman that plowerh and tilleth the earth, and then casteth in the seed, (onely Nature hath prepared and provided seed intrinsecally in the male and female, which the husbandman must have elsewhere provided by Nature for him *ab extra*) being no intrinsecal, or efficient cause of its generation or growth; but onely that particle of vital air or *æther* within it. Which being the Faber or *Archæus*, and excited with the hot and moist vapours in the Earth, or matrix, doth produce its like; or as the Holy Writ words it, gives to every seed its own body.

But to come to the true efficient cause of the generation of Metals (though what hath been said might suffice) the substance seems to be this. That the Solar particles, celestial spirit, or internal and incombustible Sulphur (which is the true fire of Nature) hid in the viscous matter or mercury, and excited and stirred up by the motion of the celestial bodies, central sun, or subterraneous fire or heat (which we shall not take upon us to determine, but leave it to the judgment of the learned Reader) doth generate, perfect, and ripen Metals; as most of what hath been said before, doth sufficiently testifie. And all do consent that Sulphur is the efficient cause, or father, and Mercury the passive or mother of all Metals.

Now for the manner of their generations, there hath been so much related in the passages of this Chapter, that we shall but onely add this short collection. That the Water being sharp and salt, and falling down in the subterraneous caverns and passages of the Earth, doth meet with the drie, sulphureous, and warm steams

that rise from the lower parts of the Earth, do joyn together, and so becomes unctuous and fat, which setling in close holes, and cavities of Rocks where the air cannot enter, as in a close womb, is in length of time thickned into a soft substance, which they call *Gur*; and after by the warmth of the place, or womb, and its own internal fire, sulphur, or heat, is concocted into a metallick body, pure or impure, according as the steams were, when they joyned together, and the place in which they are generated.

Vid. No. Lum. Chym. p. 314, 315.

Chap. V.

Of the uncertainty of the division of Fossiles, their definitions, or descriptions, and number.

THe reason why I begin here with the divisions of Fossiles, is, because I mean not to determine, but to propose, and the things being yet so far from being certainly known, that I dare but Sceptically treat of them, and recite what the opinions of Authors are in these particulars.

1. And first, That things may be plain to the Reader, as far as we are able to lay them open, by things digged forth of the Earth, commonly called *Fossilia*, we understand all elementated, and perfectly mixt bodies, growing, found, and had either in the bowels of the Earth, or in the superficial parts thereof, brought to the knowledge of our senses by any means whatsoever; thereby not intending subterraneous animal, vegetables, nor any of their parts. Which are so

so variously divided by Authors, that a man cannot well tell which of them to pitch upon, as the most perfect, but some of the chief of them we shall here recite, and leave the censure to others.

1. Mus. Worm. c. 1. p. 1.

And first the learned *Wormius* doth thus define Fossiles. *Est autem fossile, corpus perfecte mixtum inanimatum, vitæ expers, peculiari forma, & virtute seminaria à deo in prima creatione dotatum, ut sibi simile procreare, suamque speciem propagare possit.* But a Fossile is a body perfectly mixt, inanimate, void of life, endowed with a peculiar form, and seminary virtue of God in the first creation, that it might procreate a like to it self, and might propagate its species. And after doth divide them into three sorts. 1. Into middle Minerals; which have a middle nature, as it were betwixt stones and Metals; and of these he maketh four sorts. 1. Earths. 2. Salts. 3. Sulphurs. 4. Bitumens. 2. Into stones, of which he maketh two sorts. 1. Stones less precious. 2. Stones precious. 3. Into Metals, by which (he saith) he understands metallick bodies, meaning as well the Metals properly so called, as also those bodies that are of kin or nearness to the Metals. Which I confess to me seemeth as comprehensive a division of Fossiles as any other Author that I have read.

2. De re metal. l. 1. c. 1. p. 6.

Secondly, *Encelius* divides them all but into two sorts, that is to say, 1. Into the greater Minerals, which have their original from Sulphur and Mercury, and that these are all ductible and liquable. 2. Into the middle Minerals, or remote, which are not properly metallick bodies, as those that draw their original from a very weak Mercury and Sulphur, or those that consist of *argent vive*, or sulphur alone, as subventaneous

ventaneous eggs, or a Mole. This division I leave as but defective, and to be censured by others.

3. 3. I cannot now but mention the Jesuit *Cæsius*, who writ a huge Volume of Minerals, but grounded upon very little experience; in which notwithstanding a curious fansie may find many nice and speculative questions handled, and according to his notions resolved. It being the custom of those kind of men to seem ignorant of nothing, when indeed experimentally they scarce know any thing. He relateth that *Avicen* quoted by *Albertus*, *Agricola*, and others, do divide Fossiles into four kinds; as Stones, Metals, Sulphurs, and Salts. And others likewise into four, to wit, remarkable Earths, concrete Juices, Stones, and Metals. These and other divisions he sheweth, and seemeth to approve of them all, in these words. 'I say 'that the before-alledged divisions are all useful, for 'they fitly enough do distribute the whole into its 'parts, which is the office of a good division. Therefore '*Fallopius* and *Raynandus* do rightly commend the di-'visions of *Aristotle*, *Theophrastus*, *Galen*, *Avicen*, and '*Albertus*; and that the said *Fallopius* doth rightly 'prefer the fourfold division of *Agricola*, into Earths, 'Juices, Stones, and Metals, as more clear then the rest. And afterwards he forth of *Agricola*, doth enumerate six sorts; which, with the rest, I commend to be considered of.

Mineralog. l. 1. c. 8. p. 129.

Ibid. l. 2. c. 1. p. 141.

4. P. 24. 4. The Author of the *Aureus* Tract *De Lapide Philosophico*, divides them into four sorts, to wit, Stones, amongst which the matter of every kind, and Earths are understood Salts of all sorts, the middle Minerals, and Metals.

5. 5. Lastly, I shall onely add the division used by *Trevisan*,

Trevisan, not so much regarding the exactness, as usefulness, which he maketh four-fold. 'The first 'he calls of the first imposition, which are vulgar and common Stones, in which there is a bare compaction 'of the Elements. 2. The second are the *media mi-'neralia*, or lesser Minerals, as Salts, Aloms, Tackles, 'Auripigments, Vitriols, Sulphurs, &c. 3. The third are the metallick bodies, or *mineralia majora*. 4. Of the fourth sort are gems, and precious stones.

Epist. ad Tho. Bovon.

Now for the definitions and description of what a Metal is, to distinguish it from other Fossiles and compound bodies, we find the Authors as different in their opinions; and therefore the most learned and expert in Mineral knowledge, have for the most part omitted it, as too nice a difficulty and fruitless speculation, as *Paracelsus*, who giveth this; and yet however, thought of it as good and true as the best of them; who saith, 'He that goeth about to know what Me-'tals are, and from whence they arise; must under-'stand, that our Metals are no other thing, then the 'best part and spirit of common stones, that is to say, 'pitch, grease, fatness, oyl, and stone. For so hardly 'are the things of Nature to be known; that they are 'more easily to be known by similitudes then Logical 'definitions.

Lib. cœl. Phil. p. 126.

This definition is given by an *Aristotelian* thus: '*Metallum est corpus perfecte mixtum, & inanima-'tum, ex sulphure & argento vivo, mixtis & tempe-'ratis in terræ venis natum.* A Metal is a perfect 'mixt body, and inanimate, arising from sulphur and 'argent vive, mixed and tempered in the veins of the 'Earth. And first he thinks the definition to be 'good, as consisting of a genus and difference. 'The

1. Jo. Magyr. Physiol. Peripatet. l. 5. c. 1. p. 321.

'genus

'genus he makes *corpus*, because a Metal doth consist 'of three dimensions: and the difference he makes 'fourfold. 1. It is called a body perfectly mixt, to 'difference it from meteors; because there is not so 'light a concourse of the Elements in Metals as in 'Meteors. 2. It is called inanimate, to difference it 'from animate things, as Plants and Animals. 3. The 'matter of Metals is set down to be sulphur and ar-'gent vive, as the father and mother of Metals. And 'when they are said to grow of sulphur and argent 'vive mixt and tempered together in the veins of the 'Earth, by which the efficient cause, and place or 'matrix of generation is signified.

2. Muf. Worm. Sect. 3. c. 1. p. 113.

'*Wormius* gives this modest definition of a Metal. '*Metallum est corpus perfecte mistum, non vivens, sed* '*viventi æmulum, à Deo in venis creatum, ex terra* '*subtilissima, & halitibus pinguibus ex terra & aqua,* '*per calorem mistis, ut inde sulphureum & mercuriale* '*semen fiat, ex quo metalla generari possunt: quæ ac-*'*cedente salino principio concrescunt, & incrementa* '*capiunt, donec pura, & perfecta reddantur, igne fu-*'*silia, ictuque in longum & latum ductibilia.* A Me-'tal is a perfect mixt body, not living, emulating 'life, created of God in the veins, of a most subtile 'earth, and steams being fat, from the earth, and wa-'ter, mixed by heat, that from thence a sulphureous 'and mercurial seed may be made, from whence 'Metals may be generated: which do joyn together, 'and take increase, by a saline principle coming to 'them, until they be made pure and perfect, being fu-'sible by fire, and by force to be drawn into length 'and bredth.

3. 'Schroderus gives this description: *Metalla sunt* *corpora*

Pharm. Med. Chym. l. 3. c. 9. p. 42.

'corpora dura, ductilia ex succo saline sine Mercurio, vi '*sui sulphuris in terra coagulato.* Metals are hard bo-'dies, to be drawn (or ductible) coagulated of a saline 'juice or Mercury, by the force of sulphur, in the 'earth.

There might be many more definitions, or descriptions given of Metals, from many other Authors, but so defective, or imperfect, that I have onely instanced in these, to shew how lame this piece of learning is concerning Metals, that all ingenuous persons may be stirred up to a farther search into the nature and properties of them, to help to lead this knowledge towards perfection. And therefore we shall onely mention three particulars that may be observed from what hath been spoken before. 1. That if we take a Metal in the sense of the first definition of *Magyrus*, then it may comprehend both those that are strictly called Metals (not excluding common *argent vive* to be one) and those that are also called semi-metals, as Antimony and the like.

2. But if we take a Metal strictly to be, a perfect mixt, constant and Mineral body, fusible, ductible, or malleable, arising or generated of Sulphur and Mercury: and so the special difference of a Metal from all other Minerals to be its abiding the hammer, and *per se*, or of its own nature, without commixture of any other, to endure extension into length and bredth by force. Then quicksilver must be none of them, nor those that are accounted semi-metals, as Antimony, Bismuth, or Tin-glass, and the like; which of themselves will not extend under the hammer, but with the commixion of some others will easily do it. For they make a semi-metal to be a perfect mixt body, less con-

ſtant, fuſible not ductible *per ſe*, compounded of a leſs perfect Mercury and Sulphur then the former. Its difference from other Minerals, to be its metallick colour, and fuſion; and from a Metal, that it will not (without mixture of ſome other) extend under the hammer, but proves brittle and frangible.

3. But if a metallick body be taken in the largeſt ſenſe, then it ſometimes comprehends not onely thoſe that are malleable *per ſe*, but thoſe called ſemi-metals, that will not extend under the hammer without commixtion of ſome other, and thoſe other Minerals that ſome Authors call *Cachimiæ & Marchaſitæ*; of all which we ſhall have occaſion to ſpeak hereafter.

In the next place we come to ſpeak of the number of the Metals, which commonly are accounted ſeven, according to the number of the ſeven Planets, which we ſhall let paſs, as a thing aſſumed by Analogy and ſimilitude, more then by certainty and truth; but becauſe they have been moſt anciently and commonly known more then others, they have got that repute and eſteem, which we ſhall not labour to take from them.

Concerning this point we may take the judgment of *Paracelſus*, in ſtead of all; whoſe experience in Mineral knowledge was inferiour to none; who ſaith: Lib. de Miner. p. 346.

'But underſtand further of the generation of Metals,
'that there is a great number, and a diverſe variety of
'them. For a Metal is that which the fire can tame,
'and the Workman frame an inſtrument of; of which
'are Gold, Silver, Iron, Copper, Lead, Tin. For
'theſe are accounted Metals of all men. But fur-
'thermore, alſo there are certain other Metals, which
'are

'are not accounted Metals, either in the Writings or
'Philoſophy of the Ancients, or by the vulgar, and
'notwithſtanding they are Metals. Hitherto doth be-
'long *Zink*, *Cobalt*, which are tamed, and forged or
'ſtamped by force of the fire; as alſo certain *Granates*
'(ſo uſed to be called) of which there are many kinds,
'and theſe are Metals. But there are many others
'beſides theſe, that are not yet known unto me: as
'are many differences in *Marchaſites*, in *Biſmuths*, in
'other *Cachimies*, which yield Metals, but not yet
'known or diſcovered. For the chief Metals are one-
'ly known, that are more ready, and commodious for
'uſe, as Gold, Silver, Iron, Copper, Tin, Lead:
'The reſt are for the moſt part neglected through a
'certain ſlothfulneſs; neither is there much care ta-
'ken about their properties. For neither the Smith,
'nor Artiſt that worketh in Iron, or Tin, or Copper,
'regardeth them: and yet they are Metals for other
'Artificers not yet ſprung up; for none labours to
'learn, except by one way and one Art. And a little
'after he ſaith: But this Chapter of Metals doth teach Ibid p. 347.
'that there are ſix Metals in number known unto me,
'which alſo I have reckoned above: to which yet a
'few more are to be added, to wit, three or four, alſo
'known unto me; whoſe number and ſpecies do
'hereafter follow. But it is of likelihood to me, that
'yet a great number of them remains behind un-
'known. For by the probation or eſſaying of Me-
'tals, manifold trials or eſſays do offer themſelves,
'which are of a metallick nature, that is, they are ve-
'rily eſtimated according to the nature of the (known)
'Metals, but notwithſtanding they do not altogether
'agree with it; that from hence I conjecture that there
'remains

'remains a great number of Metals undiscovered. For 'every Mineral may be rightly known and discerned, if 'it be tried or tested, by a just proof or examination. 'And to this purpose *Georgius Agricola* tells us, That Berman. p. 692, 693. 'he would shew them a certain kind of Mineral, which 'was in the number of the Metals, but (as it seemed 'to him) unknown to the Ancients, which the *Ger-* '*mans* called *Bismuth*. And thereupon they reply, 'Therefore according to thy opinion, there are more 'then the vulgarly and commonly known seven Me- 'tals. To which he replies: I judge there are more, 'for this which even now I told you our Countrey- 'men call *Bismuth*, you cannot rightly say it is either De natur. Foss. l. 2. p. 575. 'white Lead (that is Tin) nor black Lead (that is, 'that Lead which is commonly called so) but differs 'from them both, and is a third kind. And again he 'tells us; That there are said to be six Metals in num- 'ber, distinct in kind, to wit, Gold, Silver, Iron, Cop- 'per, Lead, Tin; but that indeed and truth there 'are more. And that also Quicksilver is a Metal, and 'that which the *Germans* call *Bismuth*. Therefore (he 'saith) that *Ammonius* had written well, that there 'are many species of Metals to us unknown.

CHAP.

CHAP. VI.

Of the signs and discovery of Mines and Ores, both in general and in particular.

NOw we shall relate the signs of Mines and Ores, as we could promiscuously gather them from the best Authors we have, or could meet withal; and add some few of our own experience and observation. And first take these from *Cæsius*, who tells us thus: That they are either found forth by chance, or by Art and search. Mineral. l. 1. c. 7 p. 123. &c.

1. 'Sometimes Mines are found forth, without the 'industry of men; as when torrents and great floods 'do make them bare, as hapned at the Silver Mines at '*Friberg*.

2. 'By eradicating the Trees that grew over the veins of the Ore, by the force of winds.

3. 'By the falling out of stones forth of the Moun- 'tains, by the force of large Showers, Earthquakes, 'Thunderbolt and Lightning, the rowling down of 'Snow, or the force of winds.

4. 'By plowing, or accidental digging; as Gold 'was found in *Galecia*, as *Justin* reporteth.

5. 'By the burning of Woods, as hapned in *Spain*, 'in shewing Silver Mines, as *Diodorus Siculus* 'writeth.

6. 'Lastly, Any other force may discover Ores, 'as the hoof of a Horse (as it is said) at *Gose-* '*laria*.

Again,

Again, they may be discovered by Art, and probable signs before digging, or searching.

1. The heads of Springs and Fountains are to be carefully observed, and their Waters to be tried, because they cannot be far from the Vein, as having their rise or passage near them.

2. The pieces or fragments of Veins are to be marked, that the force of torrents hath laid open; for if they be smooth, it is a sign that the Vein is far off, but if fixed in the Earth, or rough, it is a sign that the Vein is near at hand.

3. The site and position of the place is to be noted, for that may be the cause that the Veins are more or less hidden in the Earth, and the pieces thrust farther off.

4. The Frosts sticking to the Grass are to be marked, which commonly are white and hoary, except they which grow over the Veins of Minerals, because they breath forth hot and drie steams, which hinder the concretion of the Frost; therefore where the Grass is moist, and not congealed with the Frost, as other Grass near the same place is, there the Vein is probably under it, and the Grass short, and of a languid and pale colour.

5. The signs of hidden Veins, are the leaves of Trees, which in the Spring time are livid and something blewish, the boughs (especially the highest) infected with blackness, or some less unnatural colour, and the stock or trunck chinked, all caused by metalline vapours.

6. The tops of Mountains which tend towards the South, and their bottoms towards the North, do afford an Argument of Metals, and especially of silver, and

and those most abounding which tend directly from the East towards the North.

7. The colour of the Mountains, Stones, and Earth, is to be regarded, for these do not onely discover Metals, but also shew of what sort they are, as a green colour Copper, a black Silver or Gold, a Purple a Fire-stone, or Marchasite, livid and wan Lead and Iron, lurid or very pale Vitriol, Copperas, or such like Juices, ashie and obscure Sulphur.

8. The smell or odour also may be reckoned amongst the signs of Mines or Ores; as when two stones of the same Mountain are rubbed hard together, if there be Metal, they will greatly smell of Brimstone.

9. Barren Mountains are also a sign of Metals, because the humour is wasted within, and the evil vapours destroy the young Plants and Grass.

10. The stones or earth being heavier then ordinary; are a certain sign of Metals.

11. If the stones shine more then ordinary, or be very solid shining but little, it is a sign of Metals. And if thou flux or melt the stones, thou shalt not onely discover the Metal, but the kind, and quantity of it. Vid. Agric. l. 1. de re Metal. p. 25, 26. Card. de Subt. l. 5. p. 158.

12. The Waters afford signs, for if they have any strange smell, or colour, they shew some Metal. The mud and sand in the bottom of Rivers and Brooks, are diligently to be examined; for something in the length of time must needs be washed from the Veins in their passage. And where there are unusual and strange Plants, where they do not thrive, but their truncks are little, leaves and branches withered, &c. are sometimes signs of Metals.

To

Rer. Natur. l. 9. p. 112.

To these we may add what *Paracelsus* saith, 'That 'coruscation, or scintillation, is a certain sign of Me-'tals that are unripe, and yet in *primo ente*; and ac-'cording as sparkling or fire is carried, so the Veins lie. 'And that this coruscation, or sparkling of fire, is to be 'seen in the night, as if Gun-powder were sprinkled 'in a long line, and then fired; so it goeth along, 'and shineth, and doth glisten, and glimmer even as 'Gold or Silver upon the Test or Cupel, when the 'Lead is separated from it. And if this glimmering 'shew whitish, it is a sign of white Metals, as Tin, 'Lead, Silver, *&c.* if red, a sign of red Metals, as 'Copper, and Iron; if yellow, yellow Metals, as 'Gold, *&c.* That this coruscation being thin and 'subtile, is the best sign; and sheweth subtile, and 'excellent Metals; and the contrary denoteth the con-'trary. And as long as these glimmerings appear, 'whether of this or that colour, little or great, so long 'the Metal is immature, and as yet in *primo ente*, as 'the sperm of a man in the matrix of the woman. But

Last Will and Test. c. 17. p. 38.

'*Basilius* saith, Seeing this stuff which this coruscation 'seizeth on, is found often in a place where no Metals 'are, therefore it is very deceitful; however com-'monly, and for the most part of a metalline 'breath.

For the signs of Metals, in or after digging, to seek them, take these:

1. If the Miners happen into a fat clayish earth, 'which discovereth a Vein of pure and fresh Metal, it 'is a very good sign, certainly shewing, that the Me-'tal of which it is a Vein, is not far off.

2. If the earth digged up have no Metal in it, but 'be very fat, and be of a white, black, yellow, red, 'green,

'green, or a bright blue or Azure colour, it is also a 'good sign of some noble Metal there. For the Mine-'men have especially a regard unto noble, neat, and 'prime colours, as green Earth, or *Chrysocolla*, *viride 'æris*, *Lazure*, *Cinnabar*, *Sandaraca*, red *Arsnick*, *Au-'ripigment*, *Litharge* of Gold or Silver, &c. For eve-'ry one of these doth for the most part shew its pecu-'liar Metal and Mineral. So *viride æris*, *Chrysocolla*, 'Green Earth, do for the most part shew Copper, 'or a cupreous Metal. So *Lazure*, or white *Arsnick*, 'or *Litharge* of silver, do for the most part shew the 'Metal of Copper. So *Cinnabar* and *Sandaraca*, or 'red *Arsnick*, do sometimes denote Gold, or Silver, or 'both mixt together. So *Auripigment*, red *Sulphur*, 'or *Litharge* of Gold, for the most part do portend 'Gold. So where *Chrysocolla* with *Lazure*, or *La-'zure* with *Chrysocolla* and *Auripigment*, are found 'mixed and confounded together, for the most part 'they shew a most excellent and rich Mineral. Where 'stones or earth are found of an Iron-like colour they 'certainly shew an Iron mineral.

3. 'It is to be noted, that sometimes the *Archæus* 'of the Earth doth thrust out, or vomit forth, by some 'hidden passages, from the lower Earth, some Metal; 'and that is a good sign that the Miners should pro-'ceed, because there is certain hope of a noble metal 'hid there.

4. Moreover, If thin leaves of metals like to Talck 'do stick to the pebles, or stones, it is a good and cer-'tain sign. Thus far *Paracelsus*.

Rer. Natur. l. 9. p. 111, 112.

Now we shall shew the signs from that laborious and experienced person, *Georgius Agricola*, which are these, very well worth noting.

De re metal. l. 5. p. 76.

1. There is often found pure Gold, Silver, Copper, 'and Argent vive; seldom Iron, or *Plumbum Cine-* 'reum, or *Bismuth*, seldom ever Tin, or Lead. But 'the little black Stones, and the rest, do not much dif- 'fer from pure Tin, which is melted by blast forth of 'them; and the best *lapis plumbarius*, or Lead Ore, 'from which the Lead is melted, differs little from 'the Metal it self.

2. 'Then after pure gold, that is, *statim suum*, that 'which is called rude, or unwrought; whether it be 'greenish yellow, or yellow, or purple, or black, or 'red without, and inwardly of a golden colour, it is 'to be reckoned as a rich Vein, because the gold doth 'exceed the stone, or earth in weight. Also every 'Vein of Gold, whereof an 100 pound weight doth 'contain more then three ounces of Gold, is rich. All 'the rest of the Veins of gold are to be esteemed as 'poor ones.

3. Earth, whether drie or moist, sometimes con- 'tains gold; but in that which is drie, for the most 'part there is more, if in the Furnace it give any good 'sign, or do not want little spangles like cat-silver. 'These Juices for the most part contain Gold, *caeru-* 'leum, or a kind of blue Sand, Azure, Chrysocolla, 'native Borax, or green Earth, Auripigment native, 'yellow Arsnick, Orpiment, or Orpine, Sandaraca 'native, red Arsnick. Also pure or unwrought gold 'doth sometimes stick or cleave, sometimes less, some- 'times more in the sand, gravel, or grittle of flints, 'little pebles, slates, or cleaving stones and marble. 'In Fire-stones sometimes it is found, but very 'rarely.

4. 'But the richness of a silver Vein is thus discer- ned;

'ned; If in 100 *l.* weight of the Ore, there be a- 'bove 3 *l.* weight, it is rich, 'otherwise it is poor, as 'is that which consists of unwrought silver. Whe- 'ther the colour be leaden, red, white, black, ash-co- 'loured, purple, yellow, liver-coloured, or of any o- 'ther sort; such also sometimes is the Vein of flint, 'slate, and marble, if much do adhere unto them. Some- 'times in Fire-stones, Cadmia, Ore of Brass, Lead 'Ore, and Ore of Antimony.

5. 'But in the other sort of Metals, though their 'Veins may be rich, yet unless they be plentiful also, 'they are seldom worth labour. But if it happen that 'any kind of gems or precious stones be discovered, 'they are diligently to be sought after; as Cements, 'Marbles, *Lapis Haematites*, Load-stone, which is u- 'sually found in the Iron mines; *Smiris*, or as com- 'monly called by Mechanicks Emery, in Silver mines; 'the *Lapis Judaicus*, Trochites, and the like, in Quar- 'ries, or elsewhere. Neither ought they to neglect 'the several sorts of Earth, whether found in the gold, 'Silver, Copper Mines, or others: nor should they 'neglect the several concrete, or hardned Juices, 'found in the metallick passages, or in their proper 'Mines.

6. 'If a yellow Earth offer it self, in which the ra- 'ments or shavings of any Metal, pure or unwrought, 'do appear, it is a good sign: For the Metallick mat- 'ter from whence the shavings are separated, must 'needs be at hand. But if it offer it self void of all 'Metallick matter, but be fat, and of a white, green, 'blewish, or such like colour, the Workmen ought 'not to give over, so they have the signs spoken of 'before.

7. But if any drie Earth offer it self to the Miner, 'which containeth pure and unwrought in it self, it is 'a good sign. If yellow, red, or black, or any other 'notable colour, which hath no Metal in it, then it is 'no bad sign, and *Chrysocolla*, *Cæruleum*, *Ærugo*, *Au-'ripigmentum*, *Sandaraca* being found, are good 'signs.

8. 'Also where a subterranean Spring casteth 'forth some piece of a Metal, we ought to pursue it; 'for it sheweth that that piece was separated from 'some greater part of the Metal. Likewise when 'very thin spangles of some Metal do cleave to the 'Rock or Stone, they are to be numbred among the 'good signs. Furthermore, Veins which forthwith 'do consist partly of flints, partly of clayish and dry 'earth; if being mixed together with fibres, and 'descend low into the earth, it is good hope that there 'is metal. But if the fibres afterwards appear not, and 'little or no metallick matter offer it self, they ought 'not to give over digging.

Vid. Achan. Kirch, Mund. subter. tom. 2. l. 10. p. 180.

9. 'But if a brown, black, horn-like, liver-colour-'ed flint appear, for the most part it is a good sign; 'but white is sometimes good, sometimes not; but the 'sand or grittle of marble, appearing in the depth of 'the Vein, is not good. And those sorts of stones 'that do easily melt in the fire, although they be trans-'parent, are to be numbred amongst the middle signs, 'if other good signs appear, they are good; if not, 'they are no good signs. And they are of some hope 'which above and below (or at the covering or bot-'tom) have a flint or marble, and in the midst clayish 'earth, &c. In like manner, where the top (or as 'our Miners call it, Cooping) and the bottom have 'an

'an Iron-like earth, and in the midst fat and clammy 'earth. So where the top and the bottom have that 'which the Miners call *Armaturam* (the harness or 'arming) and in the midst black earth, or like to burnt 'earth, these yield some hope.

10. But the proper sign of Gold, is *Auripigment*, 'natural yellow *Orpiment*, or *Orpin*. Of Silver, *Plum-'bum Cinereum*, *Bismuth*, and *Antimony*: of *Copper*, 'natural *Verdegrease*, pared off from brass stones, out 'of which it groweth; *Melanteria*, or black Earth; '*Sory*, a poisonous black pory Earth; *Chalcitis*, the 'Copper stone, or red Vitriol; *Misy*, a kind of Vi-'triol now not known; *Atramentum sutorium*, green 'Vitriol, Shoo-makers black. Of Tin, the pure black 'stones, out of which the Metal is melted, and things 'digged up like the spume or froth of silver. Of Iron, '*Ferrugo*, Iron stone. The common sign of Gold 'and Copper, is *Chrysocolla*, green Earth, or native 'Borax, *Cæruleum*, *Azure*, or blue sand. Of Silver 'and Lead, *Plumbago Fossilis*, Lead Ore, in which 'is always silver, less or more; and is also called *Ga-'lena*, *Molybdena*, and *Lapis plumbarius*. But although 'the Miners do rightly call *Plumbum cinereum* Bis-'muth, Wismuth, or Counterfein, the cover (or coo-'ping) of Silver; and that the Copper fire-stone, or '*pyrites æroſus* be the common parent of *Atramen-'tum sutorium*, *Melanteria*, and the like: Yet notwith-'standing sometimes these have their proper metals; 'as also *Auripigment* and *Stibium*. And amongst good 'signs are slate stones of a pale-blue, or black colour; 'and also Lime-stones of any colour. But a good sign 'of Silver, are little black pebles, forth of which Tin 'is drawn, especially when the intervein is made of 'such

such like. And thus far this noble Authour.

The signs to discover where Metals are that the expert Miners have informed me of, and that I have observed in these Northern parts, where the Ores that they either get or look for, are commonly **Lead**, and but rarely any Silver Ore, are these.

1. The Hills and Mountains from whence they are digged, are for the most part barren and squalid, having but little Grass, and that short, dried, and (as it were) withered; few Trees, Plants, or Shrubs, growing upon them; and those they have, little, dwarfish, livid, and ill coloured, very rocky and stony at the tops, with earths of sundry colours, but most commonly something reddish.

2. The stones that by the Land-flouds and Torrents are brought down into the Vallies, are very ponderous, flinty, grayish, or horn-coloured, and oftentimes pieces and fragments of *Cauk*, and pure white, and other coloured *Sparr*; and good store of small grey, black and white *Silices*, or pebles, which are found to be good, and for the most part certain signs that there is metalline Ore in those Hills or Mountains.

3. There are commonly found upon the tops of the Hills where they find Lead Ore, many sorts of fire-stones, or *pyritæ*; which rubbed hard or smitten together forcibly, do not onely give sparks of fire, but smell most strongly of Brimstone, whether they yield fire or not. And sometimes store of little yellowish and reddish stones, and these prove very good signs of Metals.

4. Sometimes there is found fragments of very bright and shining marchasites of a golden colour, or like Copper in shew, wrought forth of the Hills by Rains,

Rains, and Flouds, that together with some other signs named before, give great incouragement to Miners, and seldom deceive them.

5. Some expert Workmen (which I my self have divers times seriously marked, and sought for) have found in the chinks and holes of the stones washed from the tops or sides of Mountains; a blue kind of Sand or Earth, being (as I conjecture) the native *Cæruleum* or Azure; as also a pure green Earth or Sand, which might be the natural *ærugo* or *verdegrease* that *Agricola* mentions: and where these were found they always proved good signs.

6. But the most certain sign that all our Miners relie upon, is to find some fragments of Ore washed down from the sides of the Hills; or by careful walking over the tops of the Mountains (whose barrenness, and some other such like signs, have moved them to search) and prying into the clifts, irruptions, or crevises of the Rocks. And this they find never to fail them.

7. After they have digged, the most of the signs that doth encourage them, is grey or blewish stones, flints, or slates, red or yellow clay or earth, or that which appears of many colours; but especially to find some pieces of such Ore as they call loose and shaken Ore; or some small twigs of a Vein of Ore, for then they think that there cannot but be greater store, if they can find the right way to it.

8. I have specially noted that near where Metals are (especially near *Brunghill* Moor, where Silver Ore was formerly gotten, and at a place called the *Syks*) there the Stones being for the most part of a greyish, or blewish colour, are very thick interspersed with

the

the ſmall Atoms, or grains of Metal; as little as ſmall Pin heads, or almoſt Needle points, and will exceedingly ſhine and gliſter upon a Sun-ſhine day, and alſo are very ponderous.

Now to conclude this Chapter, I ſhall onely mind the Reader of a remarkable paſſage of *Paracelſus*; which though twice repeated in his Works, and (as I judge) of great weight, and full of honeſt and plain inſtruction to a Mineraliſt, yet hath been little regarded by any one that ever I yet converſed withal; which is this:

Coel Philoſ. p.126. 'Whoſoever therefore doth ſearch after Minerals, 'it is fit that he be endowed with ſuch reaſon and diſ-'cretion, that he have not a regard alone to vulgar and 'known Metals, which are found only in the depths of 'Mountains. For very often ſuch a Mineral is found 'in the very ſuperficies of the earth, that no ſuch, or Id. de contract. Tract. 2 p.119. 'none ſo good is found in the hidden deeps. There-'fore every ſtone that comes into our view, whether 'it be great or little, whether it be a ſmall peble, or 'a whole ſtone, is moſt diligently to be looked into, 'and to weigh the nature and property of it, with an 'exact examination. For many times a vile flint or 'peble, contemn'd and thrown away, is better then 'any Cow. For here the dominion of Heaven pre-'vails. And all over earth, duſt, or ſand is offered, 'which hath with it much of Gold, or Silver, which 'thou ſhalt mark and take notice of.

It may be perhaps here expected that I ſhould ſay ſomthing of the *Virgula divinatoria*, as by many judged to be a ſure way to diſcover where the Ores of Metals lie; of which I find that ſome of our credulous Miners have a great opinion but none of them that ever

ever I could meet withal, had made any certain or exact trial of, ſo as to verifie the truth of the experiment. Neither indeed is it much uſed by any in theſe Northern parts. But yet notwithſtanding I ſhall give you the opinion of ſome of the beſt Authors, both againſt the certainty of it, and for the verity of the Experiment.

1. And firſt *Agricola*, a very ſober perſon, far from ſuperſtition, and doubtleſs that had ſeen the fallaciouſneſs of it, and that it hapned to ſhew where Metals lay but rarely; and after a long diſcourſe about the verity or falſhood of it (to whom I refer my Reader) doth conclude againſt charms and incantations uſed about it, but that the natural uſe of it may be allowed, in theſe words: '*Virgula igitur, in inveniendis venis, viro bono, gravique uſui eſſe poteſt.* Therefore the rod for diſcovering of Veins of Metals, may 'be uſed by a good and grave man. But not in chuſing the figure, nor uſing charms: *non enim valet 'virgulæ figura, ſed incantamenta carminum.* For 'the figure, of the rod prevails not, but the charms. De re metal. l.2.p.26,27,28

2. The ſecond I ſhall name, is *Paracelſus*, one whom his enemies would brand with moſt groſs ſuperſtition, and favouring or practiſing of unlawful and cheating Magick: as commonly all that pretended Magick that is practiſed, and counted Diabolical, is but the cheats of crafty and cunning Knaves; or as *Cardan* ſaid, *Carnales Dæmones, ipſis dæmonibus callidiores.* Incarnate Devils, more cunning then the Devil himſelf. He (I ſay) doth ſo clearly, plainly and honeſtly diſclaim all ſuperſtition, charms, and inchantments, as none can do more; and alſo confeſſeth the deceitfulneſs of the uſe of this Divinatory rod, in De ſignat.rer. l.9.p.112.

these words; which for brevity I give in *English*. 'Therefore care is seduloufly to be taken, that ye suf-'fer not your selves to be seduced by the Divinations 'of uncertain Arts. For they are vain and frivolous, 'especially the Divinatory rods, which have deceived 'many Miners. For if they once shew any thing 'rightly, they on the contrary deceive ten times. In 'like manner, we are not at all to trust to other frau-'dulent signs of the Devil, which are done and appear 'against Nature upon the night, and at inconvenient 'time, as Apparitions, Visions, and the like. And in ano-ther place he saith; For the Divinatory rod is fallacious; as also the other Visions in Glasses, and Crystals.

Philos. Occult. P 490.

3. The great *Kircherus* doth reject it, and that upon his own trial, in these words: *Cente ego sæpius 'hujus rei supra metallica corpora auri & argenti, ex-'perimentum sumens, semper spe mea frustratus sum.* 'Certainly I very oft making an experiment of this 'thing upon the metallick bodies of Gold and Silver, 'was always frustrated of my hope. And concludeth, '*Atque luculenter adverti manifestam esse non dæmonis, 'sed virgam tractantis illusionem.* But I have clearly 'observed, that the manifest illusion is not of the De-vil, but of him that handleth the rod. From whence observe,

Mund. Subter. Tom. 2. l. 10. Sect. 2. p. 180.

1. That there have been, and are many things that are performed by true natural means, though hid, and secret; as also by sleight, nimbleness, and cunning, that wiser heads, and cunninger wits, have used charms, spells, strange words, or incantations to, thereby to keep them veiled from the Vulgar, and to deceive others. Which hath occasioned many inconveniences; and therefore not to be used by an honest and

and conscientious Christian; but we are carefully to mark what is natural Magick, which is both lawful and laudable, what may be done by Art, which is often strange and wonderful, and what is done by Diabolical means, if it be a truth that there is any such matter; of which the most learned do not causelesly doubt.

Vid. Rog. Bac. de mi. pot. art. & natur.

2. That in trying such nice experiments as this, there had need be extraordinary care, and caution, both in time, and in every minute circumstance thereof; and though one should often miss about it, it is not safe to conclude generally, and negatively: for an experiment (especially when it depends upon Nature more then Art) may fail at some times and places, for peculiar reasons; and yet when all circumstances necessary and suitable are added, may prove effectual: and therefore notwithstanding the authority of *Paracelsus* and *Agricola*, it may be doubted, whether their trials were accompanied with all the exact circumstances that were requisite for such a matter; for we know they were men, and might err; and it is too manifest, that in many things they did err, and it is the common frailty, that no man, as meer man, hath been priviledged from.

3. For *Kirchers* trials often made with the rod upon the metallick bodies of gold and silver, which I suppose were the Ores of those Metals, he doth not mention of what kind of wood his rod was; or whether he had tried with rods of all those several woods that he nameth; which if not, he left it short, and concludes not safely. Again, the great question is, whether if the rod will move when it is over the veins of Metals, that it will do so at any distance, which is not

probable to be ſuppoſed, for the Loadſtone will no work beyond the ſphere of its activity; and therefore there may be great ſtore of Metals in the Mountain where it is uſed; and yet they not lying near enough the ſuperficies of the earth, may fruſtrate its effects, though if they had been within the compaſs of its virtue, it may be that it would have ſhewed them. Further the great *Quæry* may be, that it will diſcover Mines at ſome times and degrees of their concoction, when they ſend forth ſtrong ſteams, but not when they ſend forth little or none. And much may be in the manner and skill of uſing the rod.

A diſcovery of ſubterranean creature, p. 11. 12.

1. Now firſt for thoſe that affirm the experiment of the rod to be true, I ſhall give what Mr. *Gabriel Platte* delivereth us upon his own trial, who ſaith: 'The 'operation with the *Virgula Divina*, is thus to be per-'formed: ſome obſerve a ſet day and hour, with cer-'tain words and ceremonies at the cutting up of the 'ſame, which I have found to be little to the pur-'poſe. Thus I wrought about Midſummer in a calm 'morning, I cut up a rod of Haſel, all of the ſame 'Springs growth, almoſt a yard long; then I tied it 'to my ſtaff, in the middle with a ſtrong thred, ſo 'that it did hang even, like the beam of a ballance: 'thus I carried it up and down the Mountains where 'Lead grew, and before Noon it guided me to the 'orifice of a Lead Mine, which I tried, having one 'with me with an hack of Iron and a Spade, and with-'in two hours we found a vein of Lead Ore; within 'leſs then a foot of the Graſs. The ſigns that it ſhew-'eth, is to bow down the root end towards the Earth, 'as though it would grow there, near unto the orifice 'of a Mine. When you ſee it do ſo, you muſt carry it 'round

'round about the place, to ſee that it turneth in the 'ſtring ſtill to the place, on which ſide ſoever you ſtand. The like Story to this I have ſeen in an unnamed Author, but ſhall here omit it, becauſe I know not of what credit he was.

Theatr. Chym. Vol. 4. p. 171.

2. The ſecond I ſhall give you is, from the Author of the *Nova diſquiſitio de Helia artiſta*; who affirms it of his own knowledge thus, which I give you in *Engliſh*. 'Let a two-forked rod be cut of one years 'growth, of Haſel or of Oak, whoſe Forks or two 'twigs muſt be equal, and without fault. Some think 'it ought to be cut down before the Sun riſe, eſpecial-'ly the Moon increaſing, and that above all about the 'day of the *Annunciation of Mary*. But we obſerved 'none of theſe. This being done, let the two ends be 'taken into the oppoſite hands, the fingers compreſſed 'upwards towards Heaven; to wit, that on both 'ſides the ends of the twigs of the divided branch, 'or fork, may hang forth out of the hands at both the 'thumbs preſſed to the hands. But the root of the 'forked branch muſt bend outwardly between the two 'hands. Which if any having ſilver buttons fixt to 'his doublet, that cut end of the root, although with 'all thine endeavour thou compreſs the rod in both 'hands, will make a circle by moving by it ſelf, and 'will turn it ſelf inwardly towards thy doublet, even 'to the buttons. But if, having no Metal at all about 'thee, thou lay ſilver or gold upon the earth; then 'holding it faſt, and being unwilling, the cut part of 'the root will bend outwardly, until with a ſtrong 'motion it ſmite the Metal. That there are many exceptions may be made againſt theſe two experiments, is plain; but I ſhall omit them, becauſe thoſe

that

that are curious may easily be satisfied with trials of this nature.

Last Will and Test. c. 23.

3. *Basilius Valentinus* hath a large discourse about several kinds of rods, but I confess to me so dark, that I dare not adventure to meddle with them, nor to say that I understand any thing of them, onely I shall give you these two passages. First he saith; 'Though 'the stirring of the rod is fallen into abuse among ma- 'ny people, however it is a fundamental way to know, 'and to bring forth the Metals, if duely and naturally 'used. Again, he saith: Therefore if you take such 'a rod, especially of a Hasel, or of a Kray Tree whose 'sap is full, and beareth a pleasant and sweet fruit; it 'draweth the same downwards, that the rod must 'sink and stick; it will suck out the juice when the 'rod stands right on its passage, this holdeth from a- 'bove unto this station, where the rod stands still, that 'place they call the Ores station, standing as streight 'as a line. I shall say nothing, but refer all to experiment; for some have believed too much, and some too little.

CHAP.

CHAP. VII.

Of those Minerals that are said to be of affinity to Metals, as those they call Cachimiæ, Marchasites, Pyritæ, or Fire-stones.

WE shall speak something of these, because the difference, and divers kinds of them are little known or regarded by our common Miners, because they can make no profit of them, nor other use, except as signs to discover where metalline Ores are. And what is convenient to our purpose we shall give you, what we account material forth of some choice Authors, and also what we have noted and observed our selves.

1. And first of those they call *Cachimia* or *Kakimiæ*, for it is printed both ways; but whether the word be Arabick (as most judge) I being not at all skilled in that language, or of some other tongue, I cannot certainly determine. For I find nothing either written by *Toxites*, *Rulandus*, or our Countryman *Johnson*, but what they seem to have taken forth of *Paracelsus*, but have either grosly mistaken, or wilfully perverted the sense of that learned and experienced Author; for they make a *Kachimia* to be *Immatura metalli minera, vel semiperfectum metallum, & nondum à natura absolutum, quod adhuc in primo suo ente, ut infans in utero suæ matris delitescit. Ejusmodi Kachimiarum species triginta reperiuntur hactenus cognitæ.* It is the immature Ore of a Metal, or an half perfect Metal, and not yet compleated of Nature; which as yet lieth hid

Tox Onom. 2. p 447. Rulandi Lex. Alchym. p 270. Johnson Lex. Chym. p. 117.

hid in its first being, as an Infant in the womb of the mother. And that there are thirty sorts of these *Kachimies* found that are known. This is indeed the description of his *primum ens* of Metals, or of the volatile spirit of Metals, whilest it lies hid in *Kachimies*, *Marchasites*, and the like, as a child in the womb of the Mother, but not of a *Kachimy*, as we shall shew hereafter. And he doth not say that there are thirty sorts of them, but that of *Marchasites* and *Kachimies* there are about thirty sorts comprehended under those two names, not under the one of them. But his description is thus, both of a *Marchasite* and a *Kachimie*; for speaking of *Marchasites*, he saith; *Nihil autem* 'sunt aliud, *quam superfluitas metallorum, hoc est ma-* 'teria, *in metallis abundans, quam metalla intra se fer-* 're, *ac continere, aut in suam formam vertere neque-* 'unt. But *Marchasites* are no other thing then the 'superfluity of Metals; that is to say, a matter abound- 'ding in Metals, which the Metals cannot bear, or 'contain within themselves, or change into their own form. And that a *Kachimy* is of the same sort, to wit, bred of the superfluity of the Metals, he thus declareth: '*Sic ergo Marchasita nihil est aliud, quam superfluitas* 'abundans *in prima materia metallorum in Ares, qua* 'per *Archæum separatur in Yliadum, unde postea Mar-* 'chasitæ, *& Kachimiæ generantur triginta circiter ge-* 'nerum *& formarum, quæ tamen omnia duobus istis no-* 'minibus *comprehenduntur. Quod vero illæ multipli-* 'ces *sunt, nec unius formæ, licet ab una materia descen-* 'dant, *causa est hæc, quia scilicet inæqualiter concurrit* 'trium *primorum pondus, uno altero abundantius sese* 'conferente. *Hinc formas enasci varias necesse est.*

Lib de Elem. Aq. Tract. 3. de Miner. p. 280, 281.

Vid. Schrod. Pharm. l. 3. num. 5. p. 124.

So therefore a Marchasite is nothing else, then the superfluity abounding in the first matter of Metals 'in the Ares, which is separated by the Archæus into 'the Yliad; from whence afterwards *Marchasites* and '*Cachimies* are generated about thirty of divers sorts 'and forms; which notwithstanding are all compre- 'hended under these two names. But, that they are 'manifold, and not of one form, although they de- 'scend from one matter, the cause is this, because the 'weight of the three first principles do meet together 'unequally, one bestowing it self more abundantly 'then another. From hence of necessity divers forms 'do arise. From hence it is plain that *Cachimies* and *Marchasites* are bred and generated of the same matter; to wit, the superfluity of the Metals; and are both about thirty in number, of divers forms and colours. And for the difference betwixt them he makes it this: '*Est autem Cachimia fixior, &* 'constantior *Marcasita, propter sal fixum ex quo constat.* 'But a *Cachimy* is more fixed and constant then a '*Marchasite*, because of the fixed salt, of which it con- 'sists.

Ibid. p. 280

Again, he enumerateth eight sorts of *Cachimies* that were known unto him; to wit, *Marchasitæ* Marchasites, *Pyrites* Fire-stones, *Antimonia* Antimony, *Cobalta* Cobalts, *Talka* Talks, *Auripigmenta* Auripigments, *Sulphura* Sulphurs, *Arsenicalia* Arsnicks. Now it seems he maketh both *Cachimies* and *Marchasites* to be the superfluity of Metals, onely that a *Cachimy* is more fixed then a *Marchasite*; and so seemeth to make *Cachimia* the Genus to the other eight, and then every *Marchasite* is a *Cachimy*, but not on the contrary; but how this should stand with the rules of Logick, I understand not; nor that Antimony is a

Cachimie, being in ſome reſpects a Metal, or at the leaſt a ſemi-metal. But it was uſual with this Author not onely to neglect, but to deſpiſe the Art of Logick; and if he did but certainly know the ſeveral ſorts of Minerals, and their nature and properties, he little regarded the ordering of them according to thoſe ſtrict rules. Therefore I ſhould commend this particular to be ſeriouſly conſidered of, and due obſervation to be made thereof, that what is defective may be ſupplied, and what is amiſs may be rectified.

Muſ. Worm. l.1.Sect.2.c.3. p.39. De nat. Foſſ. l.10.p. 658. De metal. l. 2. c.54.p.148. De re metal. l.1.c.14.p.25.

2. As for *Marchaſites* and *Pyritæ* Fire-ſtones, *Paracelſus* makes them to differ; and ſo *Wormius* ſeems to do, ſhewing that ſome of them may better be referred to the ſorts of Metallick bodies, then meerly to the kinds of ſtones. But others make them both one, as *Agricola*, *Cæſalpinus*, *Encelius*, and moſt of the reſt. And ſome think them called ſo, by reaſon of yielding forth ſparks of fire; and ſome becauſe of their ſhining and fiery colour. We may take them under theſe conſiderations. 1. Thoſe that have the ſplendour and colour of Metal, and alſo contain ſome Metals in them. 2. Thoſe that have the ſplendour and colour of Metals, and contain no Metal in them. 3. Thoſe that yield fire by ſtriking, and thoſe that yield none.

Agric. de natur. Foſſil. l. 10. p.658.

1. Thoſe *Marchaſites* or Fire-ſtones that contain Metal in them, are in general of divers ſorts, and colours. *Agricola* reckons theſe, that at *Reitheſtein* in *Lygiis* (that is within *Germany*) there were found thoſe that yielded ſilver and gold; and at *Cotteberg* in *Bohemia* thoſe that yielded copper and ſilver, and thoſe that yielded lead and tin, copper and ſilver at *Goſelac* in *Saxony*; onely copper in thoſe that are found at

at *Cuperberg* in *Bohemia*, and in many other places: But that of *Breitebren* in *Miſnia*, none at all; which is alſo confirmed by *Wormius*. *Rulandus* doth number ſix ſorts that yield Metal of one ſort or another, that are very ponderous and yield ſparks of fire. 1. One of a ſilver colour, that yields ſilver. 2. One other of almoſt a golden colour, forth of which copper is melted. 3. One of a full golden colour. 4. One like the Ore of ſilver or *Galena*, that like the former, holds ſilver, and ſome gold. 5. One of an aſh-colour that holdeth gold and ſilver. 6. One of of an Iron-like colour, but what it holds he telleth not.

Muſ Worm. l.1.Sect.2. c.3 p.134. Lex Alchym. p. 394, 395, 396, &c.

2. He reckons four of a ſilver colour, that hold no metal, nor yield any fire: and ſix others of a golden colour, that have no Metal in them: And other five of a golden colour, that hold no metal, nor yield fire: And ten more of an aſh-colour, that hold no metal in them, nor yield fire.

3. He nameth four of other colours, forth of which fire is ſmitten; and ſo of divers others that do yield fire, and thoſe that do not yield fire: and numbreth ten ſeveral ſorts that are fertile of Metal; to which I do refer the Reader.

They alſo ſeem to attribute to every one of the ſix Metals its proper *Marchaſite*, but have not been ſo free to tell us which were they, nor what they in this ſenſe meant by a *Marchaſite*. For *Baſilius* ſaith; For what is the *Marchaſite* of Iron? Is it not the Magnet? what is it of gold? is it not *Lazul?* and ſo forth of the reſt. And Antimony that they call the *Marchaſite* of Lead, but for the other three, we are at a loſs, except we can make it forth from ſome paſſages in *Paracelſus*, where he

Laſt Will and Teſt. c. 24. p 49.

Rer. nat. l.9. p.104.

he ſeemeth to grant thus much, that the *primum ens*, or ſpirit of ſilver is in a white *Marchaſite*, white *Talk*, &c. In *Zink* and *Cobalt* the ſpirit of Iron, of Copper in *Zink*, *Vitriol*, &c. In *Zink* or *Biſmuth*, &c. the ſpirit of Tin, and in *Cinnabar* the firſt *ens* of Quick-ſilver. But this makes but a ſlender conjecture; for if every matter, as Stones, Clays, Earths, Juices, Cauk, Sparr, Marble, Plaſter Ore, or Quarry, in which the Metals are commonly contained and mingled, be *Marchaſites*, then the Ore of every Metal is its proper *Marchaſite*. But we may as roundly ſay, that the *Lapis Lazuli* is the *Marchaſite* of Gold; of Silver, *Talk* or *Galena*; of Lead, *Antimony*; of Tin, *Biſmuth*; of Copper, *Zink*; of Iron, the *Load-ſtone*; of Quick-ſilver, *Cinnabar*. But of this enough.

Now I ſhall ſay ſomething of *Marchaſites* or *Pyritæ*, of mine own experience. We have in our Coal-pits in theſe Northern parts great ſtore of the ſaid *Marchaſites*, ſome of which are of a very bright ſhining golden colour, and ſome of them of a pure bright ſilver ſplendor, and ſome of them ſo curiouſly intermixed with diverſity of colours, that are very delightful to the Eyes; theſe are ſomething ſoft and will not ſtrike fire, but being laid in a cold and moiſt place, will diſſolve; and then any one may perceive that they hold ſtore of Vitriol; but being fired in a melting pot, do yield ſtore of fumes that ſmell ſtrongly of Sulphur, by which we may be aſſured that they contain both Brimſtone and Copperas. There are alſo other ſorts found, that are ſome of them bright, and of a metalline colour, and far more hard then the former, which by ſtriking will yield ſparks of fire.

Alſo I have divers ſorts of them that are very ſmooth

ſmooth and ſhining, as bright as *Flanders* metal, *Orichalcum* or Braſs, which is found in the Quarries of Stone, Slate-pits, or where they get flooring-ſtones for paving of houſes, in the clifts betwixt the Stones, but contain no Metal in them, but being fired do ſmell ſtrongly of Brimſtone. Some few I have had that held ſome little Copper in them, of an hard ſubſtance, and not very bright but ponderous; but I have found none that held any Silver, Gold, or any other Metal in them. Many other ſorts I have of divers and ſundry colours, ſome of a golden, ſome of a ſilver-like, and ſome of a copper-like, or braſs-like colour; ſome of them found near the Lead Ore, and ſome of them in their proper Mines, ſome of them in confuſed lumps, or interſperſed in Stones, Cauk, or Sparr; ſome triangular, ſome of them quadrangular, like to the *Ludus* of *Paracelſus* or *Helmont*; ſome ſexangular, and ſome of them of other figures; but all of them ſulphureous, and to be fired away to nothing, but an unprofitable black Earth. One ſort there is found in ſome of our Lead Mines near the Ore, that is ponderous, black, and gliſſening; but by ſeveral trials I could find no Metal in it, neither any great ſtore of ſulphureous fumes; and it is not that which the *Germans* call *Blend*, and our Miners blue *Blind ake*; becauſe that is brighter, more ſhining, and liker a metallick body. I therefore intreat all Miners to inquire of theſe particulars.

1. What ſorts of Fire-ſtones or *Marchaſites* they find, and near what ſorts of Metals.

2. Of what colours, forms, and figures, that they may get them tried, to ſee what ſort of Metals they contain; or if they hold Vitriol, Sulphur, Alom, Salt, or any other ſort of Mineral.

3. To

3. To make exact observation what difference there is to be found amongst them, either as to colour, shape, taste, smell, or any other qualities that appear in them, and if possibly their number.

Chap. VIII.

Of the several sorts of Gold according to the mystical Authors; also of the primum ens *of Gold, and of some other things of the like nature.*

NOw we shall come to the Metals themselves, and first of those that have been commonly and anciently accounted so; to wit, the known seven, and afterwards to those that some esteem as Metals, that have been more lately discovered, or at least by others are acknowledged to be semi-metals. And first of that most noble metal of all others, Gold; of which *Paracelsus* maketh three sorts: saying, *Aurum est in essentia triplex*, Gold in essence is threefold, 1. *Cæleste, & est solutum*, celestial and loosed. 2. *Elementare*, and that is fluid. 3. *Metallicum*, and that is corporeal. I confess the place is very dark, and hard to understand; but I thought good to commend it to the curious searcher of Natures secrets; for there is more of truth in it, then at the first sight any one would imagine; and that which follows will make it more plain.

Lib. Vexat. Canon. 7. p. 123.

Rhumelius a *German* Author of good account and experience, whose Works are not translated that ever

Comp Herm. c. 18. p. 54.

ever I could hear of, saith thus: 'There is no greater 'strife amongst the Physicians, then about the sub- 'ject out of which the matter of the *Elixir vitæ* is to 'be taken and prepared. And it is found in the final 'conclusion, that in Gold alone the medicament is to 'be sought and found, because that Nature alone 'doth consist in the spirit of Gold, that drives away 'all diseases, and brings in health; and this all Philo- 'sophers with one voice confess. It is found also in '*Philosophia adepta, & naturæ thesauro*, that in *rerum* 'natura there are four sorts of Gold. 1. *Astralish*. 2. *Mineralish*. 3. *Metallish*. 4. *Elementallish*.

1. *Astralish* is, and is called that very thing which as 'yet lieth in *primo ente*, and therein is as yet imperfect. '*Frater Basilius* calls it, the Star of the Sun, because 'the stars as yet have their influence and first opera- 'tions therein. And from this spiritual-like matter '(saith he) from whence the beginnings of Gold doth 'grow, may be made *Aurum potabile*, more perfect 'and better, then from the perfect common gold it- 'self; which first must be opened, and made spiri- 'tual, ere forth of it drinkable gold can be prepared. '*Theophrastus* calls it, *Electrum immaturum, & pri- 'mam compositionem solis*, because therein Nature 'doth yet work her first composition; and it is there 'likewise called *aurum immaturum*, unripe or imma- 'ture gold. *Aureum Vellus* calls it, *primum ens solis*, 'and *Rosarius*, gold and silver *in posse*. *Turba Philoso- 'phorum* calls it *leonem viridem*, the green Lion, 'while it is yet green, crude, immature, and imper- 'fect. Moreover, this matter is entituled by the 'Mine-workers, and named with its proper Teuto- 'nick or *German* name; which in this place cannot be 'remembred without prejudice. 2. *Au-*

2. *Aurum minerale*, or Mineraliſh gold, is that very thing, which as yet doth ſtick in its Earth-ore, or *Berg-ſtuff*, until it be melted from thence, and brought into a pure and clear Metal.

3. *Aurum metallicum*, or Metalliſh gold, is that which being freed from its *Schleck* and raw mineraliſh Ore-ſtuff, and with great force of fire is driven forth of it, and then may be called a pure and clear Metal.

4 *Aurum Elementale*, or Elementaliſh gold, is any Earth, Mineral, Stone, or the like, wherein the ſpirit of gold doth lie hid, and may be drawn forth by the *Spagyrick* Art. And he from hence concludeth that the Aſtraliſh gold, according to the experience and the teſtimony of all Philoſophers, is the beſt and moſt profitable of all theſe four.

From whence we may note, 1. That Mineraliſh gold, as it lies undrawn from its Ore, Marble, Earth, Sparr, Stone, or the like; is commonly known, and eaſily to be had, there being divers ſorts of gold Ore, of ſundry ſorts to be gotten from many places.

2. That Metaliſh gold is that which is purified and refined, and is commonly known, and to be had.

3. That Elementaliſh gold, being that which lieth hid in many Earths, and Minerals, may by a laborious and skillful Chymiſt be had and obtained. As *Wormius* relateth of the *Terra ſigillata Sileſiaca*, or *Strigonenſis*, which is found in the gold Mines near *Strigonium*, amongſt the hard Rocks. And was firſt invented by *Johannes Montanus*, a moſt famous Phyſician, who publiſhed a Book of the ſame. Wherein he ſetteth down that it is gold by the provident ordination of God and Nature tranſmuted into a moſt excel-

Muſ. Worm. l.1. c.4. p.13.

excellent prepared medicament, profitable againſt poiſon, no leſs then the medicaments prepared with great charges forth of *Hungarian* Gold; and (ſaith) that the Chymiſts call it *Axungia Solis*. Of this alſo *Schroderus* tells us, that that which was gotten and prepared at *Striga*, a Town of *Sileſia*, was called *Medulla vel axungia Solis*, becauſe it was believed to be impregnated with the ſulphur of gold. And that Earth called *Lignicenſis*, was termed *Axungia Luna*, becauſe it was mixed with the ſulphur of Silver. And this, or ſuch like, it is probable that was which *Paracelſus* calleth *Axungia Solis*, which he preſcribeth againſt the poyſonous bite of a *Salamander*, uſed both inwardly and outwardly.

Pharm l.3. c.2. num.3. p.[illegible]

Chir. mag.c.3. p.33.

4. But the Aſtraliſh gold is the great ſecret, and therefore may be queſtioned whether it may be found in a liquid and ſoft form, or hard, or both; and of the former we ſhall ſay thus much.

1. We ſhall give the teſtimony of *Paracelſus*, and leave it to cenſure; who ſaith thus: 'The firſt *ens* 'is an imperfect compound, predeſtinated unto ſome 'certain end, and corporeal matter. And becauſe it 'is not perfect, therefore it can alter any body with 'which it is incorporated, as Mercury, which is like 'this imperfect *ens*, according to its imperfection. 'But we ſpeak of the firſt *ens*, which is perfect to renew and reſtore the whole body, as is the firſt being or *ens* of Gold; and that for this cauſe, by reaſon 'it altogether poſſeſſeth the ſpirit of gold, and is moſt 'ſubtile, and far more ſubtile then the true body of 'Gold it ſelf. Alſo from hence it cometh to paſs 'that the firſt *ens* of Sol or Gold, is penetrable, even 'as Mercury in Metals; and doth not contain in it

'self the spirit of Salt, by which it may be coagulated. 'For the spirit of Salt the first coagulating *ens*, receiveth so great forces, that Gold for the hundred part, 'is not so potent in its vertues, as the *primum ens* of it 'is. Further, it is to be known that the first *ens*, that 'is to say, the first composition of Gold, which as yet 'remains a liquor not coagulated, doth renew and restore whatsoever it takes; not onely men, but also all Beasts, Fruits, Herbs, and Trees. From hence we may note these things.

1. That if this Author be to be credited, then in *rerum natura* there is such a thing as the *primum ens* of Gold, and this as a liquor not coagulated. To the search and enquiry of which, I humbly and heartily intreat all ingenious persons, and Sons of Art, to use their industry, and ultimate endeavour, and not to think it a *Chymical Chimæra*. For if the quotation of that honourable person Mr. *Boyle* (who useth not to cite Authors of small credit or veracity) may be trusted, from *Gerardus* the Physick Professor (a man of great learning and Chymical experience, and whose fidelity is not questioned by any) that 'at *Anneberg* a 'blue water was found, where silver was yet in *primo* '*ente*, which coagulated, was reduced into the calx 'of fixt and good silver. Then it may be as possible and probable, that the liquor of Gold may likewise be found uncoagulated, especially if we consider that all the Adeptists do seem to acknowledge a twofold way of the generation of Gold; one when the mercurial and sulphureous steams (of which Metals are bred) being pure before and at their conjunction, do meet with a pure matrix, that hath nothing of impure sulphureous faculency, nor other earthly or watery unclean-

Scept. Chym. p. 360.

uncleanness to mix with them, and to pollute them, then pure Gold, and no other imperfect metal is generated: and in this way onely I conceive, that the pure *primum ens auri*, is to be had liquid, and not otherwise. Another way there seems to be of the generation of Gold, and that is when the mercurial and sulphureous steams, either before, or at their conjunction, are commixt with some impurities, or meet with an impure matrix, or both; then this liquor being the first *ens* of Gold, cannot be had; but yet that impure substance containing in it the true seeds and principles of Gold, will in time work it self through the degrees of the imperfect metals into Gold, as Nature's ultimate and finite end; and therefore in some respects (though perhaps not to be found liquid) contains in it the *primum ens auri*, which I wish may be noted.

For it is the unanimous consent of all the Adeptists (as we have sufficiently proved before, where we shewed the vegetability of Metals) that Natures intent was to bring all metals to the perfection of Gold, if she had not been hindered by the adventition and mixture of extraneous matter; and so that metals do not specifically differ one from another (as *Erastus* and many other Authors, ignorant of, and unexperienced in the true manner and order of Natures way of producing of Metals) but onely gradually, some of them standing in an intermediate way, and wanting the due height of concoction and maturation. For as *Petrus Bonus Ferrariensis* saith, *Ad aurum reliqua metalla ordinantur tanquam ad finem*: For the seed of all Metals are but specifically of one nature: for as *Trevisan* saith, Nature hath nothing in the bowels of the

Earth, whereof it may generate Metals, but onely a mercurial ſubſtance, in which is included its quickning ſulphur, as its agent. And there is Sulphur and Mercury, equally perfect in the reſt of the Metals, as well as in Gold; onely it is in the imperfect Metals infected, or contaminated with terreſtrial fæculency, or combuſtible Sulphur, which are extraneous and adventitious unto it, and not of its homogeneous and conſtitutive principles. For the Metals become more pure, or impure according to the wombs where they are produced; a pure matrix yields a pure metal; and ſo on the contrary, for Nature always aims at the moſt perfect work, though ſometimes by accident ſhe may be hindered; and perfection in the inferiour Metals is attained, when either by Nature or Art, they are brought into Gold; the one of which all experienced Miners know, the demonſtration of the other remains with the Adeptiſts. And to this purpoſe we may take ſerious notice of another paſſage in *Paracelſus*, who ſaith; ‘ *Primo ſciendum eſt, metallum quodvis, &c.* Firſt we are to know that every Metal, as long as yet it lies hid in its firſt being, or *ens*, hath its peculiar ſtars. So Gold hath the ſtar of the Sun, Silver hath the ſtar of the Moon, &c. But ſo ſoon as they are come unto their perfection, and are coagulated into a fixt metallick body, their ſtars do recede from every one of them, and leaves its body dead. From whence it follows, that all their bodies are from thenceforth dead, and inefficacious; and the invincible ſtar of the Metals doth overcome them all, and convert them into its nature, and make them all ſo to be Aſtral. Whereby we may perceive that when the Ore of Lead is from its liquid and ſoft ſubſtance, coagu-

Rer. natur. l. 9. p. 113.

coagulated into an hard metallick body, then the ſtar of *Saturn* doth leave it, and ſo of the reſt; but it muſt be underſtood, that when the ſtar of an imperfect Metal hath left it hardned, that yet the ſtar of ☉ or ☽ may operate in it to a greater perfection.

I may add to this purpoſe what *Treviſan* ſaith, That vulgar bodies, to wit, Metals perfected by Nature alone in the Mines, are dead, that they cannot bring imperfect bodies to perfection. So that thereby it is granted, that before they were perfected in the Mines, they had life and vegetability. And *Baſilius* ſaith, that therefore all things are found more perfectly in the ſtar of the Sun, then in the reſt of the Metals, if it be brought to its maturity by the benefit of the fire.

De Alchym. Theatr. Chym. Vol. 1. p. 754.

2. We may note, whether this *primum ens auri*, in its liquid form, be to be had or not: and that this Author doth affirm, ſaying; And although we cannot ſo well take theſe *prima entia*, as we have written; or have them in the ſame eſſence, as we have demonſtrated before; nevertheleſs that thing is notwithſtanding poſſible unto us: for if we know where a Mine of Gold lies hid, we ſhall alſo find its *primum ens* there, if we ſhall come before its perfection. And to make the thing more feaſible, he addeth the ſigns how we may know when it is in *primo ente*, ſaying: ‘ So verily while it is yet in its firſt being, it maketh the Trees fruitful, and the Earth fertile, it renovateth old Trees that of twenty years have brought forth no fruit. For when the firſt being of Gold hath taken hold upon them, or their roots, they begin again to live and flourith as before. And a little after he ſaith; But where flames, or ſcintillations have been ſeen;

De Renovat. & Reſtaur. l. p. 45.

'seen; it is to be judged, and noted, that a Metal is 'then made *ex primo ente.* And to confirm this in another place, speaking of coruscations, or scintillations seen in the night; which he saith 'are certain 'signs of a latent Metal, that is not yet come to perfect 'maturity; but as yet in its first being. And that 'further it is to be known, that as long as those effulgescences or glimmerings appear, whether great 'or little, whether of this or that colour; that then 'that Metal is not yet perfect and ripe in its Mine, but 'as yet is in its first being, no otherwise then the sperm 'of a man in the matrix of a woman. Also he con-'cludeth that Gold doth grow *ex primo ente auri*, from 'the first being of Gold, to such a form from its be-'ginning of Gold, that in touch it is like to red Wa-'ter, and is moved and exalted like Gold.

Rer. nat. l. 9. p. 112.

De Renovat. p. 45.

3. And the more to illustrate this, we may call to mind what we have in this Chapter spoken of Elementalish Gold, that the steams of Gold may be had in divers Earths and Minerals; as *Paracelsus* confesseth, 'it may be drawn forth of *Marchasites*, *Granates*, '*Cachimies*, *red Talk*, *Lazure*, and the like, by the 'degree of sublimation. And further saith: But it is 'to be noted of this *primum ens*, that it is a fugacious spirit, as yet consisting in volatility, as an Infant 'lies hid in the womb of the woman; and is some-'times likened to liquor, sometimes to Alcool, or 'Atoms.

Rer. nat. l. 8. p. 104.

And for the obtaining of this volatile spirit, he giveth this caution. 'Whosoever therefore goeth about 'to get and separate the *primum ens* of every such like 'body, doth stand in need of much experience, and 'knowledge in the *Spagyrick* Science.

Ut supr. l. Rer. nat. p. 104.

2. We

2. We may now consider whether this *primum ens auri* may be had in an hard and coagulated form or not. And it appeareth plainly that it may; for the Philosophers that sought after that great secret of Nature and Art, the Physical Tincture, or Grand Elixir, do certainly affirm it. And they, though they writ darkly, yet it was truly that there is such a metallick subject that hath in it the seminal principles of Gold and Silver, in vegetability, which was the onely true substance forth of which they accomplished their great work, both as to transmutation, and the universal medicine. And to prove this, we shall quote some few pertinent particulars from unquestionable Authors. And first that learned Author of the *Rosary of Philosophers*, saith thus, *Tale sulphur non reperitur supra ter-'ram, nisi in quantum existit in istis corporibus, sole & 'luna, & in alio quidem est illud, quod nulli dicitur, 'nisi ex parte Dei sibi reveletur.* Such a Sulphur is not 'found above the earth, but in as much as it exists in 'those two bodies of Gold and Silver; and truly it is 'in another body, which is declared to no man, ex-'cept God upon his part may reveal it unto him. From whence we may note, that this Sulphur they speak of, is not a combustible Sulphur; for their maxim is, that no combustible matter enters their work, but that vivifying and incombustible sulphur that is Natures true fire and agent, which is hid in the metallick Mercury, and is to be found most perfect in Gold and Silver. And that it is also found in another subject, which none will openly declare; and this is it that is so carefully to be sought after. Agreeable to this is that saying: '*Datur in rerum natura 'corpus metallicum quoddam, facilis solutionis, facilis-'que*

Art. Aurifer. p. 195.

Theatr. Chym. Vol. 2. p. 132.

'*que putrefactionis; si ejus præparationem novit, felix*
'*medicus eris, totis conatibus, in eo votum tuum dirige.*
'There is a certain metallick body in the Nature of
'things, that is of an easie solution and putrefaction; if
'thou knowest the preparation of it, thou art an hap-
'py Physician, direct thy desire with thy whole en-
'deavours in this thing. *Basilius* saith, having spoken
'of common Gold, Those that dive deeper in this
'Art, will meet in the same place with a more easie
'and better known matter, which almost was named
'and set down, of an effectual quality. And after he
'saith, In this known and despicable matter and mi-
'neral substance, is found a Sulphur and Tincture
'more effectual, and more worthy then the best Gold
'can afford which is fluid and open, and its mercurial
'spirit also; and its mystical salt is free, and open,
'whose virtues may with less pains in a visible man-
'ner be drawn from it. This is a very remarkable
'passage, and worthy to be seriously weighed and
'considered of.

Elucidat. 12. Keyes, p. 118, 119.

I shall onely add another Testimony, which is this; *Materia nostra non est mercurius quilibet, sed*
'*ille circa quem natura suas primas operationes incepit,*
'*& eas primas operationes determinavit ad naturam*
'*metallicam, sed imperfecte rem illam reliquit. Non est*
'*res plane perfecta, nec penitus imperfecta. Sed ipsa*
'*est res media inter corpora perfecta, & imperfecta.*
'Our matter is not any sort of Mercury, but that about
'which Nature hath begun her first operations, and
'hath determinated those first operations unto a me-
'tallick nature, but hath left the same thing imperfect-
'ly. It is a thing not plainly perfect, nor altogether im-
'perfect: But it is a middle thing, betwixt bodies that
'are perfect and imperfect.

Art. Aurifer. p. 112.

To

To these we shall add what *Rhumelius* saith, where he speaketh of the vertues of his Medicine, which he calleth, *Aurum Vitæ*. 'The matter forth of which it
'is prepared, is a pure shining Mineral; which in its
'first coagulation is found red, and was to be had in the
'Gold-mine hills of *Hungaria* and *Siebenburg*, and in
'the *terra rubea*, the *terra Adamita*, and the red Lion,
'the *Electrum immaturum*, the *primum Ens Solis*, the
'*Axungia Solis*, or the goldish *Saturn* of the Philoso-
'phers.

Antidot. Chym. 261.

Further he saith, 'I prepare mine *aurum potabile*
'two manner of ways; the one forth of perfect Gold,
'that is to say, common and perfect fine Gold: the
'other *ex auro imperfecto, vel è radice solis, vel primo*
'*ente solis*, and are both potable; and therefore may
'not unfitly be called *Aurum potabile*. My Tincture
'(he saith) of *Sol*, is an extraction as well forth of a
'Rubie-coloured, red, through-shining, or transpa-
'rent, golden Ore; as also from several other sorts of
'Metals and Minerals, wherein the Sulphur and Tin-
'cture of *Sol* (as *Frater Basilius* remembereth) even
'as well as in Gold, doth stay and inhere.

Ibid. p. 248.

'Lastly, He saith it is found by true experience,
'and the sentence of all Philosophers, that the true *au-*
'*rum potabile* of the Philosophers, is impossible to be
'had forth of perfect Gold: because the *Astra* do for-
'sake Gold, when it is perfect and coagulated into an
'hard body, which they do not, while they lie in *primo*
'*ente*. Therefore that *aurum potabile* that is had *ex*
'*primo ente*, is far more perfect, more excellent, and
'more operative, then that which is made forth of the
'Metal it self.

Ibid. p. 239, 245.

I may perhaps be condemned, and derided for quo-

T ting

ting those Authors, and urging this point so far, especially with those that judge every thing a *Chimæra* that they themselves know, or understand not. But let such know, that I onely write to the ingenious and inquisitive persons, that pursue this Mineral knowledge; and for the censure of the rest, I neither care for, nor regard.

And all that I would from hence mind the diligent searchers of Mines and Minerals of, is carefully to inquire and search for what sort of Minerals may be found, that are either red, or transparent, or both; besides the Ore of Sulphur (that some Authors say is red) and of Argent vive, that all knowing Miners understand to be of that colour; and *Quercitan* mentioneth some *Cinnabar* that is found red and transparent; for doubtless besides these, there are others that are red, and some transparent; which is the chief matter I would have inquired after.

CHAP.

CHAP. IX.

Of the sorts of common Gold, as they are produced by Nature, and in what manner they are severally found.

THere are two sorts of Gold produced by Nature. 1. That which is called Native Gold, that is *statim suum*, pure, and unmixt with any heterogeneous matter, which the *Germans* call **Gedygen Goldt.** 2. That which is decocted, or melted with the force of fire forth of several matters wherein it lies, which is commonly called refined or purified Gold.

That Gold that is Native, and found pure, unmixed, or that needs no refining; is found, according to *Encelius* and *Rulandus*, four ways: and that the *Spaniards* call *Palacas*. 1. In Rivers, as in *Tagus*, *Albis*, and *Sala*, which they call Wash-Gold. And *Munster* saith, 'That there is much more pure Gold found, 'then mixed with Earth or Stones, as these Rivers wit-'ness, *Ganges* in *India*, *Pactolus* in *Lydia*, *Hebrus* in 'Thrace, *Tagus* in *Spain*, *Padus* in *Italy*, *Albis & Rhe-'nus* in *Germany*. And *Strabo* tells us, That Gold is 'not onely digged forth of the Pits, or Mines, but also 'the Rivers and Torrents do afford a Golden sand; 'and that by digging of Pits, divers other Artifices, 'and washing the sand, they get much Gold; and 'that more did get Gold this way then by Mining. 'And that amongst the sparks or crums of Gold, there 'are sometimes found clods, or masses of Gold of the

De re Metal. c. 4 p. 14. Lex Chym. Geogr. de auro.

Strab. Geogr. l. 3. p. 137, 138.

'weight of half a pound, that need little purifying; 'which they call *Palas, quæ sunt massulæ auri.* 2. Na- 'tive and pure Gold is found in the Mountains of *A- 'rabia.* 3. In Mines, or Pits, partly alone, partly its 'little sparks do as it were cleave to a certain white 'kind of stone, which in the *German* Tongue is called 'Quartz; of which there was store at *Cottenheyden.* '4. In the heads of fishes, which we call *Florellas*, 'which some do account to be the Burn, or Beck- 'Trout. Of these we shall speak in order more at large, from some approved Authors.

1. And first of that which is native and pure, *Apyron*, not having tried the fire; of which the Honourable person Mr. *Boyle* gives us this account. But that 'is nothing to what our *Acosta* subjoyns, which is in- 'deed very memorable; namely, that of the morsels 'of native and pure Gold, which we lately heard 'him mentioning, he had now and then seen some that 'weighed many pounds. To which I shall add, that I my self have seen a lump of Ore not long since digged up, in whose stony part there grew, almost like Trees, divers parcels though not of Gold, yet of (what perhaps Mineralists will more wonder at) another Metal which seemed to be very pure, or unmixt with any heterogeneous substances, and were some of them as big as my finger, if not bigger. But let us hear *Acosta* himself, who saith. 'They draw 'Gold in those parts, after three sorts; or at least I 'have seen all three used: For either they find Gold 'in grains, in powder, or in stones. They do call 'Gold in grains, small morsels of Gold, which they 'find whole, without mixture of any other Metal, 'which hath no need of melting or refining in the fire; 'and

Scepr. Chym. P. 372.

Histor. nat. & mor. of the Indies, c. 4. p. 212. 213.

'and they call them Pippins, for that commonly they 'are like to Pippins, or seeds of Melons, or Pumpions: 'and that whereof *Job* speaketh, *leve illius aurum*, 'though sometimes there be greater, and such as I 'have seen weighed many pounds. It is the excel- 'lency of this Metal alone (as *Plinie* affirms) to be 'found thus pure and perfect. To this purpose I my self have seen some grain or sand-gold, that a Gentleman sent forth of *Guinea*, some twenty years ago, to his Sister for a token, that was pure native Gold, and had not felt the force of fire; many of the grains as big as the ordinary pippin of an Apple, and some smaller; and one morsel half as long as my little finger, and as thick.

Job 18.

Plin. l. 3. c. 5.

Peter Martyr, a person neither suspected to be guilty of ignorance nor falsity, in naming some Rivers in the *Indies* saith: 'In the sands of all these Rivers is 'found great plenty of Gold, which the Inhabitants of 'the same Island which were with us, gathered in this 'manner: making holes in the sand with their hands, 'a cubit deep; and taking up sand with their left hands 'from the bottom of the same, they picked out grains 'of Gold with their right hands, without any more 'Art or cunning; and so delivered it to our men, who 'affirm that many of them thus gathered, were as big 'as Tares or Vetches. And I my self saw a mass of 'rude Gold (that is to say, such as was never molten) 'like unto such stones as are found in the bottom of 'Rivers, weighing nine ounces, which *Haieda* him- 'self found. And further he saith, The Admiral de- 'clared, that if they would bring Gold, they should 'have whatsoever they would ask. Forthwith turn- 'ing their backs, and running to the Shore of the next 'River,

Decad. 1. l. 2. p. 16.

Decad. 1. l. 3. p. 19.

'River, they returned in short time, bringing with 'them their hands full of Gold. Amongst all other 'there came an old man, bringing with him two Pe- 'ble stones of Gold, weighing an ounce, desiring to 'have a Bell for the same. And a little after he saith, 'Beside this old man, there came also divers other, 'bringing with them Peble-stones of Gold, weighing 'ten or twelve drachms, and feared not to confess, 'that in the place where they gathered that Gold, 'there were found sometimes stones of Gold, as big as
Decad. 1. l. 4. p. 26. 'the head of a child. He further saith, There was a cer- 'tain King, which gave them a mass of rude Gold as 'big as a mans fist, weighing twenty ounces. This 'Gold was not found in the bank of this River, but in 'an heap of drie Earth, like unto the stone called '*Tophus*, which is soon resolved into sand. This 'mass of Gold I my self saw in *Castile*, *&c.* Again,
Decad. 1. l. 4. p. 29. he saith of another place: 'As the Miners digged the 'superficial, or uppermost part of the Earth of the 'Mines, during for the space of six miles; and in di- 'vers places sifted the same on the drie Land, they 'found such plenty of Gold, that every hired Labou- 'rer could easily find every day the weight of three 'drachms.

We shall add but one instance more from this Au- thor, which though it may seem incredible, yet we
Decad. 1. l. 10. p. 56. shall leave the censure to others. 'These regions (he 'saith, meaning *Hispaniola*) are very large; in the 'which, in many places, here and there are found 'sometimes, even in the upper crust of the Earth; and 'sometimes among the stones, certain round pieces 'or plates of Gold, sometimes of small quantity, and 'in some places of great weight: Insomuch that 'there

'there hath been found round pieces of three hundred 'pound weight, and one of three thousand three hun- 'dred and ten pound weight, which was sent whole 'to the King, in that Ship in the which the Governour '*Boadilla* was coming home into *Spain*; which Ship 'was cast away. And this *Gonzales Ferdinandus* Of the West-Indies, p. 190. *Oviedus* seemeth to confirm, saying thus: Sometimes there are found grains of Gold, of great quantity, and great weight above the Earth, and sometimes under. And the greatest of all other that was found to this day in the Island, was that which was lost in the Sea, about the Island *Beata*, which weighed three thousand two hundred Castellanes of Gold.

2. For pure native Gold being found in *Arabia*, I find nothing asserted of the places, or manner how it is found, and therefore shall pass on to the next.

3. Besides this pure native Gold found in Rivers, Sands, or Earths, there is sometimes some found pure digged forth of the Mines, that needs little or no force of fire, or refining; and sometimes it lies inter- sperse in the clefts of the stones, like thin plates, or spangles, or like threds or hairs, or the small and ten- der sprigs of Plants and Herbs, which are usually cal- led *metallorum efflorescentiæ*, the flowers of Metals; but most commonly mixed with Earth, Stones, Mar- chasites, or other Minerals and Metals; of which we shall speak promiscuously, as they occur to our me- mory, without regard of any strict order.

Rulandus reckons these in general: 1. Out of a Alchym. Lex. p. 91. 'Fire-stone of an ash-colour, and forth of *Galena*, or 'Silver Ore.

2. 'Out of a purple-coloured Earth so tempered 'with the vapour and steam of the Earth, that it is very 'fruitful

Ut supr. p. 246. 'fruitful of Gold; from which in the Furnace Gold 'is drawn in many places.

3. Out of 'Chrysocolla, natural *Borax* or green 'Earth; and this he saith is digged up in *Hungary*, 'Burgundy, and at *Goldberg* in *Silesia*, from whence 'Gold is drawn.

4. 'Out of the *Cæruleum* or *Lazure*, in which 'sometimes Gold is contained.

More particularly he tells us: 1. That Gold is 'found in the *Carpathian* Mountain, *quod statim est* 'suum, pure and perfect.

2. 'Pure Gold digged up in the same Mountain in 'Iron-stone.

3. 'In the same Mountain in a white hard flint.

4. 'In the same Mountain out of the stone called 'Lapis Armenius.

5. 'That it is found mixed with other Ores, as of 'Copper, Silver, and the like.

But now we shall give more full testimonies of these sorts.

Scept. Chym. p. 371, 372. 1. Mr. *Boyle* relateth these two Observations. The first thus. 'I remember (he saith) that a very skill- 'ful and credible person affirmed to me, that being in 'the *Hungarian* Mines, he had the good fortune to see 'a Mineral that was there digged up; wherein pieces 'of Gold of the length, and also almost of the bigness 'of a humane finger, grew in the Ore, as if they had 'been parts and branches of Trees. Secondly, He 'saith, And I have my self seen a lump of a whitish 'Mineral that was brought as a rarity to a great, and 'knowing Prince; wherein there grew here and there 'in the stone, which looked like a kind of a Sparr, 'divers little lumps of fine Gold (for such I was assured 'that

'that trial had manifested it to be) some of them seem- 'ing to be about the bigness of Pease.

2. Besides what we have before proved concerning the vegetability of Metals in general, this from so honourable, and experienced a man as Mr. *Boyle* doth confirm it very much, nay even to the growth and increase of Gold: to which therefore we shall add more testimonies. And I my self have likewise seen and handled a piece of whitish Metal sent to a great person, (of which I yet retain a small piece) which being fluxed, was most pure Gold. The Coat in which it was contained, was like white Marble, or our white Plaster Ore, or Stone; and the Metal grew in it like a thin crisped Plate, or like many threds joyned close together; and some of it like two twisted threds one with another, and might have with a little crushing of the stone, been separated from it.

Ut supr. p. 94. And further to prove this germination and sprouting of Metals like Vegetables, even of Gold. *Rulandus* tells us, That in the exteriour *Pannonia* thin leaves, and sparks of most pure Gold were found in a white and hard stone. And *Athanasius Kircherus* gives us the like answer to this very question; from those Mine-masters, to whom he had sent, from *Schemnitz*, to his second Query concerning the efflorescence of Metals, he hath this answer. 'That some- Mund. subter. l. 10. Sect. 3. p. 183. 'times in the Mines do occur Crystals wrapt about 'with most tender silver threds like hairs, and the rest 'like. The former years there was found a pure grain 'of silver in *lapide fatuo*, in a fool-stone (in the *Ger-* 'man Tongue **Taubenstein**) in a certain white mat- 'ter like Chalk, which is called *lapidea medulla*, stone- 'marrow, as though it had been there laid up on pur-

'pose, and weighed two pounds. Again to the same question from *Herrengrundt* in *Hungaria*, from *John Schapelman*, he receives this answer. 'There are 'sometimes found in this Mine, the flowring that are 'Cupreous, of pure Copper, even as flowers and 'herbs grow above the Earth. Thirdly, to this que- 'stion he hath this answer from *George Schutz*: That 'in the Silver Mines there are often found silver flow- 'erings, where the bright Silver thrusts forth it self 'in form of a thred, or hair, out of the Metallick 'stones. And that there are found shavings (*ramenta*) 'of pure silver, the thickness of a finger, though black, 'and as it were of a leaden colour, &c. Lastly, Memorable is that passage from Father *Andrew Schaffer*, in these words. 'I send here a Mineral altogether 'precious, seeing any thing like, more rare is not to 'be found. Where you may see pure Silver flowring 'into its threds; that which shineth yellow, is most pure 'gold; that which is blackish, is silver mixed with 'gold.

ut supra p.185, 186, 187, 188, 189.

Gen. Dict. l. 4. s. 9. p. 198.

These are memorable proofs of the Vegetability of Metals, and may make us give the more credit to the Story of *Alexander ab Alexandro*, that in *Germany* there were Vines that brought forth little branches, and whitish leaves, of pure Gold, which was given to Kings and great Captains, together with the sprig or branch of the Vine, with a chinked bark.

Mund. Subter. ut supr. p. 188.

3. We shall now shew some other substances wherein Gold is found, and by the force of fire drawn forth, and separated from them. *Kircher* tells us, that in the *Hungarian* Mines, there was an Ore found that contained Copper, Silver, and Gold: as also a silver *Marchasite*, which had mixed with it gold. Also shining

ning Lead Ore, or *Plumbago*, which contained Gold and Silver; that likewise there was a Mine of Antimony that held in it some Gold. The learned *Wormius* tells us, that 1644. the noble *John Sigfridus* being general Overseer of Metallick matters, found a Mine of Gold, the Ore being black and like Talk, shining with frequent grains; which when he had tried, an hundred weight of the Ore yielded thirty eight marks of pure Gold. That a mass of another Vein 1646. did, being purified, yield six drachms of pure Gold, contained in one pound. This Ore shined with lesser grains then the former, and more tending to redness. Likewise that there were other Ores brought from the same place, that were like Talk, and pregnant with frequent granates, which many thought, did abound with Gold, &c. And although before I had omitted it, I shall here insert what *Diodorus Siculus* delivers of the *Arabian* gold; who saith, There is Gold digged up in *Arabia*, which is not melted with the fire, as is accustomed amongst others. But as soon as ever it is digged up, it is found like to *Chesnuts*, and is of so lucid a colour, that it makes the precious stones included by Artificers in Gold, most splendent. And that in that part of *Egypt* that lieth towards *Æthiopia* and *Arabia*, there are places that are very fertile of Metals; and from whence with great cost and labour they draw forth Gold, from a most pure white shining Marble.

Mus. Worm. l. 1. Sect. 3. c. 2. p. 114.

Biblioth. l. 2. c. 12. p. 65.

Lib. 3. c. 11. p. 73.

But of this we shall say no more but refer it to the next Chapter.

4. But for Gold found in the heads of *Flerella's* or Beck-trouts, we find little in particular, but onely that they affirm it in general. And *Kircher* tells us, that

Mund. subter. l. 10. Sect 4. p. 200.

Picus Mirandulanus (but he quotes not the place) relateth, 'That in his time gold was found in the stomach 'of Partridges; and addeth his reason, that it was no 'marvel, for that Hens, Partridges, Ducks, and the 'like, do much desire metallick bodies; and there- 'fore finding the raments or small shavings of Gold 'commixt with the sand, do swallow them; which 'after by the heat of the stomach do flow into one 'mass, which is a rational conjecture. And saith, 'that they report that Goats that are called *Ibices* 'were seen, whose teeth were spred over with a gol- 'den colour, especially in that part with which they 'did pluck up the grass; which without doubt did 'happen from the tincture of Gold-bearing spirits, 'wherewith the grass was imbued. And also tells us, 'that *Albertus* relateth that Gold was found in an hu- 'mane scull; which if it were truth, happened from 'no other cause then the steams of gold, when melted 'do arise, and no otherwise then quick-silver was 'coagulated in the brain. A reason I confess more 'probable then what *Sendivogius* and others have gi-

Hist. 1. ven of it. And I my self can affirm by experience and sight, that here in these Northern parts, where Sheep are bred upon barren mountains and hills (likely enough to contain metallick Ores) that their teeth are often (if old) at the roots of them, covered with a thin tincture of a very bright shining and golden

Hist. 2. colour. And I had some years since brought me by a friend two or three of the molares or grinding teeth of an old Cow bred upon such barren hills, and killed for Beef, which near the roots were covered with a crust thicker then our common Groat, with a fine shining gold-coloured substance, which for the rarity of it I keep by me, and did not scrape it off to trie if it contained any metalline matter. Which doubtless had gathered there, by the steams either of golden Marchasites, Copper Ore, or Gold it self, while yet in *primo ente*. Of which I hope to enquire more, that I may be able to make a trial of it, and thereby to satisfie my self and others, whether it contain Metal or not; for the Proverb is true, *All is not Gold that glisters.*

Chap. X.

Further of the Stones, Rocks, and Flints of Gold, and the striking passages wherein it is found: as also of the several sorts of it mentioned in Scripture, and elsewhere.

THe reason why I am so large in this particular is, to mind all ingenious Mineralists to make a more diligent search how all Ores lie, and in what wombs, coats, or substances, then hitherto hath been used; and especially about the Ore of Gold: and to this end we shall transcribe what we find most material to this purpose.

And in the first place we shall give the Reader an account of what *Basilius Valentinus* hath discovered in this particular; a person of vast experience in these matters, who writeth thus. 'This noble gold-stone 'and Ore is sometimes mixed, and on its outside there sticketh some obscure and dark matter, having annexed

Last Will and Test. par. 2. c. 3. p. 84, 85, 86.

'nexed to it ſome ſlates and other ſpermatick matter,
'which detracts from the goodneſs of its own nature.
'And though the Creator hath indued it with great
'virtues, yet doth it humble it ſelf, and ſuffers it ſelf
'to be found in deſpicable Mineral ſtones, where it
'loſeth much of its tincture; as is apparent by the
'Touch-ſtone, where the mixture of Copper, Silver,
'Tin, and others, is ſeen; all theſe mixed impurities
'can be ſeparated from it with artificial manuals; and
'with little ado it may be brought into a perfect
'ſtate. Gold Ores naturally are wrought thus; that
'the Gold ſtands in it cloſe, compact, firm, and good;
'which is found ſometimes in the croſs paſſages. Its
'fixedneſs is found in the deepneſs under ground,
'where it hath its greateſt power; and it is found alſo
'ſometimes in a ſpeckled Jaſpis, full of eyes, and mix-
'ed with flints in its paſſages; where many times Vi-
'triol flint is found abundantly, which Vitriol is the
'beſt among all other ſorts of Vitriol. The *Hunga-*
'*rian* Vitriol hath the precedence before all the reſt,
'which is ſufficiently known in their proofs, and exa-
'mens, as may be demonſtrated to the eye. In its
'paſſages are found ſometimes fluxes of ſeveral co-
'lours, which are interlined with gold, and muſt be
'forced with fire. To that purpoſe it is requiſite
'that it be dealt withal with ſuch fire, as you heard in
'the firſt part: commonly *Zwitters* and *Zirn* ſtones
'are ſuch, which muſt be ſtamped, and beaten, and
'drawn to a narrowneſs, and fined.

'Gold is wrought alſo in ſtanding paſſages, and on
'level ground; the Ores and ſuch paſſages are yel-
'lowiſh, rocky, and of a iron ſhot-ſand in clifts, as it
'is on-grown compactly. And generally it is found
near

'near Flint works, ſometimes it is found in a Flint, or
'in a liver-coloured Jaſpis, ſometimes in white pe-
'bles, that gold that is in it is of a white colour, like
'ſilver, or in white Copper Ore, where it ſticketh
'hoary and rugged: It is found alſo in brittle lime-
'ſtones, where it ſtands curled with black ſpecks un-
'ſprinkled, is granulated like drops found in the ſub-
'tileſt firm ſtones, ſpotted with iron-molds, or ſpots,
'and are protruded in fair yellow flowers, and are a
'black exhalation thruſt forth. It is found alſo in
'ſtreaked ſlate-work in pure paſſages, mixed with a
'blue horn-ſtone, and ſlate; in flinty glittering paſſages
'it is found hoary, and compactly wrought. There
'are found alſo flat Marble floats, wherein in all your
'clifts is wrought inherent gold, mixed with green
'grit, and iron ſpots. Sometimes it is found alſo in
'ſquare iron ſhots, or porous marble Marchaſites,
'but for the moſt part in grits. Sometimes gold Ore
'is found alſo compact, and firm, in black paſſages.
'Some gold Ores and gold paſſages are found alſo to
'be of Minerals, and of Vitriol; and Miners in *Hun-*
'*gary* eſpecially can diſcourſe of it, becauſe gold Ore
'is found in that manner in thoſe parts.

Theſe ſeem to me to be excellent diſcoveries and directions to find out the Ore of this Metal; and though the terms ſeem harſh and difficult, our *Engliſh* not ſo properly ſuiting the *German* Tongue, eſpecially about this ſubject; yet doubtleſs may be familiar to experienced Miners, *& artifici in ſua arte credendum eſt.*

Acoſta likewiſe tells us, Gold is commonly found 'mixt with Silver or with Copper, but that which is 'mixed with Silver, is commonly of fewer Carats then

Hiſtor. nat. & mor. of the Indies, c. 4. p. 214.

'then that which is mixed with Copper. If there be
Plin.l.33.c.4. 'a fifth part of silver, *Pliny* saith, it is then properly cal-
'led *Electrum*, which hath the property to shine more
'at the light of the fire, then fine gold, or fine silver.
'That which is incorporate with copper, is common-
'ly of a higher value.

Mus. Veronens. Sect.4.p.436. *Franciscus Calceolarius* tells us, that in his *Musæum* he had three sorts of the Ore of Gold.

1. 'One brought forth of *Pannonia*, in which there
'was a white colour, like silver.

2. 'Another arising with silver, forth of a stone heavy enough, of much what an ash colour, brought from the Mines of *Bohemia*.

3. An Ore flowing forth of a stone of a very red
'colour, in which was seen Copper growing, shining
'with an inset colour from the same Mines.

De nat. Fossil. l. 8. p 640. Agreeable to what is here related may be found in *Agricola*, to whom I refer the Reader: and onely shall add a passage or two more from *Basilius*, who

Last Will and Test. l.1.c.8. p.18. saith: 'To distinguish Metals by colours, is a curious
'skill, as red-gold-glass, mine-green, black Ore;
'however their working is not so exactly known that
'way.

And a little after he saith: 'Hither belong all mixt
'Ores, which at separating are parted asunder, and not
'before, as the custom is. As in *Hungary* there is had e-
'very where gold-silver (that is, in it there is gold)
'which in its colour and ponderosity is pure, hath lost
'nothing, and is still in its working quality, and if it had
'not been interrupted, and digged up unseasona-
'bly, then the silver would have been turned into
'pure gold.

Lib.2.p.41. *Lazarus Ercker*, that was chief Mine-master to *Maxi-*

milian the Emperour, tells us; 'That Gold is
'found in a white stone like marble, the *Germans* call
'it **Quartz**; as also in a blue and yellow horn-stone:
'likewise in a blue slate, iron, slats, yellow and of a
'subtile flaming; and sometimes in corn, tin, and iron-
'stone.

And once more *Paracelsus* tells us, (speaking of the separating of Metals forth of their Ores, and one from another:) 'These sorts of Ores sometimes will con-
'tain more then one Metal; as it often happens, that
'Copper and Silver, Copper and Gold, Lead and Sil-
'ver, Tin and Silver, &c. may be found in one
'Mineral. Rer. Nat. l.8.p.101.

Now for the gradual differences of Gold, they may be, and doubtless are many; for in fineness and purity there may be much disagreement; and therefore *Basilius* offers us a notable passage, thus. 'And take
'notice that Nature loveth to keep her own ways or-
'derly, and keeps together two, and sometimes three
'sorts of Ores in their ascension and descension,
'whereby she intimateth a way unto the after-work;
'but men in their fansies think upon other means,
'though to no purpose. View all the Mines which
'are in *Europe*, you will find no other Ores but im-
'pure ones, that is, a mixture of them; for their Na-
'ture maketh them so, as much as ever I could learn.
'If you can shew me the contrary, I will assent un-
'to it. Last Will and Test. par.1. c.11. p.25,26.

And again he saith; 'Who could tell what gold
'and silver were, if they were not known in their
'perfection; for when they are perfect it appeareth,
'when they have their colour, their weight, their mal-
'leableness, their flux and hardness. And this per-
'fect Ibid.c.12.p.27, 28.

'fect Metal Nature hath produced compactly and 'purely: for such perfect, pure, and compact gold is 'found in *Hungary*, in the white marble, which pre-'sently may be broken: as also silver and copper. The 'difference betwixt the perfect and pure is, because 'Metals are not pure before they are perfect, and so 'there may be a perfect Ore which is not pure, which 'defect is found in many of our Metals, which come 'to their perfection as soon as in any other Foreign 'parts, but in their perfect purity they are defective 'sometimes. And this we commend to the Reader to be seriously considered of.

Now from hence we may gather, that even one sort of gold, as it is gold, may be more fine and pure then another. And the Scripture doth shew us, that in those days gold was found to be, and esteemed, one sort better and purer then another; of which we shall now speak something largely for diversion sake, and to stir up all ingenious spirits to a more narrow scrutiny after these curiosities.

Gen. 2. 11, 12. 1. And first it mentioneth the gold found in the Land of *Havilah*, and saith; And the gold of that is *Zahab tob*, that is good: intimating plainly that there was other gold that was worse, and not so good. But where that gold was found, is something doubtful; though *Tremellius* maketh *Pishon* there to be the River *Tygris* that runneth all along the Inland into the *Sinus Persicus*, and takes it to be the Country of the *Susians* in the edge of *Persia*, and calleth it *aurum præstans*, that is excellent gold, and the Vulgar Latine calls it *aurum optimum*. And as to the place, *Piscator* doth agree; which I leave to others to be disputed of. *Castalio* calls it *aurum probatissimum*; but that it should

Not. in Gen. 10. 7.

should be the best, agreeth not exactly with the Hebrew word *tob*, which implieth not the superlative degree, and therefore the Septuagint renders it τὸ χρυσίον καλὸν, good gold. And *Luther* renders it, that is precious gold. And so do the *French* and *Italian* Bibles tránslate it good gold, not the best.

2. Though *Zahab* be the primitive word, the Hebrews most commonly use for Gold; and that some Lexicons take it to be meant of raw and unwrought Gold, yet sometimes they add some other word or Adjective unto it, that doth specifie some notable degree of the goodness of it, or some other quality: and in many places *Sagur* of the Verb *Sagar clausit*, which *Montanus* where the Text speaketh of *Solomons* covering the Oracle, he saith, *auro concluso*, or *purissimo*; but *Tremellius* (whose reason for this is the likest in this place) gives it; *auro asservato*, meaning the gold that *David* had preserved for that purpose of building the Temple; and it is not likely that *David* for a work of that nature, would not have kept any Gold, but that which was most pure; and in this sense that *Tremellius* gives, I find no place to contradict it.

1 King. 6 20, 21.

3. They use the word *Kethem*, which commonly signifieth a mass of bright and shining Gold, from the word *Katham emicuit*, it hath shined, or been bright; and to this they add *Tahur* from the Verb *Taher mundus fuit*, and this signifieth a mass of pure and clean Gold, and was most usually reckoned amongst their best sorts of Gold.

Vid. Job 28. 17, 18, 19, 20. & aliis locis.

4. They use the word *Phas* or 1. *Pas* from the Verb *Pasas*, *deauratus est*, it is covered over with Gold, and that very pure; for it is said: And the King made a Throne of Ivory, and covered it over. 2. *Mepasas*, that

1 King. 10 18.

that is with pure Gold; and sometimes it is taken for
Jer.10.9. that precious stone that is called *Topazion*. And it is not unlike but that it was brought from a place of that name, for it is said; That silver spred into plates, was brought from *Tharsis*, and Gold from *Uphaz*. And
Dan 10.5. again, *Then I lift up mine eyes, and looked, and behold, a certain man cloathed in linen, whose loyns were girded with fine gold of Uphaz.* Where the word *Kæthem* is used, as coming from that place called *Uphaz*; and *Arias Montanus* renders it, *in massa auri*
Vid. Polan. in loc. citat. *obrizi*. But it is plain that *Uphaz* was the proper name of a place, and not to be taken adjectively; and is thought to be the same with *Ophir*, of which we shall say more presently.

Job.28.1,6. 5. We may observe that it is probable that in the time of *Job*, Gold was gotten forth of the Earth, or Rocks, or separated from the sand. For he saith, as *Piscator* renders it, and *Tremellius* seems so to expound
Vid. Author. in loc. it; 'Surely there is a vein for silver, and a place for Gold where they find it: and it (the Earth) hath dust of Gold.

6. But the Gold that was known in the days of King *Solomon*, that had the chiefest commendation, was that which was brought from *Ophir*, or *Uphaz*; for it is taken by all the Learned, that they were both one place. And this is in divers places of all
Job 28.16. other most commended. For *Job* preferring wisdom before all earthly things, saith it shall not be compared with *Kæthem Ophir*, naming that sort of Gold that was accounted the most excellent and pure above all other, nor it shall not come in competition with
Psal. 45.9. *Kæthem tahur*, the mass of the purest Gold. And *David* setting forth the glory of Christs Kingdom and the

the Church under the person of a Queen, saith; *Upon thy right hand did stand the Queen in Gold of Ophir, Kathem Ophir, in massa auri Ophir*, as that sort of Gold that was most pure and excellent in esteem in those days. And that this gold was fetched by *Hiram* from *Ophir*, these places do testifie. *Then went Solomon to Ezi-on-Geber, and to Eloth at the Sea side, in the land of Edom. And Huram sent him by the hands of his servants, ships and servants that had knowledge of the sea; and they went with the servants of Solomon to Ophir, and took thence four hundred and fifty talents of gold, and brought it to King Solomon. For the Kings ships went to Tarshish with the servants of Huram: every three years once came the ships of Tarshish bringing Gold and Silver, Ivory, and Apes, and Peacocks.* Now the great question being amongst the Learned, where this *Ophir* or *Uphaz* was, from whence was brought the most pure Gold that was known in the days of *Solomon*; Sir *Walter Rawleigh*, a person of profound judgment, and great learning, hath extreamly laboured to prove that it was not from *Peru* in the *West Indies*, but brought from an Island in the *East Indies*, called by the name of *Ophir*; and to make this good he hath strained all possible or probable arguments to assert it. And so hath *Josephus Acosta*, and many others.

1 King 10.11. 2 Chron. 8. 17,18.

Ibid. c.9.v.10,11.

Hist. of the World. l. 2. part. 1. c. 18. parag. 3. p. 425. Hist. of the Ind. c. 13. p. 41, &c.

But notwithstanding the authority of such learned persons, I am of an opinion that their arguments are not of such force but that they may be easily answered, as having no other ground but probability and conjecture; but we have no time to bestow that way, but shall lay down that proof that may demonstrate that the land of *Ophir* or *Uphaz* was the two *Peru's* now known to *Europe*: For that text is so plain, that no reasonings

2 Chron. 3. 6. reaſonings can be able to overthrow it. For it is ſaid in the text; *And the gold was the gold of Peruaim.* And all men know that the Hebrews put *a-im* in the dual number, as *Peru* being the ſingular number, when *a im* is added to it in the dual, it makes *Peruaim.* Which muſt of neceſſity be the name of a place or Country. Which Epithete they could not have given to their beſt and pureſt gold, if there had no ſuch Country been known to the *Jews* in the time of *Solomon*; and indeed could be no other then the two *Peru's* now known to the *Europeans.* And the Septuagint renders it Φαρυὶμ, which in a manner is the ſame. And the French Bible, *Et l' or eſtoit or de Pharuaim,* which agreeth with the Hebrew. And *Tremellius* renders it, *Aurum autem ipſum erat aurum Paruaimorum:* and to the ſame purpoſe the Italian Bible ſaith, *Et l'oro, era oro di Paruarim*, as though it were the Gold of the people of the Country ſo called, which amounteth to the ſame purpoſe. And *Luther* calls it **Das Goldt war Parwaym Goldt.** And therefore an Author of great learning and credit, ſaith; *'Terra igitur illa, ex qua 'tanta optimi auri copia Solomoni advecta fuit, & ad 'alias gentes aſportata, jam tum Paruaim dicta fuit, 'quam hodie Peru vocamus: quæ ad Europæi orbis noti- 'tiam & Mercimoniorum uſum Chriſtophori Columbi 'ſagaciſſima pertinacia anno ſupra milleſimum quadrin- 'genteſimum nonageſimo ſecundo traducta, Hebræis au- 'tem veteribus fuit exploratiſſima. Verba Ariæ Monta- 'ni in libro Phaleg, id eſt, de gentium ſedibus & ſitu 'orbis ita habent. Dictio Paruaim iis qui vel tantum 'ſciunt Hebraice legere, duas regiones olim Peru di- 'ctas clare demonſtrat, unam quidem, quæ eodem voca- 'bulo hodierno etiam die Peru dicitur, alteram vero 'quæ*

Greg. Lex. Sarr. præf.

'quæ nova Hiſpania à navigantibus eſt appellata. Ejus 'autem regionis aurum puriſſimum atque in maximo 'pretio apud omnes gentes fuiſſe conſtat. Atque inter- 'pres quidem vulgatus vel ob ignotam ſibi regionem, 'vel potius in ejus, quod illa regio exhibebat, auri lau- 'dem (cum in Hebræo ita ſcriptum legatur: & aurum 'illud aurum Peru & Peru: nam Peru in numero duali 'Paruaim dicitur) convertit: & aurum erat proba- 'tiſſimum. Quocirca quicquid auri inter alias gentes 'priſcis illis ſeculis in uſu fuit, id fere totum ex illius 'terræ cavernis elicitum eſſe exiſtimamus, &c. And thus much by way of digreſſion for the curious to conſider of.

7. We ſhall not inſiſt upon that place in the *Revelation*, where it is ſaid, *And the City was pure gold, like unto clear glaſs. And the ſtreet of the City was pure gold, as it were tranſparent glaſs.* Becauſe it is a prophetical place, and alſo that it was but like unto, or as it were tranſparent glaſs, not that the gold was really tranſparent; of which it may be doubted whether any ſuch gold were ever exiſtent, either by Art or Nature. Rev. 21. 18, 21.

Beſides theſe foregoing ſorts mentioned forth of the Scripture, we find ſeveral ſorts of gold gradually diſtinguiſhed, according to the Regions from whence they are brought, as the *Arabian*, *Spaniſh*, *Hungarian*, and *German* gold, which all differ one from another in the degrees of goodneſs or pureneſs. And the pureſt that we have in theſe days (that I know of) is the ſand-gold brought from *Guinea*, and ſome other places, which is ſo near pure, and unmixt with any other Metals, that the Artificers that beat, or make leaf-gold, and thoſe that draw gold into ſmall Wire,

or

or fine threds, do commonly buy it, because it will serve their turns, without using the *Aqua separatoria*; and so they do the old gold coined by *Edward* the Third, because it hath in it the least alloy of Silver or Copper; and the purest Gold that I have ever seen, was a piece of *Roman* Gold, stamped with the image and name of *Nero*, which was as soft, and would have cut as easily as Lead.

And the goodness of Gold is commonly esteemed according to the number of Carats, of which there ordinarily are 24. though *Paracelsus* makes them 36. For *Acosta* tells us, 'The most famous Gold is 'that of *Caranana* in *Peru*, and of *Valdivia* in *Chille*, 'for that it riseth with his alloy and perfection, which 'is twenty three Carats and an half, and sometimes 'more. They make account likewise of the Gold of '*Veragua* to be very fine. They bring much Gold 'to *Mexico* from the *Philippines*, and *China*, but com-'monly it is weak and of base alloy.

Nat. & Mor. Hist Ind. c. 4. p. 214.

CHAP. XI.

Of the descriptions of common Gold according to some Authors, and of the properties thereof: as also of some wayes of beating, sifting, and washing the Ore thereof.

Bacon doth describe, or define Gold thus; *Aurum est corpus perfectum, &c.* 'Gold is a perfect body 'generated of Argent vive, pure, fixed, clear, red, and 'of a clean sulphur, fixed, red, not burning, and hath 'no defect. *Rulandus* thus; Gold is the most tem-'perate Metal of all other, yellow, shining, ponde-'rous, equally digested in the belly of the Earth, very 'long washed with Mineral Water; consisting of a 'pure Argent vive, fixed, clear, red; and of a clean 'sulphur, fixed, red, not burning. In brief, it is the 'subtile substance of Argent vive.

Spec. Alchym. c. 2. p. mihi 259.

Lex Alchym. f. 90.

Libanius gives it thus; 'Gold is a perfect Metal fra-'med of a most mature, and most pure Mercury, by 'the virtue of a most excellent sulphur, and together 'with it brought into a most tenacious, and the best 'commixtion, and adorned with a citrine tincture.

De nat. Metal. c. 4. p. 24.

Wormius thus, 'Gold is the most pure, and most 'perfect of all Metals, consisting of a most pure Mer-'cury, most perfectly concocted, and of a red sulphur 'most excellent, and most fixed, being exactly min-'gled and united together: sustaining all the trials of 'the fire, and of *Aqua fortis*, most heavy; and above 'all other Metals extensible, or to be beaten forth, 'shining with a yellowish colour.

Mus Worm. l. 1. Sect. 3. c. 2. p. 114.

And theſe are ſufficient, that from hence we may gather ſome of its chiefeſt properties.

1. Therefore of all other Metals it is moſt perfectly maturated and decocted by Nature, and is of the moſt equal temper: for as *Treviſan* tells us, *Quare in auro ſunt quatuor elementa in æquali & anatica proportione coadunata.* Therefore the four Elements are in Gold, joyned together in an equal and anatical proportion. But yet taking his ſuppoſition that gold is generated of the four Elements, we are not to underſtand this equality of proportion in reſpect of their equal quantities, but anatical proportion in regard of qualities.

Art. Aurif p. 40.

2. Of all other Metals, Gold hath the leaſt portion of external or ſeparable ſulphur (for that it hath ſome, appears by the authority of *Paracelſus* and *Helmont*; the latter of which tells us, That external ſulphur is not poſſible to be ſeparated by Nature, but by one conſtructive liquor) and therefore is in that regard accounted more perfect then any of the reſt.

3. Gold is more denſe and compacted then any other of the Metals, that is, it is leſs porous then any of the reſt, being ſo cloſely joyned *per minima*, that little or none of the air, or *globuli ætherei* (as *Carteſius* calls them) can lodge within its particles. And this is the cauſe of two other of its properties; to wit, its heavineſs, and power of extenſion; both of which are far beyond either of thoſe qualities in other Metals.

4. It indureth not onely all the force of our common fire, but if we may give credit to Writers of ſufficient authority, they do inform us that in the greateſt torture of the fire, it loſeth nothing of its ſubſtance or weight, but rather gaineth; for ſo doth *Wormius*

Wormius tell us in the place above-cited. And it will not onely indure the trial *per cineritium*, or teſting with Lead (which ſilver will alſo abide without waſting) but alſo the probat of *Aqua fortis*, the *cementum regale* by *Antimony*, and that which Artificers call *Quartation*. All which do ſufficiently declare all thoſe perfections and excellencies that Authors have attributed unto it.

As for the beating, grinding, ſifting, and waſhing of Ores in general, from their earthy filthineſs and ſuperfluities, *Georgius Agricola* hath written very largely and learnedly, more then any other Author that I know of. And I could wiſh that ſome perſon that hath ability and leiſure, would tranſlate it into *Engliſh*; for it might be very ſerviceable to our common Miners, that in that particular have little to direct them, but what they learn one from another. But we ſhall onely here note ſome few particulars of beating or waſhing of gold Ore, from two or three Authors of Credit. For *Agricola* tells us, 'Seeing that 'Nature doth for the moſt part bring forth Metals im'pure, and mixed with earth, concrete juices, and 'ſtones; it is neceſſary, as far as can be poſſible, to 'ſeparate thoſe things from the Metallick veins, be'fore they be fluxed or molten.

Lib. de re Met. 8. paſſim.

1. *Acoſta* tells us, 'Gold in ſtone is a vein of gold 'that groweth or ingendreth within the ſtone, or flint, 'as I have ſeen in the Mines of *Curuma* within the go'vernment of *Salines*, very great ſtones pierced and 'intermixed with gold; others that were half gold 'and half ſtone. The gold which groweth in this 'manner, is found in Pits or Mines, which have their 'Veins like to the ſilver Mines, but it is very hard to

Hiſtor. nat. & mor. of the Indies, c. 4 p. 213, 214, 215.

'draw it forth. And a little after: They refine pow-
'dered gold in basons, washing it in many waters, un-
'til the sand falls from it, and the gold as most heavy
'remaineth in the bottom. They refine it likewise
'with Quicksilver and Strong-water, for that the Al-
'lom whereof they make this water, hath the ver-
'tue to separate gold from dross, or from other
'Metals.

Lib 3.c.11. p.73. 2. *Diodorus Siculus* tells us a strange story both of the getting of gold Ore, as also of its preparing by beating, grinding, and washing, which for brevity sake, we shall onely give in the *English*. 'In the bor-
'ders of *Egypt* that joyn to *Ethiopia* and *Arabia*,
'there are places very fertile of Metals; Forth of
'which with much labour and expence, Gold is drawn.
'For the black earth by nature hath passages, and
'veins of most white marble, which shineth above all
'brightness. And a little after, he saith, That almost
'infinite thousands of men do dig forth with iron in-
'struments, the more soft rock, and which is broken
'with indifferent labour. He that discovereth the
'Veins of gold, goeth before the Workmen, shewing
'what places they are to dig. They cleave the stony
'marble being shewed, by the strength of strong bo-
'dies, not by Art, but by great force with iron wedges.
'But they drive shafts or passages not streight, but
'that way which Nature leadeth, by the gold in the
'shining marble. But when by reason of the divers
'bendings, and turnings, they are darkned in their
'passages, the Workmen carrying lights before them,
'the rocks by great force being cut in pieces, they
'carry up, and cast upon the ground. Others cut
'them so casten into very small pieces, others carry
'them

'them away. The pieces taken from these Workmen
'being cut to a certain measure, they beat in stone
'Vessels with a pestle or hammer of Iron, unto the
'smallness of Millet seeds. They then being cast into
'Mills, are grinded unto the very fineness of meal.
'Then the Workmen taking it ground, do put it upon
'broad Tables a little declining, and again beat, or
'rub the Marble, water being cast upon it: By that
'means the earth being washed away, the gold by its
'gravity doth remain upon the Tables. This they
'often iterating, they rub the Gold with their hands.
'Then with thin and porous sponges, they press forth
'the soft earth, until it be made like unto golden sand.
'Lastly, other Workmen do put it by weight and
'measure into earthen pots; and do superadd in a
'certain measure, Lead, Sea-weed, or Tange, and Bran
'of Barley. These things compounded in a certain
'proportion, they diligently lome or daub up the pots
'with clay, or lute. Furthermore, being decocted
'five whole days and nights in a Furnace, pure Gold
'is onely found in the Vessel, the other things being
'wasted, the former weight being little diminished.
I have the rather delivered this at large, because it is a very remarkable passage, and perhaps not taken notice of by many Readers, and may be of some considerable use to an ingenious Mineralist.

Of the West Indies, p. 188, 189, 190. 3. *Gonzalus Ferdinandus Oviedus* relateth two notable ways both of their finding of Gold at the *Indies*, and of the washing and purifying of it: and that not by hear-say, but upon his own experience; some of which we shall transcribe, because I believe the Book is not very common. Who saith, 'This
'particular of the Mines of Gold, is a thing greatly to
'be

'be noted, and I may much better ſpeak of it then a-
'ny other man, foraſmuch as there are now twelve
'years paſt ſince I ſerved in the place of Surveyor of
'the Melting-ſhops pertaining to the Gold Mines of
'the Firm Land, and was the Governour of the
'Mines of the Catholick King *Don Ferdinando*; after
'whoſe departure from this life, I ſerved long in the
'ſame room in the name of your Catholick Majeſtie.
'By reaſon whereof, I have had great occaſion to
'know how Gold is found and wrought out of the
'Mines, &c. And a little after he ſaith: The man-
'ner how Gold is gathered, is this, either of ſuch as is
'found in *Zanana*; that is to ſay, in the Plains and
'Rivers of the Champian Countrey being without
'Trees, whether the earth be with graſs or without;
'or of ſuch as is ſometimes found on the Land without
'the Rivers, in places where Trees grow; ſo that to
'come by the ſame, it ſhall be requiſite to cut down
'many, and great Trees. But after which ſoever of
'theſe manners it be found, either in the Rivers or
'Breaches of Waters, or elſe in the Earth; I will
'ſhew how it is found in both theſe places, and how it
'is ſeparate, and purged. Therefore when the Mine
'or Vein is diſcovered, this chanceth by ſearching and
'proving in ſuch places, as by certain ſigns and tokens
'do appear to skilful men, apt for the generation of
'Gold, and to hold Gold. And when they have found
'it, they follow the Mine, and labour it, whether it
'be in the River or the Plain, as I have ſaid. And if
'it be found on the Plain, firſt they make the place ve-
'ry clean where they intend to dig, then they dig eight
'or ten foot in length, and as much in bredth; but
'they go no deeper then a ſpan or two, or more, as
'ſhall

'ſhall ſeem beſt to the Maſter of the Mine, digging
'equally; then they waſh all the earth which they
'have taken out of the ſaid ſpace, and if herein they
'find any Gold, they follow it, and if not they dig a
'ſpan deeper, and waſh the earth as they did before:
'and if then alſo they find nothing, they continue in
'digging and waſhing the earth, as before, until they
'come to the hard rock or ſtone: and if in fine they
'find no Gold there, they follow no further to ſeek
'Gold in that place, but go to another part. And it
'is to be underſtood, that when they have found the
'Mine, they follow it in digging in the ſame meaſure
'in level and depth, until they have made an end of
'all the Mine which that place containeth, if it appear
'to be rich.

Their manner of waſhing he thus deſcribes, 'And
'when they have digged forth the Mine, they fill cer-
'tain Trays with that earth, which other *Indians* have
'the charge immediately to receive at their hands, and
'to carry thoſe Trays of Earth to the Water where it
'may be waſhed: yet do not they that bring it waſh
'it, but deliver it to other, putting it out of their
'own Trays into others, which they have ready in
'their hands to receive it. Theſe Waſhers for the
'moſt part are Indian women, becauſe this work is
'of leſs pain and travel then any other. Theſe wo-
'men when they waſh, are accuſtomed to ſit by the
'water-ſide with their legs in the water even up to
'the knees, or leſs, as the place ſerveth their purpoſe;
'and thus holding the Trays in their hands by the han-
'dles thereof, and putting the ſame into the Water,
'they move them round about, after the manner of
'ſifting, with a certain aptneſs; in ſuch ſort that there

enter-

'entereth no more water into the Trays then ſet-
'veth their turns; and with the ſelf-ſame apt moving
'of their Trays in the water, they ever avoid the foul
'water with the earth out of the one ſide of the Veſſel,
'and receive in clean water on the other ſide thereof:
'ſo that by this means, by little and little, the water
'waſheth the earth as the lighter ſubſtance off the
'Trays, and the gold as the heavier matter reſteth
'in the bottom of the ſame, being round and hollow
'in the middle, like unto a Barbers Baſin. And when
'all the earth is avoided, and the gold gathered toge-
'ther in the bottom of the Tray, they put it apart, and
'return to take more earth, which they waſh conti-
'nually, as before. So that to conclude, there are in
'all five perſons ordinarily aſſigned to every Tray of
'Waſhers.

I have been the more tedious upon this ſubject, becauſe I judged it very material and profitable; but now we ſhall come to ſome higher queſtions concerning Gold, and ſo leave it.

CHAP.

CHAP. XII.

What may be thought of common Gold; whether it be an ingredient into the Philoſophers Tincture, or not? What may be ſaid of Aurum potabile, *or the Tincture of Gold; and what of the white body when the Tincture is taken from it; and ſomething of the* Alcaheſt.

I Very well underſtand that I ſhall undergo no ſmall cenſure, for taking upon me to intermeddle with ſuch abſtruſe matters as I have propoſed in this Chapter. And ſome may deem that it is my ambition to be thought or eſteemed an Adeptiſt; or at leaſt to ſpeak my ſelf ſo highly knowing in theſe Arcana's, that thereby I may draw ſome to make ſuit unto me for further unveiling of theſe ſecrets. To which I ſhall ſay little, but onely this, that my Motto hath long been, and is, *Qui bene latuit, bene vixit*; and however they may cenſure, I ſhall eaſily paſs by it, and anſwer with that of *Paracelſus*, *Alterius non ſit, qui ſuus eſſe poteſt*: and ſhall modeſtly tell them, that it is above 35 years ſince I firſt learned a courſe of common Chymiſtry under old *Johannes Huniades*; and have ever ſince at times and ſeaſons been imployed therein; and have been and am a continual reader of and ſtudier in the beſt Authors that have written in myſtical Philoſophy; and therefore let none be too cenſorious of what I know, or what I know not, in this abſtruſe Science, but weigh the

Authorities and Reasons that I lay down, and accordingly judge of what I write.

1. For those that are seeking the grand secret in Animals or Vegetables, or in any thing that they produce, or that proceeds from them, or in any Minerals or Metals, except in ☉, ☽, and Mercury, we shall pass them by, as looking at those as things that are too far removed from the intention of the Philosophers: who if they did mention them, it was onely by way of similitude, as *Bacon* tells us; *Quare admirandum est, quod aliquis prudens suam fundat intentionem super animalia, sive vegetabilia, quæ valde sunt remota, cum inveniantur minerali satis propinqua. Nec credendum est omnino, quod aliquis Philosophorum posuerit artem in prædictis remotis, nisi similitudinarie.*

Spec. Alchym. c. 3. p. mihi. 260.

But those that think they come neerest the mark, do fix upon the noblest of Metals, to wit, Gold; taking that of *Augurellus* for a truth, (which is so indeed, if rightly understood) *In auro, semina sunt auri, & ut ignis est principium ignificandi, sic aurum aurificandi*; and finding the Masters do call the Gold that they use in the first work (for we speak not here of fermentation) their Gold not *aurum vulgi*, they therefore commonly pitch upon pure Gold, such as is much sand gold, or as the *Germans* call it, Wash gold, that hath not been melted in the fire; and this many of the wiser sort do take to be living gold, strengthened by that subtile assertion of *Sendivogius*, who saith, *Scito enim metallorum vitam esse ignem, dum adhuc in suis mineris sunt, & mortem etiam ignem fusionis videlicet.* And if to this they add what *Trevisan* hath written in that learned and abstruse Epistle of his to *Thomas* of *Bononia*, it would in a manner convince an under-

No. Lum. Chym Tract. 3. p. 311.

understanding person, to believe that common gold being decocted in their *menstruum*, would communicate its vertue to their water, by which the whole magistery might be perfected; but it is good to be wary, *latet anguis in herba:* and therefore the learned *Mayerus* gives us this caution, *ut perspicuus apparet, ita profundus delitescit.*

And I shall crave pardon of those that are learned in this point, if I do not adhere to this opinion; for though I may confess that Gold by fusion in the force of fire, is thereby dead, yet my question is, that it was dead before; and so after fusion that may be more amply prædicated of it, though it was truly dead before, as when a man is slain by a mortal wound, he may be said to be dead, when he is absolutely cold, and no motion of life in him; and much more he might be said to be dead when his body (like the custom of the *Romans*) is burned.

And to confirm that Gold and other particular Metals are dead when they are coagulated into an hard and fixt metallick body, we shall give sufficient authority.

And first, *Basilius Valentinus* (a man of unquestionable verity and experience) tells us thus. 'In the 'first place be informed, that our Gold (so much spo-'ken of hitherto) must never be taken for such Gold 'by any of our Disciples, which hath been melted and 'fully digested by Nature; for herein such errour is 'committed, that men dilapidate all that they have, 'and lose both the end and beginning of all their 'Works.

Elucidar. of the 12. Keyes, p. 140.

From this it clearly appeareth, that not onely gold that hath been melted, is excluded from the beginning

of their Work, but also gold that hath been fully digested by Nature; for who can expect life from a dead thing?

To this we may add that signal passage of *Paracelsus*, quoted by us once or twice before, though not this very purpose, who saith: *Primo sciendum est, metallum quodvis, quamdiu in primo ente adhuc latet conditum, peculiaria sua Astra habere. Ita aurum habet astra Solis: Argentum astra Lunæ, &c. Quamprimum autem ad suam perfectionem venerunt, & in fixum metallicum corpus coagulantur, ab illorum quolibet sua astra recedunt, & corpus suum relinquunt mortuum.* And a little after he tells us; *Et una intelligendum, ad utriusque tincturæ, rubræ scilicet & albæ, præparationem initio non corpus auri vel Lunæ, sed primum ens auri vel Lunæ assumi debere. Si enim in principio error committatur, de opera & labore omni actum erit.*

Rer. Natur. l. 9. p. 113.

From whence it is not onely plain, that gold when coagulated into a metallick body, is dead; but also that it is in vain to take it in the beginning of the Work.

Trevisan tells us the same thing, saying; *Corpora vulgaria, per naturam solam in mineris absoluta, sunt mortua, ut imperfecta perficere nequeunt, &c.*

Theatr. Chym. vol. 1. p. 754.

And the learned *Combachius* in his Translation of *Nuysement*, tells us this certain rule. *Prudentes & nasi emunctioris homines, ex radice opera sua inciptunt, & non ex ramis: Eligentes, ut doctissimus Bacon ait, rem, super quam natura tantum primas operationes incepit, per unionem & mixtionem proportionatam puri & vivi Mercurii, cum simili sulphure in massam solidam congelati.* And this is a clear point which

De Sal. Phil. l. c. 4. p. 157.

Bacon further explaineth thus; shewing how they are excused from taking gold to the composition of the red, or silver to the white. *Cum inveniamus rem, vel corpus aliquod, ex tam mundo, vel mundiore sulphure, & argento vivo, super quod natura parum, vel minimum est operata.* And after, *Eligenda est ergo materia, in qua est argentum vivum mundum, purum, clarum, album & rubeum, non ad complementum perductum, sed commixtum æqualiter & proportionabiliter, per modum debitum cum sulphure tali, & in massam solidam congelata.*

Spec. Alchym. c. 3. p. 263, 264.

And to this agreeth the saying of *Paracelsus*, speaking of the sulphur of Gold. *Hoc sulphur, si quale in aurifera arbore, & ad hujus radicem in montibus est, Alchymistæ invenire & adipisci possent, esset certe, de quo effuse gauderent.*

De Mineral. l. Tract. 1. p. 347.

From all which it is manifest that common Gold as it is perfected by Nature, and digested to the height of maturity, though it have never been melted, nor felt the force of the fire; yet in respect of the Philosophers first work, is but dead, and wants the principles of life and vegetability, that necessarily is required to their purpose; and that there is another gold not vulgarly known for such, in which Nature hath but wrought her first operations, which above all other they persuade to seek after, and to take. Therefore we will conclude this (because we have spoken more largely where we treated of Gold according to the mystical Authors) with the advice of *Johannes Spagnetus*, who saith, 'Now those bodies must be 'taken which are of an unspotted, and incorrupt virginity, such as have life and spirits in them, not extinct as those that are handled of the vulgar; for 'who

Arcan. Herm. p. 175.

'who can expect life from dead things? and thoſe 'are called corrupt, which have ſuffered copulation; 'thoſe dead and extinct, which (by the enforcements 'of the chief Tyrant of the World) have poured out 'their ſoul with their blood by martyrdom.

2. In the next place many do imagine and urge, that though common Gold be dead, as Nature hath produced it; yet it is to be reviſed by Art, and that herein lies the great difficulty and myſtery of their ſolution, and the bringing of it back to its firſt matter. Of this there is enough ſaid to encourage this opinion.

We ſhall be a little large in handling this, becauſe it is a deep and myſterious point. And in the firſt place, we ſhall find all the Philoſophers as it were unanimouſly agreeing, that the tranſmutation of Metals is impoſſible, unleſs they be reduced *in materiam ſuam primam*: which we ſhall take to be granted as a certain truth, but all the difficulty lies in the true underſtanding of the Philoſophers meaning, who never ſpeak more truly then when darkly; nor never more equivocally (if not falſly) when they ſpeak plainly. Some underſtand this reduction of them into their firſt matter, to be taken to be brought to paſs in projection; of which we ſhall ſay nothing. Others, that it is to be underſtood of their firſt matter, that it muſt be by ſolution reduced into its firſt principles, of which it was conſtituted; and this in a ſober and limited ſenſe we ſhall allow of, and inquire what firſt matter it is that they muſt be reduced into; and that cannot be underſtood truly and properly of the firſt matter of Metals, for that is vapour. For *Sendivogius* tells us; '*Sciant ergo doctrinæ filii ſperma metal-*

No. Lum. Chym. Tract. 4. p. 312.

'*lorum*

'*lorum diverſum non eſſe à ſpermate rerum omnium,* '*ſcilicet vaporem humidum; ideo fruſtra quærunt ar-* '*iſtæ metallorum reductionem in materiam primam,* '*quæ tantum vapor. Philoſophi non talem intellexerunt* '*materiam primam, ſed tantum materiam ſecundam.* So that rationally it muſt be thought to be that which is the next and proxime matter of Metals, which *Treviſan* excellently deſcribeth thus: '*Glorientur Alchy-* '*miſtæ utut volent, nunquam formas tranſmutabunt* '*metallorum, niſi per ipſorum in primam materiam* '*reductionem: hoc ipſum habent omnes libri qui de* '*forma tractant metallica. Verum ut intelligatur quid* '*ſibi velit in primam reductio materiam, apprime ſci-* '*endum materiam eſſe primam, rem ipſam in quam* '*immediate proximeque ſpecifica forma introducitur,* '*uti prima hominis materia, eſt utrumque viri ſeminis* '*& mulieris.* So that it being granted that there is a neceſſity of reducing the Metals into their firſt, which was the next matter into which the ſpecifick form is introduced, and thoſe that ſuppoſe natural gold, though having not felt the fire, is to be reduced into this proxime matter, which they ſuppoſe to be done by their ſolution; which is accounted ſo hard and difficult: we ſhall now examine whether common gold can be reduced into this proxime or firſt matter, which we ſuppoſe ſimply impoſſible.

Theatr. Chym. p. 758.

And firſt, whereas they alledge that their ſolution is ſo extream hard and difficult, we ſhall oppoſe the authority of *Sendivogius*, who ſaith; *Et hoc vobis* '*dico, quod opus eſt rem quærere aliquam, quæ occulta* '*eſt, ex qua fit (miro modo) talis humiditas, quæ au-* '*rum ſine violentia ſeu ſtrepitu ſolvit, imo ita ſuaviter* '*& naturaliter, ſicuti glacies aquæ calidæ beneficio li-* '*queſcit,*

No. Lum. Chym. Enig. p. 351.

'*queſcit, ſi hoc inveniſtis, habetis rem, ex qua aurum à*
'*natura productum eſt: & quamvis omnia metalla, &*
'*res omnes ex illa ortum habeant, nil tamen ita amicatur*
'*ei, ſicut aurum, nam aliis rebus adhæret impuritas,*
'*auro autem nulla, propterea inſtar matri eſt ipſi.* From whence I ſhall commend theſe conſiderations unto the ſtudious Reader.

1. That this matter forth of which is drawn their great ſolvent, is a thing that is occult and hid, which humidity is made forth of it in a wonderful manner.

2. That this Water doth diſſolve Gold without violence or noiſe, as pleaſantly and naturally as Ice is melted in warm water; ſo that the water once had, the diſſolution is eaſie; and therefore what difficulty ſoever they ſpeak of in their ſolution, muſt be underſtood of the preparing and attaining of this ſolvent, and not in regard of the ſolution of Gold in it.

3. I ſhall commend it to be inquired of by all curious perſons, whether this Gold that is ſo eaſily diſſolved in it be common Gold, or that of the Philoſophers; becauſe I cannot determine it here, for reaſons not fit to be divulged.

4. Eſpecially to mark that this water is that from which Gold by Nature is produced; ſo that there is a ſubject to be had, from whence Gold by Nature is produced, forth of which this their ſolvent is made and prepared; which is a clearer hint then I know that any other Author hath ever given; and therefore I wiſh every true Artiſt to conſider, and ponder of it well; for this is the Key of all their ſecrets, and onely can open the door into the Philoſophers Roſary.

5. To

5. To note, that whereas he ſaith, That although all Metals, and all things have their off-ſpring from this water, yet nothing is ſo amicable unto it as Gold, becauſe other things have impurities, but that Gold hath none, which muſt be taken with a grain of ſalt; for there is no natural or common Gold but it hath ſome impurity; and in what reſpect all Metals, and all things have their riſe from it, muſt be carefully conſidered, calling to mind that this Author (as well as others) uſeth contradictions in his Writings, and tells us that the Roſe is not found without its prickles.

To this of *Sendivogius* we ſhall ſubjoyn that of *Helmont*: '*Summus autem atque feliciſſimus ſalium eſt,* '*qui ultimam puritatis & ſubtilitatis metam in natura* '*attigit, cuncta pervadit, ſoluſque agendo manet im-* '*mutabilis, quæque alia pro lubitu, prompta reſolvit* '*obedientia, rebellemque omnem materiam, non ſecus* '*atque aqua calida nivem liquat, & volatizat.* And in another place he ſaith: '*Quæ longe clarius per* '*Adeptos demonſtrari poſſunt. Quibus ſcilicet unicus* '*& idem liquor Alkaheſt, omnia totius univerſi corpo-* '*ra tangibilia perfecte reducit in vitam eorundem pri-* '*mam, abſque ulla ſui mutatione, virtumque diminu-* '*tione. A ſolo autem ſuo compari, ſubter jugum tra-* '*hitur, atque permutatur.*

Poteſt. Medic. p. 474.

Ignor. Act. Regim. p. 334.

From whence we may obſerve: 1. That this liquor muſt in all probability be the ſame ſpecifically with that ſolvent of *Sendivogius*, becauſe they work the ſame effects, of which we ſhall ſay more anon.

2. We are to note that the ſubject out of which this great liquor or ſolvent is drawn, is a Salt, and that the chiefeſt, and moſt happy of Salts. But I ſhould caution every learned Artiſt, or Searcher of theſe ſe-

crets, to take care that he mistake not (as many that thought themselves learned, and of piercing wits, have been) who, misled by many passages in the Philosophers Writings, have been drawn forth to rome after some universal or catholick Salt, gotten forth of the beams of the Sun, Air, or some Earths, or carried after the fansie of some other more common and vulgar Salts; but shall wish them to remember a saying often reiterated by the Philosophers, which is this; *Qui habet Sal metallorum, habet lapis antiquorum*; a sentence of few words, but of a vast depth, rightly to understand and find the true meaning of; and which some that I have known that have many years read and studied the Philosophers books, never could rightly dive into. But *verbum sat sapienti.*

3. That this liquor of *Helmonts*, like the other, did perfectly reduce, or dissolve all tangible bodies of the Universe (of which common Gold is one) into their first life, as easily as Snow is volatized and melted in warm water, without any mutation or diminution of its own strength, but remained immutable.

4. But that it was drawn under the yoke, and throughly changed by its onely compeer; which what that is, we shall plainly tell the Reader in general, that it is the Philosophers incombustible sulphur, fixed grain, or first agent, which we hope no man will think that we should particularly name. The seal of *Hermes* ought not to be broken.

Though these two places of these Authors are sufficiently concordant, as to the easiness of the radical dissolution of bodies by this liquor once had, and obtained; yet we shall give them another hint from this great Adeptist *Helmont*, that seems disagreeing to what

what hath been said, in regard of the difficulty of dissolving some bodies, and yet make it appear that they are reconcileable; for though the Philosophers spoke often darkly, yet they spoke truly; and how dissonant soever they seemed in words, notwithstanding there was a perfect Harmony in their meanings: And thus *Helmont* speaketh concerning metallick Mercury; Progym. Mer. p. 70.

'*Siquidem in mercurio deprehendi quoddam sulphur* '*externum, originale metalli labem continens. Quæ* '*quia originalis, ideo & difficulter ab eo tollitur. Qua* '*tandem nihilominus per artem separata, aiunt periti,* '*mercurium superfluo sulphure, & humido superfluo* '*mundatum.* From whence it is manifest how hard and difficult it is to separate the external sulphur from metallick Mercury, because they were originally conjoyned, but that nevertheless by Art they may be separated. And such an Artist he calls *Peritus*, which doth manifest in part, that the difficulty lies chiefly in preparing and obtaining the solvent, and not in separating the sulphur from the metallick Mercury, when the liquor is once had. For where he is speaking of the *Ludus*, he saith; *Est autem hoc opus longe difficillimum, non quidem quoad præparationem Ludi; sed ipsius Alkahest.* By which it is plain beyond exception, that the preparing of this great solvent, is of all other far most difficult, and not in dissolving any other bodies by it when it is once had: and therefore in another place, speaking of the *Alkahest*, he saith it is *tædiosissimæ præparationis.*

The next thing concerning this question in hand, is first one place in *Sendivogius* that seemeth to favour this Opinion, that common Gold is to be used in the first Work, and that is where *Sendivogius* saith:

No. Lum. Chym. Tract. 10. p. 330.

'*Lapis Philosophorum seu tinctura, nihil aliud est,*
'*quam aurum in supremum digestum; nam aurum vul-*
'*gi est sicuti herba sine semine, quando maturescit pro-*
'*ducit semen, sic aurum quando maturescit, dat semen*
'*seu Tincturam.* By which any one would think that vulgar Gold ought to be taken in the beginning, and so long concocted and digested until it be ripened, and then it yields seed or the Tincture. But if we consider more narrowly we may observe, that though it be true that common Gold must be ripened, ere it yield the golden seed or tincture by which other Gold may be produced, and inferiour or imperfect Metals be changed into the nature of Gold; yet the question is still, whether common Gold be onely ripened by being joyned in fermentation with the Philosophers sulphur first had and prepared, that doth maturate and ripen it, or not; for it is known that the Philosophers sulphur being prepared, is universal and catholick, and would work upon Vegetables or Animals, as well as Metals; and is only determined and specificated by that Metal that is joyned with it in fermentation, thereby causing it to transmute others into its own specifical nature; and therefore it is credibly written of *Kelley*, that he transmuted Gold into Quicksilver; and this was it that made *Lully* cry out and say, *Is Nature also retrograde?* But to confirm this, let us give some Authorities.

Arc. Herm. p. 188.

Spagnetus telling the qualities of the Planet *Mercury*, concludeth thus; 'The like this uncertain *Elixir*
'worketh, for that being tied to no proper quality, it
'embraceth the quality, and disposition of the thing
'wherewith it is mixed, and wonderfully multiplieth
'the virtues and qualities thereof.

Petrus

Petrus Johannes Faber, who (as is credibly thought, and may be known in part by some of his last Writings) became a Master of the grand Secret, speaks (in this point) thus plainly and roundly. Hydrolog. l. 3. c. 14. p. 250.
'*Omnes fere Philosophi Spagyrici asserunt fontem Chymicorum*
'*seu Mercurium Philosophorum perfici non posse sine au-*
'*ro vel argento: sed aurum illud, non est aurum vulgi,*
'*nec argentum illud est argentum vulgi: Sed est quid*
'*aliud, à fonte ipso non alienum nec extrinsecum; imo*
'*est aurum & argentum in ipsis visceribus ipsius fontis*
'*enatum: Et est pars fixa ipsius fontis, quæ cum in du-*
'*plici sit differentia, rubea & alba; rubea quæ est, au-*
'*rum est Philosophorum, & quæ alba est, argentum est*
'*eorundem; verissimum est sine auro illo & argento,*
'*fontem Chymicum perfici non posse.*

And a little after he saith, *De auro autem vulgi* Ut supra.
'*nullo pacto hoc est censendum, quia quamvis in fer-*
'*mentatione lapidis nostri, sit necessarium ut determi-*
'*netur lapis ad perfectionem metallorum: non tamen*
'*determinat perfectionem lapidis, imo contra lapis no-*
'*ster terminat ac perficit aurum vulgi, sine ipso enim*
'*lapide, aurum vulgi mortuum omnino est, ac sterile*
'*& infœcundum; cum lapide vero connexum, fit vi-*
'*vum & fœcundum, communicans suas perfectiones &*
'*dotes: unde perficitur aurum vulgi ab ipso lapide, non*
'*è contra, ab auro perficitur lapis.*

The last we shall add to this particular, is the testimony of learned *Mayerus*, who saith: 'Nihilominus
'*Philosophi affirmant, ut in igne ignificandi principium*
'*extat, sic in auro aurificandi: verum tinctura quæri-*
'*tur, cujus medio aurum fiat. Hæc indaganda est in*
'*suis propriis principiis, non in alienis: nam si ignis*
'*ignem producat, pyrus pyrum, equus equum, tum plum-*

bum

bum & non argentum, aurum aurum, & non tincturam
generabit: Ad hæc aurum Philosophis plumbum, pro-
prium est, quód non negant pro fermento in fine operis
lapidi aurifico adjici debere, sed necessario requiri quoq;
asserunt. Cum fermentum ducat fermentatum in sui
naturam, sine quo tota compositio ad perfectionem nun-
quam rediret.

Chrysop. l. 1 p. 203. By this may be clearly opened that of *Augurellus*, which so many have mistaken, and so few rightly understood; to wit,

Theatr. Chym. Vol 3.

Hordea cui cordi demum serit hordea: ne tu
Nunc aliunde pares auri primordia, in auro
Semina sunt auri, quamvis abstrusa recedant
Longius, & multo nobis quærenda labore.

Besides what we have already said, we shall now shew two irrefragable arguments that common Gold, whether having felt the force of the fire, or not, is no ingredient in the first work for the Philosophers tincture.

De Lithiasi. c. 8. p. 69. 1. And first *Helmont* lays it down for a firm ground of truth (which also all knowing Mineralists understand to be a certain verity) thus: *Quia prout nullum sulphur, (id est, externum sulphur) est metallum: ita omnis mercurius metallicus, est verum metallum.* And then speaking of Copper after the external sulphur be separated from it, he saith; *In propositis autem cupri* ‘*terminis, contemplare internum illud, quod in albo,* ‘*anonymo, ac mercuriali metallo, corpus fixat, sive coa-* ‘*gulat, efficitque sub malleo ductile: cum alias mercu-* ‘*rius absque sulphure nunquam in metallum coagulari* ‘*possit.*

And

And after, where he is speaking of metallick Mercury, which containeth its combustible and inseparable sulphur within it, he saith; *Si non vidissem argen-* Ut supr. c. 8. p. 70. ‘*tum vivum eludere quamcunque artificum operam,* ‘*adeo quod aut totum avolet adhuc integrum, aut totum* ‘*in igne permaneat, atque utrolibet modo, servet* ‘*impermutabilem sui ac primitivam identitatem, i-* ‘*dentitatisque homogeneitatem anaticam: dicerem* ‘*artem non esse veram, quæ vera est, sine men-* ‘*dacio, atque longe verissima. Adeo ut quod supra est,* ‘*est sicut quod est infra, & vicissim. Ignaros ergo se* ‘*rei metallicæ produnt, quotquot docent præfatas mer-* ‘*curii aurique metamorphoses.*

And further; *Imo licet aurum radicaliter in partes* ‘*heterogeneas, salem scilicet, sulphur, ac mercurium* ‘*se pateretur sequestrari (quod nullatenus naturæ, nisi* ‘*per unicum liquorem constructivum, est possibile) Istud* ‘*tamen in mercurii homogeneitate, est naturæ & arti* ‘*impossibile. Quippe qui auro est simplicior, majori* ‘*anaticaque identitate constructus.*

From whence we may observe; 1. That metallick Mercury doth either altogether abide in the fire, or altogether flie from, and both ways remains immutable. And this *Helmont* had seen in experience.

2. That they are ignorant of the nature of Metals, that teach the change of Mercury or Gold.

3. That Gold may be radically separated into Salt, Sulphur, and Mercury; but not possible to Nature to be done but by one onely constructive liquor.

4. But lastly, That this in the homogeneity of Mercury, is impossible to Nature, and Art. And in another place he tells us: ‘*Aqua itaque, est interno*

metal-

Progym. Met. p. 68. ‘*lorum Mecurio simillima, qui cum omni prorsus me-*
‘*tallici sulphuris labe, jam est exutus, tam sibi unde-*
‘*quaque indissolubili nexu cohæret, ut radicaliter om-*
‘*nem divisionem, arte aut natura possibilem, re-*
‘*spuat.*

And further he saith; ‘*Mercurius ergo originali*
‘*labe mundatus, atque virgo, non sinit se amplius à sul-*
‘*phuribus, aut seminibus apprehendi, quin hæc confe-*
‘*stim consumat, ac velut conficiat, excepto suo compari.*
‘*Sunt namque alia sublunaria, nimis debilia, ut tanti*
‘*mercurium, subigant, penetrent, commutent, aut de-*
‘*fœdent.*

Ibid. p 70. And further saith; ‘*Mercurius ergo de mercurio*
‘*vel in mercurio, sospes manet, tam ignibus, quam li-*
‘*quore acri. Alioqui si corrosiva, illum mercurium*
‘*attingeret, forte multorum labor compensaretur. Quip-*
‘*pe tota radix, transmutationum est in sulphure. Vid.*
‘*Tria prim. p.* 408.

So that the force of the Arguments lies thus: That though metallick Mercury by composition, and marriage with metallick Sulphurs, be made a Metal, and this may be destroyed by reason of the duality of its sulphur; yet the mercury of that Metal is not to be destroyed. And if the mercury of Metals when separated from its external sulphur, be not to be changed either by Art or Nature, but onely by its compeer, which is the Tincture already prepared, then it must necessarily follow, that common Gold cannot be an ingredient in the work of the Elixir before fermentation; which was the thing we undertook to prove. Nay further, either the Art of transmutation of Metals is false, or else metallick mercury is indivisible, for if it were divisible, it would be utterly unfit

unfit for the work in the particular of projection.

And if they suppose that the *Alkahest*, constructive liquor, or universal *menstruum*, which we grant is able to separate the external sulphur from Metals; nay, even from Gold it self, were able to divide, change or overcome metallick Mercury, when separated from its external sulphur, they flatly argue against the plain assertion of our Author *Helmont*, who denies it to be possible either by Art or Nature. And it is the unanimous affirmation of all the Masters, that in their first work, their Water is the Patient, and their fixed grain, or Sulphur their Agent, that doth work upon it, overcome, and coagulate it.

And if they urge the Authority of *Paracelsus* and *Helmont*, the former of which saith: *Auro enim quatenus aurum est, corrosivum præstat, & citra corrosivum mortuum est.* And the latter saith, *Sensi ergo, aurum absque corrosivo suo proprio, esse mortuum: mortuum inquam, nisi radicaliter à suo corrosivo penetretur.* Supposing by this, that Gold though dead, as it is digged forth of the earth, or melted in fire, doth yet become alive, and quickned by it its proper corrosive, or their *menstruum*, so that it thereby hath gotten a vegetative and generative power, and therefore is most fit for the first work. In which opinion they may be confirmed by many good Authors, if they be understood according to the letter. But they must excuse us if we be not of their judgment, for we shall easily grant that Gold is shut up and dead in respect of yielding any remedies to cure diseases withal, except it be opened and loosed with their onely constructive liquor, which separates its sulphur and salt, in which doth lie the medical virtue, as we shall shew

De vit. long. l. 3. c. 3.

Por. Medic. p. 480.

more at large anon) but notwithstanding the mercurial part of it remains indivisible, and cannot be changed by the power of that liquor, nor by no sublunary except its compeer. But take a full answer from the said Authors, who (whatsoever any may think) did not in so main a point contradict themselves, but did harmoniously agree.

Butler p. 594. For *Helmont* tells us; '*Profecto, metallica corpora, 'juxta suos mercurios clausa sunt sigillo anaticæ homo-'geneitatis æqualiter: Sed sulphura eorum nequaquam 'nobis indignata, colloquia præbent, modo familiaria 'reddantur.*

And further he saith, '*Attamen mercurius illius 'metalli manet indestructibilis. Hinc Paracelsus in 'vexatione præfata: etsi metallum destruxeris decies 'millies: attamen à destructionibus semper resurget* Tria prim. p. 408. '*longe perfectius. Et in Archidoxis lib. de separat. 'elementorum cap. de Metallis unumquodque Elementorum in specie olei destructionis metallicæ, potest reduci 'iterum, in metallum album, pristinum & malleabile, 'excepto elemento ignis, quod tincturam sive sulphur 'continet.*

From whence we may note, 1. That all Metals in respect of their Mercuries are equally shut up and sealed with the seal of anatical homogeneity; so that their Mercuries do yield us no Medicines, however wrought upon by their constructive liquors, but their Salts and Sulphurs do hearken unto us, if rendred familiar, and separated with that grand and universal solvent.

2. That the Mercury of those Metals remains indestructible, and not to be changed from a metallick form, or precipitated; but if they be never so oft destroyed,

stroyed, they will arise more perfect then before.

3. And that the Sulphurs and Salts (in which onely consists the Medical virtue) may (but doubtless not without their great solvent) be separated from their Mercurial bodies, which all remain white after their Sulphurs and Salts be separated from them; which white bodies may again be reduced into Anonymous Metals: of which *Paracelsus* saith thus much. *Tandem ascendent obscuri duo colores, unus albus, alter vero juxta metalli naturam, & conditionem.* And after again, *Album vero si reduxeris, habebis inde malleabile corpus album & metallicum, quod cognosci nequit sub qua specie contineatur.* Archidox l. 4. p. 13 13.

From whence note, 1. That he there nameth water wherein the Metals must be dissolved and putrefied, but according to his usual custom doth tacitely omit to declare what kind of water it should be; when doubtless according to *Helmont*, and truth it self, it was their constructive liquor or *Alkahest*; for nothing else would radically dissolve Metals, and that not without a prævious digestion or putrefaction. For *Helmont* tells us, '*In aliis vero liquorum activitatibus, corpus 'nunquam potest se radicaliter commiscere liquori solvenți. Ideoque corroditur quidem, at non solvitur 'intime, uti ad transformationem formalem alioqui requiritur.* De Lithiaf. c. 4. p. 33, 34.

And a little after, *Itaque terreum corpus, sive dissolvatur per corrosivum, sive non, pristinum suum esse 'servat. Eo quod istud dissolvens non penetret dissolutum, in radicali vinculo connexionis. Quod tamen 'in transmutandis essentialibus, est per necessarium. 'Discant ergo Chymiæ Tyrones, quod corpora non re-'solvantur per corrosivorum calcinationes. Licet etiam*

'*ſæpe repetitas: niſi intercurrat fermentalis impreſſio,*
'*per putrefactionem, quæ præcedit quamlibet radicalem*
'*ſolutionem.*

2. That the mercury of the Metals, as well as their Salts and Sulphurs, are brought over the helm, and that the white may be reduced into a metallick malleable white body, which cannot be known under what ſpecies it falleth.

3. That in theſe Salts or Sulphurs the medical virtue lies hid, and that they are coloured according to the ſeveral Metals from whence they proceed. As thus: *Ex Sole vel auro ſpadiceum, ex Luna lazurium,*
'*ex Marte rubeum & valde obſcurum, ex Mercurio al-*
'*bum, ex Saturno lividum atque plumbeum, ex Venere*
'*viride prorſus, ex Jove flavum.* And theſe in the bottom, the ☉ being at the top.

Tria prim. p. 408.

2. The ſecond Argument that I ſhall uſe, ariſeth from that immovable Axiom that the Adeptiſts have laid down, and is ſo ſtrongly, and pertinently proſecuted by *Helmont*: which is that: *Facilius eſt aurum*
De Lithiaſ. c. 8. p. 70. '*conſtruere, quam deſtruere:* Alſo *quod ſit longe faci-*
'*lius, aurum ex non auro conſtruere, quam aurum na-*
Theatr. Chym. p. 818. '*turale deſtruere.* And another ſaith; *Qui aurum*
'*ſcit deſtruere, ita quod amplius non ſit aurum, is ad*
Art. aurif. Roſar. p. 152. '*maximum arcanum pervenit.* And another ſaith,
'*Qui auri deſtructionem ignorat, conſtructionem ejus*
'*ex curſu naturæ neceſſario habet ignorare. Facilius*
'*itaque eſt aurum conſtruere quam deſtruere.* To theſe
Sum. perf. c. 11. p. 42. add that of *Geber*: '*Attentaverunt forte, quod ſit*
'*fortis compoſitionis, ſed quam fortis compoſitionis*
'*ſit, non attentaverunt.* We ſhall onely urge *Helmonts* concluſion from the two former, and leave the myſtery and ſeeming contradictions in the

the reſt, becauſe we intend but that onely point, and he concludeth thus. *Quotquot ergo promittunt auri*
Tria prim. p. 408. '*vel mercurii ſeparationes, nec tamen aurum peculioſa*
'*quantitate conſtruere ſciunt, cum neſciant, quod eſt*
'*longe facilius, credant etiam ſe neſcire, quod longe*
'*eſt adhuc difficilius. Ideo Bacon, inquirens primam*
'*artis materiam, perque omnia mundi corpora diſcur-*
'*rens, negat aurum & argentum, eſſe materiam ar-*
'*tis: eo quod ſit plane impoſſibilis eorundem reductio*
'*in ſulphur & argentum vivum, unde fiat filius ignis*
De Lithiaſ. c. 8. p. 70. '*tantus in amore Philoſophorum.* And ſo finally urgeth that, That either the Adeptiſts do lie and are deceived, or themſelves the young Writers in Chymiſtry.

So we ſhall cloſe this point (wherein we have been ſo tedious) with a few Authorities of the beſt Philoſophers.

1. And firſt that of the learned Author of the
Muſ. Herm. P. 45, 46. *Tractatus aureus*; who ſaith, *Verum benevolus lector*
'*informatus ſit, quod metalla, utpote aurum & argen-*
'*tum, in forma ſua metallica, materia noſtri lapidis non*
'*ſunt: medium autem ſunt inter noſtram materiam,*
'*& perfecta metalla, quemadmodum noſtra materia*
'*medium eſt inter illa, & magnum noſtrum lapidem.*

2. To the ſame purpoſe is that of *Lully*, who ſaith,
Teſt. Theor. c. 56. '*Et ideo bonus artiſta capit metalla pro mediis in opere*
'*magiſterii, & ſpecialiter ſolem & lunam. Ideo, quia*
Theatr. Chym. vol. 4. p. 94. '*illa duo venerunt in coequalitate temperata, & mul-*
'*tum depurata de ſulphuris & argenti vivi ſubſtantia,*
'*cocta pura, & bene digeſta ingenio naturæ, ad quam*
'*proportionem Artiſta in vanum ſe vexaret, ſi à prin-*
'*cipiis naturalibus, ſine realibus mediis pro intentione*
'*faciendi velit incipere.* To which add what is quo-
Muſ. Herm. P. 46. ted forth of his Codicil: where he ſaith, *Sine illis*

duobus,

'*duobus, auro & argento-vivelicet, ars ista perfecta*
'*fieri nequit, quam hac in re purissima sulphuris sub-*
'*stantia sit, quam natura plenarie purificavit: ad*
'*quam purificationem perveniendi ars multo est debi-*
'*lior, quam natura, ad quam tamen pervenire nequit,*
'*etiamsi in eo maxumopere desudet.*

Art. Aurif. p. 140,141.

3. This also is a most remarkable passage: *Ex hoc*
'*patet, quod aurum Philosophorum, non est aurum vul-*
'*gi, nec in colore, nec in substantia.* So that if not either in colour or substance, it must be another thing; which is to be noted.

Theatr. Chym. vol. I. p. 757.

4. That of *Trevisan* is carefully to be weighed and considered; who after he hath persuaded us to leave Alloms, Vitriols, Salts, and the like; and Animals, and all that proceeds from them; and all Minerals, and the Metals alone. For although from them there be an entrance, and that their matter ought to be compounded of Argent vive, as all Philosophers affirm; and that this is no where else to be found but in the Metals, as appeareth by many testimonies there cited; and that by them all, it is affirmed that Metals are nothing else but Argent vive, congealed by gradual decoctions; yet he concludeth thus: '*Hic non obstanti-*
'*bus omnibus affirmativis rationibus, ipsa (scilicet me-*
'*talla) non sunt lapis noster, dum in forma sunt me-*
'*tallica: nam impossibile est unam & eandem materiam*
'*habere duas formas.* From whence, if it be a truth that *Helmont* holdeth forth, That metallick Mercury can be changed by no sublunary Agent, except its compeer, but that still it will remain a Metal not to be altered from that state either by Art or Nature: then seeing that it immortally and immutably remains in its metallick form, except changed by its compeer, which

which we assert to be the tincture already prepared, then of necessity it cannot be an ingredient in the first work, which was that we undertook to make good.

Mus. Herm. p. 222,223.

5. I shall onely give two Authorities in this particular, and so conclude. One is this by *Johannes Mehung*; who saith, *Aurum itaque ex mineralibus op-*
'*timum esse mihi haud ignotum est: nihilominus tamen*
'*neque in forma, neque materia, ad perfectionem suam*
'*transgrediendam, ullam aliquam habet efficaciam.*
'*Nullam siquidem majorem operationem habet, ut am-*
'*plius aliquid, quam seipsum, perficiat, qualem qualem*
'*etiam artem homo huic adhibeat. Si quis enim affir-*
'*mare conaretur, quod reserandum, & in argentum vi-*
'*vum redigendum illud esset, is hac in re plus justo*
'*stulteseceret, cum ex auro nihil amplius, quam quod in*
'*eo est elicere possit.* And a little after: *Imo adhuc*
'*amplius affirmo, quod destruere, conficiendi auri, mi-*
'*nime via sit.* The other for brevity sake I commend to be considered of by the Reader, where he may find it at large in the *Via Veritatis unicæ*, in the *Musæum Hermeticum*, *p.* 266,267.

Now what clear light I have brought in this particular to the dark places in *Paracelsus*, *Helmont*, and the rest, will be known unto those that have thorowly studied their Writings, and do solidly understand them. And I hope that divine Providence will be pleased to open these Mysteries to the meek and lowly, and keep them still veiled from the proud and wicked.

2. The next thing we proposed to handle, is concerning *Aurum potabile* and the Tincture of Gold; which may be much cleared by what we have here spoken in this Chapter, and by some things that we have

have before mentioned, though upon another occasion. But to open it more largely, we shall draw some particulars from what hath been spoken, and add some more weighty considerations.

Chrys. passim, p.192. Id. Sept. Plan. Terrestr. p.162.

1. *Angelus Sala*, a laborious, learned and honest Chymist, writ a Treatise of common Gold, therein labouring strenuously to prove that it cannot by Art be brought into such a condition, as may be properly said to be potable, in either of those acceptations; as either Oyl or Water, which of themselves are liquid, nor as Salts, which though of themselves neither liquid nor potable, yet infused in any moist and liquid substance, will then become potable. But this he meaneth, that though its body may be divided into such small atoms, or particles, that mixed with wine or some other liquor, and so give it another colour, or a new tincture, yet that it is not thereby radically dissolved, but may again be reduced into the metallick form of Gold, of which he giveth many clear and learned instances. Thus far this Author (according to what he knew) hath said right, and so much is confirmed by *Helmont*, who not onely granteth that common gold may be reduced into a light-red coloured oyl, but also teacheth the open and plain process thereof. Yet after all concludeth that it is reducible into metallick Gold again, in these words: *Est enim* 'summe levigatum, imo & durum, solidum, malleabile, 'ac fixissimum corpus, quod jam in naturam versum 'videtur. At sane mentitus ille liquor, in pristinum 'auri pondus, & corpus, facile redigitur. And again, 'Et enim postquam scivi corpora denodare, per consen- 'tanea suis principiis radicalibus: tum primum cœpi, 'cum salutari tædio, irridere, stolidas credulitates meas;

Progym. Met. p.68.

Por. Medic. p. 450.

quibus

'quibus olim aurum dissolvi: ejus tamen potabili succo 'minus profect, quam simplicis alicujus decocto. De- 'inceps vero potui aurum dissolvere, butyri, resinæ, at- 'que vitrioli facie ludere. At nusquam inveni vir- 'tutes auro tributas, eo quod nostris sic etiam fermentis 'reluctaretur. And in some other places he hath things to the same purpose; from whence we shall commend these particulars to be noted.

1. That common Gold may by vulgar Chymistry be brought into the form of a light red-coloured oyl, but that not profitable at all in medicinal vertue, and may easily be again reduced into the fixt and malleable body of Gold; and thus far onely *Sala* was experienced in, and in this respect onely his Arguments are good and conclusive.

2. But that notwithstanding Gold and other Metals may be dissolved *per consentanea suis principiis radicalibus*, which thing was unknown unto *Sala*; and therefore we may very well take notice, that conclusions drawn from the experience of one man, nay of many, will not necessarily infer a general rule: for *Helmont* was once ignorant of this liquor that was consentaneous to the radical, proper principles of Gold; and therefore for him then to have concluded generally that there was no such liquor as would radically dissolve Gold, had been false, since he knew it afterwards: and what a thousand knows not, one that is none of them may know.

2. We have in this Chapter before sufficiently shewed that the colour, tincture, or sulphur of common Gold, may be by Art separated from its body, afterwards remaining white, and an Anonymous Metal, and not to be destroyed by Art or Nature. But

that we may make it clear beyond all exception, we ſhall add ſome further proofs. *Helmont* tells us, ſpeaking of his *Arcanum Corallinum*, which is common Quick-ſilver fixed by the liquor *Alkaheſt*: 'Non etiam auri color, ſulphur, aut tinctura alvum ſubducunt. By which he clearly grants that the colour, ſulphur, or tincture of Gold may be ſeparated from it; but that it doth not looſe the belly, or purge as the *Arcanum Corallinum* doth. And in another place he ſaith, *Quod aurum quidem ſit corporum conſtantiſſimum inigne, ſed ſuæ conſtantiam ſeparationis mutuat à mercurio: adeo ſi ſulphur ejus includat dualitatem heterogeneam; id mercurium minime attingit. Admitto quidem, quod mercurius per compoſitionem tranſmutationis, & maritationem ſulphurum metallicorum, fiat metallum, & hoc ſit deſtructibile ratione dualitatis ſui ſulphuris: Attamen mercurius illius metalli manet indeſtructibilis.* From whence he implieth plainly, That common Gold and other Metals have in them an heterogeneous duality, in regard of their external ſulphurs, and that this may be ſeparated, or in reſpect of it the Metal may be deſtroyed; yet that the Mercury of that Metal is indeſtructible. And again, which may be is quoted before: 'Unumquodque elementorum in ſpecie olei deſtructionis metallicæ, poteſt reduci iterum in metallum album priſtinum, & malleabile excepto elemento ignis, quod tincturam ſive ſulphur continet. Of which we have ſpoken largely before. And again to repeat ſomewhat, he ſaith: *Imo licet aurum radicaliter in partes heterogeneas, ſalem ſcilicet, ſulphur, ac mercurium ſe patereatur ſequeſtrari (quod nullatenus naturæ, niſi per unicum liquorem conſtructivum eſt poſſibile) Illud tamen*

Lib. volup. vivent. p. 386.

Tria prim. p. 408.

Ibid.

men in mercurii homogeneitate, & naturæ & arti impoſſibile. Quia in mercurio non eſt reperibilis diverſitas, qualis alioqui in tinctura auri hujuſque alkahest. From whence it is moſt manifeſt that the ſulphur or tincture of common Gold may be ſeparated by that onely one conſtructive liquor; but that the remaining body of the metallick Mercury (which is truly a Metal, though anonymous, and not to be known under what ſpecies it falls) is impoſſible either to Art or Nature to be divided or ſeparated. And this he hath plainly ſhewed of Copper; where he declareth, *Non eſt ergo ignis veneris ſpiritus vitrioli, utcunque exquiſite rectificatus: ſed ignis ille eſt, ſulphur cupri volatile, in forma olei viridis, melle dulcius, & à corpore mercuriali ſui cupri plane ſeparatum. Reſiduum autem cuprum manet album, nec unquam virideſcens per æruginem, ut neque amplius ex numero ſeptem metallorum. Quia evaſit notum atque anonymum metallum: non poteſt autem haberi ignis veneris, niſi cum plenaria: cupri deſtructione corporiſque mercurialis ipſius veneris volatilizatione. Quod quantumcunque ſit volatile, in forma olei: facili tamen negotio, poſtmodum iterum reducitur in metallum album ignotum, atque ſub malleo extenſibile. Sed ignis ſive ſulphur veneris, non item amplius reducitur in metallum per ſe.* Which is a clear demonſtration, not onely that the ſulphurs or tinctures of Metals are by Art to be ſeparated from them, but (excepting the manifeſting of the matter and manner of the preparing of the *Alkahest*, which he and all other Adeptiſts are bound to conceal) alſo the way of ſeparating them, and the qualities both of thoſe ſulphurs and their mercurial parts are ſhewed. A

De Lithiaſ. c. 8. p. 69.

point of high concernment rightly to be weighed and understood; and it is no great marvel that so many frivolous, and ignorant disputes have been, and are about *Aurum potabile*, or the tincture of Gold, which
Ibid c. 3. p. 24. can never be truly resolved but by him that knoweth, and is possessor of that universal solvent. Thus much more we shall onely add in this particular; where he saith: ‘*Quoties namque à mercuriis sales, & sulphura ‘distinxi, admiratus sum illorum ignaviam, hirumque ‘vero principiorum dignitates.* Where again he declareth that the Salts and Sulphurs of Metals are to be divided from their Mercuries; and that the Mercuries of Metals in medical virtue (for we have shewed by his authority before, that the mercuries of Metals are all equally shut up with the seal of anatical homogeneity, and yield no medical vertue at all, but that their sulphurs do hearken unto us, if rendred familiar) but did wonder at the efficacy of their Salts and Sulphurs. And from this root doth spring and arise those medicaments prepared by the *Alkahest* (but not otherwise to be had) that *Paracelsus* called *Hematina*: of which *Helmont* saith he had taught that which was sufficient, and therefore concludeth thus; *Quapropter ejusmodi Hematina admirandas in re medica operationes perficiunt. Sensi ergo Hematina Solis & Luna, quod etiamsi ex puritate sui balsami comfortarent: tamen aliquid alieni in se continere, respectu nostri.* From whence we may note, that these Hematine medicines may be had forth of Gold and Silver; but not without the help of their constructive liquor, or universal solvent: and therefore (as he saith elsewhere) are not ordained for remedies for the Poor; and that scarce one Artist of a thousand, can rightly get these rare and
Pot. Medic. p. 479.

and excellent medicines contained in their Salts and Sulphurs, separated from their Mercuries, which contain no medical efficacy at all.

3. From hence may be resolved that great question, whether common Gold may be made so potable, as never to be reduced again into a metallick body? To which we say that it plainly appeareth both by this Author and *Paracelsus*, that common Gold and Silver may by their great solvent be brought into an oylie substance or liquor, in two forms or colours; the Salts and Sulphurs of them according to the Metals from whence they were taken, of divers colours (which hath been shewed before) but the Mercuries of all the Metals in a white form or colour, which by it self may be reduced into a malleable and metallick body, but their salts and sulphurs never. For as no external metallick sulphur is a Metal, so every metallick Mercury is really a Metal. So that if they mean by *aurum potabile*, or any other Metal, the whole substance brought into a potable liquor, and never again to be reduced into a metallick body, notwithstanding the Arguments of ten thousand to the contrary, we positively affirm with the Adeptists, that the mercurial part of it is always reducible into a Metal, and remains immortal and immutable, never to be divided or changed, but by its compeer. But if they mean by *aurum potabile*, or the tincture of Gold, the external sulphur (which containeth its salt) separated from its remaining white mercurial body (in which is contained its internal and inseparable sulphur, agent, or *verus ignis naturæ*) then we absolutely affirm, that it may be brought into a condition of potability, at least like salts to be dissolved in liquors, and that it is never possible

sible either to Art or Nature, to reduce that sulphur or salt into a metallick body again; and this when the Philosophers speak of *aurum potabile* drawn forth of common Gold, is that onely which in that respect they truly understand, and the onely end they aim at. To confirm which take these particulars; for *Helmont* saith, 'Potest. med. p. 479. *Sensi quoque, remedia mineralia, in salis naturam mutata (non intelligo, quæ per adjunctum condiuntur salem) secum gestare, sua semina, in gradum tamen exaltata. Quibus etsi totum metallum resolvatur in alienam dispositionem (quæ est magisterii) attamen quia exin mox mercurius currens elicitur: quicquid salis resolubilis naturam vere assumpsit, non est mercurius, sive metalli interior, & immutabilis nucleus, sed salrem sulphur ejus.* From whence it is apparent, that mineral Medicines changed into the nature of Salt, do bear their seminal efficacy but in an exalted degree; he doth not mean by the adjoyning of salts unto them, but of their own interior and separable salt and sulphur. And that by this their solvent the whole Metal is brought into another disposition, (which he calls a magistery) from whence the mercurial part being separated, that dissoluble salt is not the internal and immutable kernel of the Metal, but onely its sulphur. Therefore as he tells us in another Pharmacop. p. 461. place, A magistery is the total substance of a thing reduced into its primitive juice, in which retroition of solution, the heterogeneous juices are separated on their own accord, for the most part with divers bottoms, swimming in course one above another, one chief remaining, or falling to the bottom, famous in diversity containing the seminal entity. And this way of preparing is unknown to the vulgar Chymists, because

cause not to be performed, but by the liquor *Alkahest*, and such a magistery is *aurum potabile*, which when the Gold is dissolved by their liquor, *Paracelsus* tells us, that that which is white swimmeth above, and is the mercurial part that may be reduced into a white anonymous Metal, and that the Quintessence in which is the Medical vertue, remaineth in the bottom. And of this way of preparing, take *Helmonts* caution in these words; 'Ibid. p. 467. *Hæc medendi pars, solertem requirit, ac gnarum naturæ Secretarium. Quia in illa parte, amplissimæ medicaminum opes, & deaurata glauræ suppellex invenitur.* To which I shall onely subjoyn what that learned and laborious Chymist *Joachimus Polemann* hath taken notice of, in relation to *Paracelsus* process of preparing *aurum potabile*, or the tincture of Gold, by the spirit of Wine; which is thus: Theatr. Chym. vol. 6. p. 636. *Qua in re* (speaking that the *Alkahest* is of the nature of an *Alcali*) *tanto magis me confirmavit annotatio Philosophi nostri (id est Helmontii) quam propria manu in margine Chirurgiæ magnæ Paracelsi*, p. 202. *in folio juxta præparationem tincturæ auri scripsit: ubi Paracelsus docet, si super calcem auri alcool vini affundatur, tunc animam auri extractm a iri. Hac occasione annotatio Philosophi nostri hæc fuit. Nisi sal circulatum insit spiritui vini, tinctura ex auro non transit in eum.* And so enough of this particular.

4. The Philosophers often make mention of another sort of *aurum potabile*, or the tincture of Gold, which is not drawn forth of common Gold, but forth of another subject; and this we touched where we spake of Astralish Gold, and shall here again mention it more at full. Those that will take the pains seriously to consider what *Paracelsus* hath written concerning the

the *Primum ens auri*, in his Book of *Renovation and Restauration*, and in divers other places, may (if they can understand that dark and subtile Author) find much satisfaction in this particular; to which we refer the studious and curious searcher of the Secrets of Nature.

Antid. Chym. p.231. & p.239. In the next place take what *Rhumelius*, a learned German Author, and one who doubtless was Master of the universal solvent, saith to this purpose: That all particulars whereby to obtain *aurum potabile*, or the tincture of Gold, are in vain, and fruitless, except by the universal solvent. And he further saith, Out of this spiritual-like matter, from whence the beginnings of Gold do grow, or arise, may *aurum potabile* be made, that is of more efficacy, and better then forth of common Gold it self. Again, That *aurum potabile* may be made forth of the *Primum ens vel ex auro imperfecto, vel è radice solis*; that is, more perfect, more efficacious, and better then that which is made forth of common Gold it self. Again he saith, That he did prepare two sorts of *aurum potabile*. one forth of perfect Gold, that is, common, and perfect, fine Gold. The other *è radice solis*, or forth of unripe and imperfect Gold. Sometimes they call their *Elixir aurum potabile*, because it will cure the most diseases that are curable; and that it is sprung from that root which was of a golden nature, and many things to the same purpose. For so *Paracelsus* having taught the composition of their great tincture, he saith; *Ex hoc enim (ex electro minerali immaturo scilicet) fonte scatet verum aurum potabile, nec melius alibi reperiri potest.* And a little before, *Dico tibi autem in veritate, nullum melius fundamentum esse medicinæ totius, quam in*

Ibid. p.245.

Ibid. p.248.

Man. de Lap. p.138.

Ibid. p.137.

in Electro latet. And further: *Sed in nostro dicto Electro præparato, tanta virtus latet homines curandi, ut certior, & præstantior medicina in toto mundo, non possit reperiri.* And of this, thus *Helmont*. *Inprimis tinctura Lili, ab Electro minerali immaturo in vinum vitæ redacta, cujus una pars metallus primus: altera vero membrorum essentia.* *Arcan. Paracelsi, p.790.*

5. Now we come to the last member of this tedious Chapter concerning the universal solvent, by *Paracelsus* first, and after by *Helmont* called *Alkahest*; about which we shall be brief. For we intend not here to speak either of the subject forth of which it is prepared (which is one of the Adeptists greatest secrets, nay indeed the onely thing that they have most laboured to veil and conceal; all other points of their great work being for the most part plainly opened, either by one of them or another, in one manner or another, in one place or another) nor of its preparation, which *Helmont* saith is most tedious, nor of its manifold names, and Epithetes, nor of the innumerable virtues of it in general, because (if it please divine Providence to grant us health and life) we have something in a readiness to all those purposes, that may come to publick view hereafter, if we can judge the World worthy of it. Onely here we shall say, that the *Alkahest* of *Paracelsus* and *Helmont* is the same specifically with that universal solvent or *menstruum* of *Sendivogius*, *Lully* and the ancient *Philosophers*, though many may stumble at the bold assertion, and others carp, contradict, or condemn us. For we conceive we have in part sufficiently evinced that they are parallel, by what we have said in comparing the effects of *Helmont's Alkahest* with the *Chalybeate*

water of *Sendivogius*, that they both would as easily dissolve and volatilize the body of Gold, as Ice or Snow is melted in warm water; which they could not perform, if they were not both of the same specifick nature in their effects, and operations. To which we shall onely add one or two Authorities more, and urge the conclusions that may be drawn from them.

Lid. de Febrib. c.14 p.52. The first is that of *Helmont*, where speaking of the *Arcanum Corallinum*, which is prepared by drawing of the *Alkahest* from common vendible Quick-silver, which is done in one quarter of an hour: and there he quoteth *Raymund Lully*, who, his friends, and the King being present, did coagulate Quicksilver, and none knew the manner except the King. And saith, *In qua coagulatione istud est singulare. Quod liquor Alkahest, idem in numero, pondere & activitate tantum valet millesima actione, quantum prima. Quia agit sine reactione patientis.* And then telleth that it is to be made into small powder, without any remaining part of the liquor. And to be distilled five times with the water drawn from the whites of Eggs, and then it is made red as Coral, and then concludeth, and saith; *Iste pulvis dulcis est, fixus ferens omnem follium ignem, nec perit in plumbi examine. Spoliatur tamen virtute medica, dum in album metallum reducitur.* To this we

Theatr. Chym. vol. 4. Theor. Lullii c. 87. p. 139. shall joyn the place in *Lully* hinted at by *Helmont*, who saith; *Et pro certo, in præsentia, & voluntate certorum sociorum argentum vivum vulgare congelavimus, per suum menstruale, & alias uni de sociis nostris, in cujus eramus societate expresse, quasi ad duas Leucas prope Neapolim, in quo loco in præsentia Physici regis, & unius fratris de sancto Jo. de Rhodis, & Bernardi de la Bret, & aliorum, congelari fecimus argentum*

genium vivum per suam menstrualem naturam. Et quamvis hoc vidissent, & manifeste palpassent, tamen non potuerunt scire quid esset, nisi simpliciter solummodo rustico more, regia majestate salva. Etsi realiter & Philosophice cognoscere potuissent per speculationem intellectivæ virtutis dictum menstruale ac suas virtutes, artem ac scientiam absque dubio habuissent, prout dicti socii, qui per nos multum bene intellexerunt manifeste, & habuerunt. Et tunc argentum vivum vulgare dimisissent ad creandum lapidem, & ad exuberandam suam humiditatem, & ideo nos cogit ratio, quod ignoranti habeamus illud celare. From all which we may take these most remarkable observations. 1. That this coagulating common Quick-silver by two such grand Masters as were *Lully* and *Helmont*, was no vulgar knack, but a true Philosophical work, else it had been unworthy the naming by two such serious and learned persons.

2. That *Helmont* would never have hinted at *Raymund Lully*'s coagulating common Quick-silver, but onely that it was to shew that their *menstruum* was specifically the same in effect and operation, otherwise he would not by his knowledge of the *Alkahest* have numbred himself amongst the Adeptists, as he saith; which is more clearly demonstrated by the Adeptists, *& mecum norint Adepti*, but that the knowledge and possession of this liquor, is the onely key, and the most noble of all their secrets.

3. We may here from *Helmont* note the excellency of this liquor, that it still remained the same in number, weight, and activity, and was as prevalent in the thousand operation, as in the first: which is an admirable and stupendious quality.

4. We may observe the great energie and penetrativeness of this liquor, that in so short a time as a quarter of an hour, could so perfectly fix, and coagulate Quick silver.

5. It is as clear as the light of the Sun at noon-day, that this that *Lully* calls a menstrual humour, was of the same specifick nature with the liquor *Alkahest* of *Helmont*, because they both produced the same real effects in fixing and coagulating common Mercury.

6. But the main thing above all the rest, that we are here to take notice of is, That whosoever is the Master, and Owner of this most precious liquor, hath the gates open to the Treasure of Treasures, even to the attainment of the great Elixir, or the Philosophers Tincture: for *Lully* tells us faithfully and truly, that if the standers by had known this menstrual liquor really and philosophically by the speculation of an intellective power, and its virtues, they had known without doubt, and had had the Art and Science it self.

7. And therefore because this is the onely key that opens the Rosary of the Philosophers, they are bound in all reason to hide and conceal it from the ignorant and unworthy.

8. That those that know this will dismiss common Mercury from creating the Stone, or exuberating its humidity; so that common Mercury is no ingredient (as many do too vainly and stiffly maintain) in the composition of the great Elixir.

9. We may observe from *Helmont*, That this powder of common Quick-silver, when coagulated by the *Alkahest*, is fixt and endures all the blasts of the bellows, neither doth perish in the trial of Lead; and there-

therefore hath as great a fixation and perfection as silver; which is most seriously to be weighed and considered.

10. We may from hence note, That in the coagulating of common Quick-silver by the *Alkahest*, the Atomes of the homogeneous Mercury, are brought more close together, and joyned *per minima*, then they were before; and the external and combustible Sulphur, which is less or more in all common Quick-silver, and in which is the medical virtue, is, by the radical piercing of the *Alkahest* the smallest particles of the Mercury protruded, and extroverted, which Sulphur is without question burned or separated, in fluxing down the fixed and coagulated Mercury into a white Metal, and so of necessity must thereby lose its medical virtue.

We might here also say something of that which they call Horizontal Gold, but a more fit place to handle it will be where we write of common Quick-silver: onely here we shall say a word or two concerning the compeer of their *Alkahest*, for *Helmont* saith, speaking of that great liquor, and its virtues: *Quibus 'scilicet unicus & idem liquor Alkahest, omnia totius 'universi corpora tangibilia, perfecte reducit in vitam 'eorundem primam, absque ulla sui mutatione, virium- 'que diminutione. A solo autem suo compari, subter 'jugum trahitur, atque permutatur.* Ign. Act. Reg. P. 334.

From whence we may note these two things, 1. That its general virtue is to reduce all tangible bodies of the whole Universe into their first life, without the mutation of it self, or the diminution of its virtues, which is high and wonderful.

2. But that it is brought under the yoke, and throughly

throughly changed, onely by its compeer; and the question is, what that compeer is? To which we answer, that as the *Alkahest* is the key to the knowledge of the Philosophers great work, and is an ingredient into it; so that which they call their earth, fire, sulphur, agent, king, or male, is that which doth coagulate, work upon, subjugate, and change this their water into that which they call their ripened or exuberated sulphur, or tincture, before it be fermented; and this is confirmed by *Sendivogius*, who saith: *Primum 'resolvetur terra in aquam, quæ mercurius Philoso- 'phorum dicitur, & illa aqua resolvit illa corpora So- 'lis & Lunæ, & consumit ea, ut non remaneat nisi pars 'decima cum una parte: & hoc erit humidum radicale 'metallicum.* And *Trevisan* saith: *Nulla aqua natu- 'rali reductione speciem metallicam dissolvit, nisi illa 'quæ permanet cum specie metalli in materia, & forma, '& quam metalla ipsa possunt recongelare.*

No Lum. Chy. Tract. 11. p. 333.

Theatr. Chym. vol. 1. p. 832.

CHAP.

CHAP. XIII.

Of the description of Silver, and the several ways that the Ore of it is gotten; and of its Mines, conditions, and striking passages.

NExt in goodness to Gold, Silver by all Authors is most esteemed, and of it *Basilius* saith thus. 'Silver Ore is wrought in its own stone, of a perfect nature, and most noble earth, and of a fixt clear sulphur, salt, and mercury; which with a mixture doth joyn in a fixt and firm uniting, and appeareth of a degree lower then the Gold is, and is the best Metal next to Gold; and in the fining of it loseth very little, and is separated *per se*, or with other Metals joyned in the fire. And of it *Acosta* speaks thus. 'And first I will say that the reason why they give Silver the second place among all other Metals, is, for that it approacheth nearer to Gold then any other, because it is more durable, and less indamaged by the fire, and more malleable then any other: yea, it passeth Gold in brightness, beauty, and sound; the which is clear and agreeable; for the colour is more conformable and resembling the light, and the sound more piercing, more lively, and more delicate. And the description of this Metal, *Bacon*, according to the Ancients, gives thus. 'Silver is a clean body, pure, almost perfect, procreated of Argent vive pure, almost fixed, clear and white, and of such a kind of sulphur, and to it is awanting a little fixation and colour, with weight. *Pollius* thus. Silver is a 'Metal

Last Will and Test. c. 4. p. 86.

Nat. & Mor. Hist. Ind. c. 5. p. 216.

Spec. Alchym. c. 2. p. 259.

Phys. Herm. c. 4 P 335.

'Metal consisting of a white tincture, and Mercury 'well concocted, and constantly coagulated. The most of the Ancients do in their descriptions agree with this of *Bacons*, and therefore needless here to repeat more of them. The learned *Wormius* gives this description of it. 'This perfect Metal is next unto 'Gold, consisting of Mercury, and Sulphur almost 'fixt, extensible like unto Gold, but in weight lighter 'then it, as also then Lead, bearing the force of the 'fire. They gather that it doth participate more of 'Mercury then of Sulphur, as well by the colour, as 'the liquefaction. But an indication of Sulphur, the 'vehemency of the odour of Sulphur, when it is flu-'xed and refined, to be perceived by the nostrils. But 'that it doth not reach the fixedness of Gold, is mani-'fest from this, that *in cæmento Regali*, and Antimony 'and Sulphur, something of it doth perish, and is 'burned, when by fusion they are mixed together. 'And also when it is touched with *Aqua fortis*, or 'stained with their vapours, it emits a rust of a blue 'colour.

Musc. Worm. l. 1. Sect. 3. c. 3 p. 115.

And these may seem sufficient for describing the nature and conditions of Silver, we shall onely add what *Paracelsus* saith to this particular; who, though he may be disesteemed with many, yet is the account that he giveth of it, as good as the best Author we have read; which stands thus. 'Silver is generated of a 'white Sulphur, Salt, and Mercury; which being 'prepared most subtily, and made diaphanous, are ren-'dred of a fixed nature; that is to say, they are fixed 'of their proper nature next unto Gold, abiding in the 'test by Lead, or *per cineritium*: but not in Antimo-'ny, the *cæmentum Regale*, nor in the Quartation.

Lib. de Min. Tract. 1. p. 348.

All

All which passages do fully shew the qualities and properties of this noble Metal, so that we need not sum up the particulars.

1. Now we shall proceed to declare from the best Authors, how the Ore of Silver lies in its passages in the bowels of the Earth, the manner of its Coats, Matrixes, or Coverings: for though some little may be gathered in small grains in the Rivers, and their muds and sands washed by the force of waters forth of the tops or sides of the Mountains, yet is that so seldom found, and in such small quantities, that Authors do write but very little thereof, and we have not attained the sight of any of it, and therefore shall pass it by. And as for our own Nation of *Great Britain*, we have not had the fortune to obtain any Ore of Silver (that we might justly call a Royal Mine, not to speak that all Lead Ore contains some silver in it) except some three sorts, two of which were pretty rich in silver, as containing about sixty six pound in a tun, and was found in a blewish-grey stone, in some places intermixt with white spar, and the silver mixt with some Lead, appearing like white and bright grains, as small almost as Needle points. The third which contained about twenty seven pound in a tun, was like that which Authors call *Galena*, or the hardest sort of Lead Ore. And these are all that of our own experience we can inform the Reader of; and therefore shall pass to what others deliver to the same purpose.

2. The diligent Observer *Josephus Acosta* gives us this account very worthy to be regarded. 'The Mines 'of Silver are commonly found in Mountains, and high 'Rocks very desart, although they have been some-'times found in Plains, and Champaigns. There are

Hist Ind. c. 5. p. 217.

'two different kinds, the one they call ſtragling, the 'other fixed and ſetled. The ſtragling, are pieces of 'Metal found in certain places, the which drawn a-'way there is no more found. But the fixed veins are 'thoſe which have a continuance in depth and length, 'like to great branches and arms of Trees; and when 'they find any one of them, they commonly find ma-
Ut ſupra p.218 'ny in the ſame place. And further ſaith, The chief 'places of the *Indies* from whence they draw Silver, 'are *New-Spain*, and *Peru*; but the Mines of *Peru* 'far ſurpaſs the reſt: and amongſt all others of the 'World, thoſe of *Potozi*. And ſpeaking of the
Ibid.c.6.p.219 'Mountain *Potozi*, he ſaith: The ground and ſoil of 'this Mountain is dry, cold, and very unpleaſant; yea 'altogether barren, which neither ingenders, nor 'brings forth any fruit, graſs, nor grain; it is natu-'rally inhabitable, for the intemperature of the hea-
Ibid.p.213. 'ven, and the barrenneſs of the earth. He noteth a-nother very remarkable paſſage, which I cannot but commend to the Reader; and is this: 'They ſay 'of the rich vein, the firſt that was diſcovered, that 'the Metal lay above the ground the height of a lance, 'like unto Rocks, raiſing the ſuperficies of the earth, 'like unto a creſt of three hundred foot long, and thir-'teen foot broad, and that this remained bare and 'uncovered by the deluge. This Vein having reſiſt-'ed the violence and force of the Water, as the har-'deſt part: The Metal was ſo rich as it was half Sil-'ver, and this Vein continued in his bounty fifty or 'threeſcore ſtades, which is the height of a man, and 'then it failed.

Plin.lib.33. c.6. 3. Take this paſſage of *Pliny*, Engliſhed by the ſame *Acoſta*. 'They find Silver almoſt in all Provin-'ces,

'ces, but that of *Spain* is the beſt, which grows and 'ingenders in a barren ſoil, upon Mountains and 'Rocks. It is a certain and infallible thing, that in 'places where they have once diſcovered any of theſe 'Veins, there are others not far off, which is likewiſe 'found in all other Metals, and for this the Greeks in 'my opinion called them Metals.

Laſt Will and Teſt. c.4.p.87, 89. 4. *Baſilius Valentinus* thus deſcribeth the growing and lying of Silver in its Clifts, Rocks, Stones, Earth, and ſuch like other Coats or Coverings. 'Becauſe 'nothing is ſo fixt, next Gold, then Silver is in its per-'fection; and is the reaſon why Silver-paſſages are 'accompanied with white fluxes and mineral veins; 'next thereunto are ſuch paſſages, in which are gene-'rated red mineral Sulphur, and red yellow juyces of 'the noble Gold. Silver metalline Ore is wrought 'many times in a red goldiſhneſs, and cometh forth 'better then the other; a proof whereof may be had, 'if well ordered. White-gold Ore is naturally thus 'tinged of white-copper glaſs, which cauſe ſuch Ores 'and paſſages, by reaſon of the food of their perfect 'Minerals; and with the Glaſs Ore black fumes are 'exhaled, and feed upon Wiſmuth, Lead, and Tin 'Ore, wherein Minerals that ſtrike upon the Lunar 'paſſages are greedily refreſhed: thus groweth the 'firmeſt and compacteſt Silver Ore of its pure, proper, 'and unmixed Stone. They carry and produce alſo, 'not onely mixed chambers, and Mine-cheſts, but alſo 'ſeveral hard and ſturdy mixed Ores in whole Flint-'works, and other Copper-flowers, yellow and black 'Ore, and are found different in their nature, form, 'and tincture; ſo that the one is more hard, ſturdy, 'ſlaty, broader, narrower, whiter, blewer in its co-

'lours thus qualified, and natural in its end, middle, 'and beginning. This is the reason why these Sil-'ver fruits and Ores are found differing in their co-'lours and forms; the one being more compact, 'fairer, and of a better gloss then the other. Some-'times there is found in such a Vein or Passage, firm 'and compact Gold, Silver, and Copper; so it is 'found sometimes at *Krenach*. There are found and 'seen also in a certain Vein and Passage in mixed 'Lime-stones, Lead, Iron, and Copper Ore in one 'union and juncture. And in one Mine is found 'Copper Ore, in another is found Silver Ore, and in 'another Mine is found an Iron stone. Some silver 'passages are found also in their natural Zachstones, 'which either are in the hanging or lying ones. Sil-'ver passages shew themselves also with blue gritty 'flowers, in hollowed fluxes, in sprinkled marbles, 'and carry flint-works of several colours; and these 'passages and clifts are full of pleasant silver-co-'lours, of yellow and green, of a colour of Goslings; 'the more they are mingled with such colours, the 'more they have wrought. There are some silver 'passages and veins which carry three distinct colours, 'after the manner of a Rainbow; where the one co-'lour worketh in nature either more closely, or more 'mildly then the other, in a curious order; and the 'one may be discerned before the other in their pas-'sing strokes, and shootings, together with their cham-'ber colours and floats, as they fell severally, and 'apart in each Mine-Ore.

Mand. Subter. l. 10. Sect. 3. c. 1, 2, 3, 4. p. 183, 184, 185, 186, 187.

5. *Athanasius Kircherus* also gives us to understand of several sorts of Silver Ores found in the several Mines of *Hungaria*; from whence he had responsions

sions to his questions sent to inquire about metallick bodies and minerals, some of which held onely Silver, some Gold and Silver, some Gold, Silver and Copper, and some of other sorts; which may be of singular use to a diligent searcher after mineral knowledge, which would be over-tedious for us to transcribe, and therefore we leave them.

Mus. Worm. l. 1. Sect. 3. c 3. p. 118, 119.

6. *Wormius* hath some things in this particular worthy to be noted, where he sheweth what silver Ores he had, and in what Coats they were contained; for he saith:

1. A white Marble, in which did inhere silver of its own colour, and red.

2. A white Marble, in which was mixed onely silver of its own colour.

3. A white Marble, containing *Galena* in it, yielding silver.

4. An Ash-coloured Marble containing silver.

5. And also another of the same kind.

6. A blue one containing silver.

7. A kind of flint, which they call *Quartz*, which containeth silver of its own colour, and lead.

8. A black Marble, which being polished sheweth like the Touch-stone, to which also certain veins of Iron do grow. This is pregnant with silver, so that when it is polished, streaks and lines of silver are frequently seen in it.

9. That also there is found in the Groves or Pits of *Norway*, a certain Mineral of Silver ash-coloured, which is tinged in a certain part of it with a yellow colour, and almost an Iron colour, that it is suspected to hold something of Iron.

10. That he had a Mineral of silver, fruitful enough,

nough, from *Sneberg*, which the *Germans* call **Rot-gylden ertz.**

Ut ſupra c.4. p.120.

11. He tells us, That from the Church of **Heerre-ſtad**, about four *Norway* miles, at the top of a certain Mountain, there are found certain kinds of Earths, in which the ſparks of ſilver do ſhine ſometimes leſs, ſometimes greater, as alſo to be ſeen in the form of moſt tender, or ſmall hairs. To which is adjoyning a vein of pure ſilver of a foot broad; from whence they brought away a piece cut with a hatchet of a pound weight.

From all which I ſhall onely commend theſe two particulars to all diligent and inquiſitive Artiſts.

1. That ſeeing we have in *England* ſo many ſeveral places where ſtore of Lead Ores are gotten, and thoſe Ores alſo of many ſeveral ſorts and kinds, that it might prove worth the coſt and labour, to have ſome ſmall quantities of them (eſpecially thoſe that are moſt likely to contain ſilver) to be teſted and tried *per Cineritium*, to ſee what they hold.

2. That whereas often the Miners find divers other ſorts of Ores and Minerals, which becauſe they yield no Lead, are commonly thrown away and not regarded; that theſe alſo might be tried to ſee what they hold; for it is often uſual that the better is caſt away, and the worſer kept.

CHAP.

CHAP. XIV.

Of Silver found pure by Nature, that needs no refining by Fire. And of thoſe ſorts that muſt be purified, their Colours, Mixture, and ſeveral Coats wherein they lie.

WE have in the third Chapter, where we ſpoke of the growth and vegetability of Metals, ſhewed that much ſilver is found pure by Nature, and that needs no refining by the Fire, but is (as they diſtinctly and properly call it) *ſtatim ſuum*, which though we have ſeen now of it our ſelves (though we have ſtrained our abilities, and the intereſt of friends to procure ſome of it) yet we are aſſured from other perſons of ſufficient veracity who have ſeen and handled ſome of it; and that it is often ſo found, we ſhall now prove.

1. *Sebaſtianus Munſter*, a perſon of good credit, eſpecially concerning what he wrote of his own Country of *Germany*, which is alſo almoſt word by word related by *Georgius Agricola*, who wrote about the ſame time, and is alſo recited, and credited by the learned *Wormius*, gives us a moſt remarkable paſſage to this purpoſe. He declareth that (contrary to the opinion of the Ancients) Silver is found pure in divers places of *Germany*, as at *Schneberg*, *Anneberg*, *Gair*, and in the Valley of *Joachim* and *Abertham*, near the Mountains of *Bohemia*. Alſo in the Hill *Voſagus* in *Lotharingia* in the Valley *Liberia*; and two eſpecially, one at *Schneberg* called *George*, the other at *Abertham* called *Laurence* and *Theodorick*; from whence a huge

1. Geograph. Munſt. l.1.c.9. p.7.

trea-

'treasure of pure silver is digged. And that forth of 'the Mine called *George* at *Schneberg* there was a 'great Mass digged, which when *Albert* Prince of '*Saxony* descending into the Grove, or Pit, with his 'followers, had used for a Table, he is reported to 'have said, *Frederick* the Emperour is Great, and 'rich, but yet he hath not such a table as this. *Agri-*
De nat. Foss. l. 8. p. 641. '*cola* relating the same story tells us, that none of those 'that remembred that famous Mass hath recorded its 'weight, which doubtless (he saith) was of many Ta-
Mus. Worm. l. 1. Sect. 3. c. 3 p. 116. 'lents. And *Wormius* reciting the same thing, saith: 'It was thought that this Mass was of many Talents 'weight. And subjoyneth: That the King of *Den-*'*mark*, *Christian* the IV. had a Mass not much less, 'digged forth of the Mines of *Norway*, esteemed to 'be five Talents weight. And that in the Grove, or 'Pit called *Divine Benediction*, there was found a 'Mass of pure Silver, in the Year 1629. the seventh of '*May*, in weight 130 Marks. And further, *Munster* 'saith; Another grand Mass weighing ten *Attick* Ta-'lents, was digged forth of the Mines in the Valley of '*Joachim*, out of the Grove called *Stella*, and *Sulcera* 'or *Sulcera*: which *Agricola* confirms, as but lately
Vid. ut supr. 'digged up in his time. And *Munster* again saith: 'And that many Masses or pieces of pure Silver 'were digged up at *Abertham*, forth of the Grove '*Theodorick*, some weighing one, some two *Attick* 'Talents. And *Agricola* saith, And that many 'Masses digged forth of the Grove *Theodorick* at '*Abertham* of the weight of two Talents, or of one: 'which must needs be a Truth, being established by 'the mouth of two or three such credible witnesses 'as these Authors, and one of them an ocular wit-'ness too.

2. To

2. To this very purpose these Authors tell us fur-2. ther; For *Munster* saith, 'And that many pieces, 'some greater, some lesser, were found in the clifts of 'the stones, or adhering unto them, or to the Marble. 'And that nature doth figure pure silver into the form 'of Trees, Rods, Twigs, or Hairs. And we shall here take that eminent and pleasant relation of *Wormius*; who saith: 'That (amongst others which we shall 'nominate hereafter) he had an elegant, and excel-'lent Mass of silver that was *statim fusi*, from the gift 'of the Lord *Stenon Beck*, the Kings Treasurer, which 'weighed twelve ounces, that did imitate a Vine, with 'branches variously spred abroad. For divers little 'boughs did arise from the broad root, being full of 'fibres, which according to the rise did shew more 'thick truncks, which were writhen variously amongst 'themselves, and did embrace one another, until they 'did end in boughs and fibres, or small twigs; and 'so goeth on in that pleasant description, which for 'brevity we omit, and concludeth; That it was in-'fected with a leaden colour, which with a slight fri-'ction would go away, and leave the Metal clean and 'neat.

3. *Agricola* tells us: 'That in the cavities of the 3. 'stones are found masses of pure silver, as also little De nat. Foss. l. 8. p. 641. 'pieces severed from the Rocks, Stones, or Marbles, or 'cleaving unto them, or else most slender leaves of 'the silver do embrace them: for like Gravel, Sand, 'or small Grit, is mixed with the earth. And also 'Nature doth form or figure pure silver into the shape 'sometimes of trees, sometimes of little twigs, some-'times of hairs: after which manner it is often found 'most white with flaws, like flakes of Snow, which

do wholly consist of the least threads of silver, which [c] sometimes outwardly we see tinged with a golden [c] or other colour. That also is very singular which was sent forth of *Hungary* unto *Kircher*, and thus described. *I send you here a Mineral altogether precious, seeing any thing more rare may not be found at this time; where you may see the pure silver flowring forth into its filaments, or little threads; that which shineth yellow is most pure gold, that which is of a blackish colour is silver mixt with gold.* And though he do not tell its weight, nor quantity, yet it seems to have been no very small piece, but is a wonderful and rare evidence of the vegetation of this Metal. *Rulandus* doth tell us the very same things of the growing of silver in divers figures, which we have before quoted. And also *Encelius* in the very same words adding, that he had seen an whole Fish, a Serpent, a Scorpion, &c. so formed in the bowels of the Earth, of such pure silver, which the *Germans* call **Gedygen Silber.**

Mund. Subter. l.10. Sect.3. c.4.p.189.

De re Metal. c.5.p.15.

4. We shall now shew the several sorts of pure silver, so produced by Nature, that *Wormius* had in his *Musæum*, and were of less weight and bigness then some of those formerly mentioned.

4. Mus. Worm. l.1.Sect.3.c.3. p.16.

1. He had a piece of pure native silver equalling 3 ounces in weight, which appeared to have been greater by far, because the two sides which were large, had had some parts taken from them, because the footsteps of the Ax or Hatchet, rendring the two sides plain and equal, did fully shew it. When otherwise the remaining body of the Mass, approaching to a form of triangle, was rough, and unequal in its figure.

2. Ano-

2. Another piece he had that was branched, spreading it self like unto boughs, or twigs, after a certain manner resembling a Vine, abounding with the wonderful twistings of leaves and young twigs, drawing with it little parts of the *lapis specularis*, or that we call *Muscovy* Glass, from which it did grow or arise, shewing its roots wonderfully wrapped or twisted together, and that it did almost equal two ounces in weight, and had it from the Mines of *Norway*.

3. Rudiments of the same he had in another *lapis specularis*, which (he saith) without doubt was from the same Vein, but not abounding with such plenty as the former Mass.

4. He had another forked piece, resembling the figure of an Harts horn, to wit, pure, without any mixture of stone, or other thing; branched elegantly, and near the ends adorned with its branches and small twigs.

5. Another he had resembling an hook crooked, sharpned at both ends, of a white silver colour, something yellowish like Oker, it sticketh together in notches, plainly in its other part it was like a crooked Tooth-picker, such as by Art Workmen are wont to fashion of silver or gold, in the other part like unto a Crows bill.

6. Another piece he had crisped, resembling the shrub Southernwood, thick set with little twigs leaning one to another.

7. He had another piece that was rough, and endowed with divers extuberances on the one side, as though infected with Oker, on the other shewing in it certain most elegant Amethystine flowers, like gems.

8. Another piece he had like thin leaves growing to a ſtone (to wit) an aſh-coloured marble, which ſticketh to the plate or leaf, and ſometimes as it were pierceth it through.

9. He had a capillary or hairy piece of two ſorts, one criſped and writhen together, the other conſiſting of more thick hairs, moſt ſubtile, plain, and moſt like to Spider Webs.

10. Beſides theſe enumerated kinds of pure ſilver *ſtatim ſui*, he had various elegant particles, which commonly they call **Gaud-ſtein**, in ſome of which Amethyſts, in ſome Cryſtals are ſeen. Some do ſhew a Dragon fighting with a Lion, ſome the twiſted locks of hair, ſome trees, ſome ſhrubs, and infinite ſports of Nature, *&c.* And theſe are ſufficient not onely to ſhew that Silver is found pure by nature, without mixture of any other Heterogeneous ſubſtances, but alſo may further illuſtrate the growth and vegetability of this Metal.

Now we are to handle thoſe ſeveral ſorts of ſilver Ore that is not pure of it ſelf, but ſtands in need of refining, purging, or decocting by the fire to bring it to the perfection of ſilver, of which there are two ſorts: 1. Thoſe that are mixt with other Metals. 2. And thoſe Ores that yield no other Metal but ſilver.

1. Muſ. Worm. l. 1. Sect 3. c. 3 p. 118.

1. *Argentum rude*, is that Ore that is digged forth of the earth, and hath mixt with it ſome ſtones, earth, or other Mineral ſtuff, which muſt be ſeparated from it, before it become a pure Metal. Or as *Agricola* defines it in *Bermanno*, which is truly ſilver, but differeth in colour; and ere it attain that colour of ſilver, requireth decoction by the fire; and ſome of theſe

theſe are mixt with other Metals, of which we have ſpoken ſomething before, and ſhall now add a little more.

1. *Wormius* tells us that he had *Vena Æris rude argentum continens*, that this was of a golden colour, ſhewing purple, and red ſpots of raw ſilver, having ſomething of the rock mingled with it, in the figure of a rude maſs, of a golden fire-ſtone, or marcaſite; or in a more dilute colour, in an aſh-coloured ſtone, having no purple ſpots mixt with it.

2. A black Copper Ore containing ſilver in it, ponderous, and ſmooth, tending to whiteneſs, by that moſt often betraying that which was lodged in it.

3. An Ore of Iron holding ſilver in it, being blackiſh, and in certain places covered over with an iron-colour; but when broken, ſhining fairly, with almoſt a ſilver colour, and is of an unequal colour, ſhewing various protuberances.

4. *Galena* containing ſilver of a leaden colour, ſhining, and friable, that knocked with iron doth eaſily fly aſunder. Some of them do contain ſilver inviſibly, ſome of them have leaves and thin plates, that are thick enough.

5. Sparks of ſilver is joyned to Talck, and is either mingled with more minute grains, or adheres unto it in the manner of leaves or plates.

2. Muſ. Worm. ut ſupra p. 117.

2. Now of rude ſilver, though this be of divers colours externally, as of a leaden colour, an aſh colour, black, white, red, purple, liver colour, and yellow: yet notwithſtanding within it hath its genuine colour, which doth ſhine and appear when it is broken with the hard ſtroak of a ſtone or hammer. And in this kind that is accounted the beſt, when forth of an

Lex. Alchym. p. 56.

Agr. de nat. Fossil. l. 10. p. 655.

hundred pound weight, ninety pounds or more of pure silver is drawn, as was often found in the Kings Mount of *Norway*. *Rulandus* reckons, though not this precise number, yet he enumerates divers sorts, of some of which we shall now speak. To which *Agricola* doth accord; from whence in likelyhood *Wormius* had it.

Mus. VVorm. ut supra.

1. The first place is given (saith *Wormius*) to the rude Ore of silver, which is of its own colour, called by the *Germans* **Gediegen Silber ertz**, of an hundred pound weight, of which more then ninety pounds are made of pure silver. Of which (he saith) he had one piece excelling the rest in weight half a pound, having divers inequalities and protuberances, shining with a silver colour, and of one part having something of purple coloured raw silver admixed: which *Christian* the IV. with his own hand drew forth of the Mine or Pit.

2. The next that succeeds is crude silver Ore, of a leaden colour, which the *Germans* call **Glas ertz**; which appellation (he saith) *Agricola* doth not unworthily carp at, when plainly it hath no affinity with Glass, but doth emulate Lead, or Plumbago in colour, being a little more obscure; so that by the sight of the eye, no man ignorant of metallick affairs, can discern it, though in nature they much differ. For Plumbago or Galena is composed of Lead and Stone; but rude silver Ore of a leaden colour, comprehends little earth and much silver. Plumbago in the Mortar is reduced with the Pestle into Powder; but this rude Ore will be dilated, or extended. Plumbago smitten with a hammer, or pressed with the teeth, or cut with a knife doth break, or leap asunder; but this silver Ore

Ore will be dilated, and spred abroad. Although sometimes this Ore is found hard, which is onely tried by the Touch-stone, and useth to be of a more dilute colour, and is found in divers and sundry forms.

3. The third is crude silver Ore that is black, called **Swartz Silber ertz**, and is a blackish stone, shining with frequent sparks of pure silver, and seemeth rather to have obtained a grey then a black colour. He saith he hath also a black silver Ore, to which is mixed in thin leaves pure silver, joyned with fire-stone, and silver of a leaden colour.

4. The next is crude silver Ore of an ash colour, called **Graw ertz**; and sometimes this aboundeth with much pure silver, sometimes it containeth little. Sometimes it shineth forth of an ash coloured stone like most small grains: of which he saith that he had two little stones, which being held to the fire did seem to sweat forth silver, and therefore was called of some, the Vegetable Moon. And that *Matthesius Sermone 3. Sareptæ*, did call it **Russ-gesprossen Silber**, that is, sprouting Silver, because that being thrown into the fire, it doth shed forth pure granulated silver, like Hemp or Poppy seed. The other of the little stones that he had of this sort of Ore did contain red silver, inclining to purple. And there was that had a fire-stone joyned unto it.

5. He had raw-yellow silver Ore, of an earthly and porous substance, to which some Galena was admixed, shewing a colour like Oker, more soft then other sorts of Ore contained in stones. And so saith that he omitteth Ores of a red, purple, and other colours, because he was not possessor of them. And almost to this purpose the Author of the *Museum Veronense*. VVorm. ut sup.

nense acknowledgeth that he had seen some such sorts, which were needless here to relate.

In the next place we shall shew what sorts of silver Ores, that are raw and crude, the experienced *Rulandus* doth reckon up. For he saith that of those Ores of silver that stand in need of purifying by the fire, there were found several sorts in their Mines, some of a white, red, leaden, black, purple, ash colour, and the like; of all which he reckoneth many sorts, some of which we shall here transcribe, to satisfie the curious inquirer, because (he saith) that six of these sorts were known to the *German* Miners.

Lex Alchym. p. 56, 57.

1. I. And first, he reckons silver Ore of a white colour, and that of these several sorts. Ib. p. 61, 62.

1. White silver Ore that was glebous, or cloddy, found at *Sneberg*, which might be cut with a knife, or beaten with an hammer.

2. White silver Ore in a most white Marble, found at *Anneberg*, and also found there Ore of that colour, like hairs, or wrapped together like a lock of many small hairs; and also that which was most white, like flakes of most small silver threds, and other crisped together, in a crumbling earth of a light red colour.

3. That of this sort of Ore there was some found in a yellow clayish earth, as also in a most white flint, and in red spar (or that we call *fluores*) that was transparent, at *Maricberg* in an hard ash coloured stone; also thin plates of white silver in a fattish stone, as also thin plates or leaves at *Marieberg* in an hard ash-coloured stone.

2. II. Silver Ore of a leaden colour, that must be purified by the fire, he enumerateth these sorts.

1. Of this colour that might easily be cloven with a knife, or beaten forth with an hammer. 2. Of

2. Of this colour in a most hard white fire-stone, also in fire-stones that were joyned together, and four-square. Ib. p. 63.

3. Of this colour in white spar, that was of six angles, likewise in purple-coloured spar, that was pellucid, and quadrangular.

3. III. Silver Ore of an ash colour or grey was found at *Anneberg* in metallick Cadmia, or Copper Ore, as also in a mass, and in white flint.

4. IV. Silver Ore that is black, in which sometimes shineth silver Ore of a leaden colour, sometimes also it containeth little sparks of red silver Ore, and sometimes sparks of white Ore; and by how much more it containeth greater plenty of those sparks, by so much it yieldeth more silver when it is excocted. But if it be barren, and void of metallick matter (as it is sometimes) it is to be accounted meerly black earth.

5. V. Ore of this sort that is yellow, is found:

1. In yellow earth like hairs.

2. Fire-stones like to a purple colour, to which do adhere little grains of a leaden colour.

3. Ore of this sort found at *Marieberg* like to a transparent horn, which holden to a candle doth dissolve or melt.

4. Of an iron colour, which smitten with an hammer, doth shine or sparkle, and is not known by its species, but by the fire, Ut supra p. 65.

6. VI. Silver Ore of a blue colour.

1. That which containeth in it self in the middle, as though it were marrow, crude red silver Ore.

2. Mixed with white cloddy silver Ore, of a leaden colour.

3. Ore found at *Annceberg* of a green colour, digged forth of the Vein called the *Celestial Army*; as also Ore of a purple colour in the same Vein.

7. VII. Now we come to the last that we shall mention, to wit, crude silver Ore that is of a red colour, which the *Germans* call **Roth gulden ertz**. And he saith it appeareth to be some kind of Carbuncle, but that a Carbuncle doth shine more vehemently, but this kind of silver Ore more faintly. And that it was found in the Mines, in the Valleys, and also in other places, and that in divers manners, but especially three ways.

1. The first was bright with a certain blackness.

2. Certain small pieces like sparks do embrace some sort of its rock.

3. Thirdly the solid masses of it do cleave and adhere to the stones, and that sometimes simply, or after a simple manner. On the contrary, sometimes for the other part of it, which hangeth forth in a Point or Pyramis, rounded as a Top, it imbraceth some other matter then the Vein containeth: and that in a foursquare form like a Die, sometime in a sexangular form as a Diamond; commonly it consisteth of many, and unequal angles as the Iris. Thus doth Nature exercise Geometrie in the bowels of the Earth, by a wonderful workmanship.

Lastly, The same crude red Ore of silver is found interspersed with *cæruleum*, or native blue, after a beautiful manner: so that Nature seeming to be weary in perfecting of Metals, doth recreate and delight her self with such colours, which Art with its greatest endeavours cannot attain unto. And these sorts of Ores were (as most of others) utterly unknown

known to *Dioscorides*, yea to *Pliny* and all the Ancients.

Of this and the preceding sorts, that diligent Mineralist, *Georgius Agricola*, gives us an account to this purpose. But (saith he) the unwrought, or crude Ore of silver that is red; if it be soft, it yields not much, or altogether none at all in goodness to the crude Ore of Silver that is of a leaden colour. But if it be hard, as in the plentifulness of silver it is overcome of the other Ore of a leaden colour, so it far excels it in most excellent beautifulness; especially when it is interspersed lightly with *cæruleum*, or natural blue: or hath the greatest similitude to the translucid gem the Carbuncle. For it is no doubt but that it hath grown of the matter of a perspicuous stone, mixed with the juice of that from whence silver was after to be produced. Therefore it is not onely like to the Carbuncle in colour, but also with a transparent facility. But notwithstanding they differ betwixt themselves, for the Carbuncles for the most part do shine more fully, and this more weakly. The Carbuncles cannot be filed, but this will be wounded with the file. The Carbuncles either do not at all, or very slowly feel the fire; but this put into the fire, doth dissolve, and is made liquid. This Ore doth vary in figure no otherwise then the crude Ore of silver of a leaden colour, but more often is angular, and sometimes square as a Die, sometimes six-angled as Crystal, and sometimes it hath many angles. Also its most thin plates or leaves do adhere to the Rocks and stones. But that silver Ore that is pellucid, is like to the Carbuncle; that which is not pellucid, is like Rubrica, or Ruddle, and doth much vary in colour.

De nat. Fossil. l. 10. p. 656.

That which is most like to mean Ruddle, was digged up at *Sneberg*, forth of that Grove or Pit that hath the name of *Levites*. And (he saith) certain old men have affirmed to us with all asseveration possible, the Mine called *George*, besides other kinds of crude silver Ore, had yielded great store of this sort. But crude silver Ore that is of a red colour, sometimes contains in it Gold; and such (he saith) is digged up in the Mountain called *Carpatum*, at *Boccantium* and *Cremnitium*: and was digged forth of the Grove in the Valley of *Joachim*, that is called *Rich Barbary*. That obscure sort which may be dilated with the stroke of the hammer, doth more abound with silver, then that which is transparent, that being smitten with the hammer, doth flie asunder.

Lex: Chym. p.64,65.

Rulandus proceeds, and of the red Ore of silver that is pellucid, he gives these sorts:

1. That which was glebous or cloddy, like unto the Carbuncle imitating the Amethyst.

2. Like unto the Carbuncle, having six, seven, or eight angles, erected in the form of a Bean, found in a fire-stone of an ash colour, and in native yellow sulphur.

3. Like the prickles of an earth Hedg-hog, in metallick Cadmia or Copper Ore, which hath the form of a Brain.

4. Little masses which appear most purely, as though compounded of Rubies.

5. Masses compacted as it were of pellucid oriental Granates.

Of the sorts of red silver Ore not pellucid, he reckoneth these:

1. Bloud-red, of seven angles, called red golden Ore.

2. Glebous or cloddy found in a white metallick Marble.

3. Glebous in a fire-stone of a golden colour, like unto native *Minium* or *Cinnober*.

4. Found in six-angled spar, like to the external coat of a Chesnut.

5. Found in an ash coloured stone.

6. Found adhering to the Rock.

7. That which was something whitish.

8. Found in a white soft stone.

9. In a fire-stone of an ash colour.

10 Found in *Galena inani*, which the *Germans* call **Blend**; and our Miners in the North, *Blue Blindake*.

11. Another sort that contained Gold in it.

12. That which was red, inclining to blackness.

13. That which was of a Liver colour.

From all this that hath been spoken concerning the crude Ores of silver, especially those of a red colour, we shall commend these ensuing particulars to be considered of by the Learned and Ingenious.

1. We should heartily desire that the learned Mineralists may be pleased to compare what is here quoted from these Authors, with what several sorts of crude silver Ore they have seen, or known, or may have in their Repositories, that this so material a point may be more manifest, and that they would not disdain to communicate it unto others, for the general improvement of this part of Mineral knowledge. 1.

2. We would intreat all noble and generous spirits that affect this kind of Learning, and have interest and abilities, to trie if the several sorts of Ores of this 2.

kind,

kind, that are to be had in *Germany*, (where they moſt abound) may in ſome ſmall parcels be procured, thereby to examine how far the credit of theſe Authors may be relyed upon.

3. 3. We intreat all Bermen, Over-ſeers of Mines, or other ingenious perſons imployed about ſuch Works in his Majeſties Dominions, to take ſerious notice of all ſorts of Ores that may be met withal, to ſee if any ſuch ſorts, as theſe before mentioned, may be found, or come by, that exact trials may be made of them.

4. 4. Beſides the two Authors *Agricola* and *Rulandus*, perſons experienced in what they writ, there are ſome others that do teſtifie that Ore is found red, and alſo tranſparent. As *Johannes Rhumelius* (whom I have quoted before, though not to this very purpoſe) doth confeſs in theſe words: That his *Tinctura Solis* was made forth of a Rubie-coloured, red, thorough-ſhining, or tranſparent, bright golden Ore, &c. And that his *Aurum vitæ* was prepared forth of a certain, pure, ſplendent, or ſhining Mineral; which in its firſt coagulation, was found of a red colour. Alſo that learned Author (whoſoever he was) that writ the *Cheiragogia Heliana* doth quote *Paracelſus*, and to this purpoſe he ſaith; The *Helvetian* Doctor, *in libro Theſauri Theſaurorum*, writing of Minerals, ſaith thus; Nature doth produce a Mineral in the bowels of the Earth, of which there are two ſorts which are to be found in many places and coaſts of *Europe*. But the beſt is in the figure of the greater World, in the riſing of the Star of the Sphere of the Sun: The other in the Sotherine Star, which is in its firſt flower, produced from the Star, of the gum of the Earth; and that which

Antidotar. Chym. p. 248.

P. 261.

Theatr. Chym. Vol. 4. p. 306.

which in its firſt coagulation is found red, in which the flowers and colours of all Minerals do lie hid. Of which words of *Paracelſus*, the aforeſaid Author ſaith thus. Which words literally taken, do ſeem to be underſtood of the Ore of Gold and Mercury; becauſe *Theophraſtus* doth attribute to Argent vive, as to the Mother of Metals (as alſo the great *Phrædro*) all the colours of Minerals, as in the Book of the Generation of things in his Metamorphoſis is to be ſeen. Although they are not awanting, who do accommodate very ſtiffly this Mineral to the red tranſlucid Ore of ſilver (called by the *Germans* **Rotguldig ertz.**) But I (he ſaith) ſhould rather think that it doth agree to another certain kind of Mineral, that is truly fruitful of Gold, but notwithſtanding is not Gold. From whence we may note theſe things.

1. That there were in the time of *Paracelſus*, two ſorts of Minerals to be found in divers places of *Europe*, that in their firſt coagulation were found red, in which lay all the flowers, and colours of Minerals; but he doth not ſpeak that they were tranſparent, nor is it very eaſie to conjecture what kind of Minerals they were, and therefore we ſhall leave the ſearch of them to all curious inquirers.

2. That many thought that theſe were the red Ore of ſilver, by which he plainly grants that there was a red Ore of ſilver, to be found and had, but thinks it not the ſame that *Paracelſus* meant or intended.

3. But conceives the Mineral that *Paracelſus* intended, was an Ore that was fertile of gold, but not gold; which for ſome weighty reaſons we ſhall not here determine, but leave it to be diſcuſſed by others. And the learned *Arthur Dee* (who in his younger years had

Faſcic. Chem. Corollar. c. 2. p. 41.

had with his own eyes often seen the truth of the Art by projection made by his Father and Sir *Edward Kelley*) tells us that their matter was taken from a certain mineral mass, coagulated, lucid, red, and ponderous, being perfect metal in the neareſt power, containing in it self vive-spermatick sulphur, and vive immature Mercury, multiplicable in it self. Of which sufficient is said to those that understand.

5. To illustrate this more amply, I find in such Authors as I have met withal, that treat of mineral matters, that there are three sorts of Ores that are found in the bowels of the earth, that are red, or yellowish, and transparent.

1. This mentioned by *Agricola* and *Rulandus*, that did contain silver in it, and therefore by them ranked in the number of silver Ores.

Lex. Chym. p. 458.

2. I find that *Rulandus* tells us, that at *Dresda* divers sorts of Sulphur were excocted forth of certain fire-stones, whereof some were of the colour of crude silver Ore, red, and pellucid; some other, like native Cinnober, red, and transparent. And *Encelius* speaking of native vive sulphur, of all other sorts commends that most that was transluciđ, resplendent, and flourishing. And the very same is confirmed by *Cæsalpinus*. And the learned *Wormius* tells us, that he had a piece of native sulphur, weighing scarce a drachm, that was exceeding elegant, and was pellucid like Crystal, and of a golden colour, plainly like to that which the Author of the *Musæum Calceolarium* calls Vive sulphur, digged forth of the gold Mines of *Peru*; which did imitate most pure Gold, in a full yellow colour, and so transparent that it might be assimilated to Glass.

De re Metal. c. 2. p. 10.
De Metall. l. 1. c. 28. p. 62.
Mus. VVorm. l. 1. c. 11. p. 26.
Pharmac. Tom. 2. Not. 13. p. 672.

3. *Josephus Quercetanus* speaking of native Cinnober, tells us: That Nature did bring forth in certain gold Mines in *Hungary*, a certain kind of mineral Cinnober most ponderous, and of a far more red colour then artificial Cinnober. And that it was so far transparent, and thorough-bright, that it was of no less price and esteem then Gold it self. And this sort, (though I have used mine ultimate endeavours) I never yet could procure nor see any, though I am informed by a learned *German* Physician, that there is of it in some places of his Country, but rarely to be had.

These sorts (if to be met withal, which I fear cannot be but with difficulty and much diligence) may doubtlesly be indifferent easily distinguished one from another. 1. For the Ore of native sulphur, though transparent, seems not to be so highly red as the other. 2. But rather yellowish; and again, it containeth neither Quick-silver, nor any other Metal, as the other do, the one containing Quick-silver, and the other Silver. And also the combustibleness and strong smell of this Sulphur doth difference it from both the other; the red transparent Ore of Silver, being (I suppose) neither so inflamable, nor of so strong a smell; and the native Cinnober will hardly burn, and scents very little of Brimstone. 2. The transparent Ore of native Cinnober will (as I imagine) with an easie fire yield Quick-silver, which the other Ore of Silver will not.

6. The last thing we shall observe is, that whereas *Agricola* and *Rulandus* do tell us that some of this transparent silver ore, that is red, is often found formed very like unto Carbuncles, which (I suppose) they mean of Rubies or Granates (that which they call a Carbuncle, being nothing but the greatest and purest sort

6. Vid. Anselm. Boetium de Boodt. l. 2. Gem. & Lap. c. 8, 9 p. 70, 71.

of Rubies) and that these metalline Carbuncles (as they call them) differ from the other, in that they are of less lustre, more soft, and will yield to the file, and dissolve in the fire, it may be a reasonable conjecture, here fit to be proposed to the Learned to enquire after; whether these be not of that kind that *Paracelsus* calleth Granates, that did contain some Metal; of which he saith thus much. 'Besides these there is a-'nother peculiar Metal, which is found in Rivers and 'Ponds or Fens, in the form of a grain, like a greater 'or less Bean. It of it self is to be melted, or fluxed, 'and may be hammered, but not to the aptitude of in-'struments. This is of no great use, neither is its pro-'priety known, what it may contain. And if herein 'Alchymy discover nothing, it will not easily appear 'what at last it may be. It sustaineth many adultera-'tions of Silver and Gold, which do pierce into it, as 'into Copper or Lead. And further giveth us this 'note. Furthermore also some Granates are perspi-'cuous in the form of Crystal, in which Silver and 'Gold do lie hid. Here he seemeth plainly to intimate, that these which he nameth Granates, did contain an Anonymous Metal, that was neither silver nor gold; neither doth he mention that these were perspicuous or transparent, but that there were other sorts that were perspicuous, and in form of Crystal, in which were contained silver and gold: which in probability were such as *Agricola* and *Rulandus* do describe; and that he did not understand it of the Granates that are gems, and doubtless contain little or no Metal in them. And thus much for curious Enquirers.

Lib. de Miner. Tract. 1 p. 349.

CHAP.

CHAP. XV.

How they refine Silver Ore at the Indies, *and of some other such things.*

BEcause the Natural and Moral History of the *Indies* written by that learned and experienced *Spaniard*, is not in the hands of many, I shall therefore transcribe some particulars that may be of very good use to an ingenious Mineralist, as followeth, where he saith thus: 'The Veins, as I have said, 'where they find silver, runs betwixt two Rocks, 'which they call the Chase, whereof the one is com-'monly as hard as flint, and the other soft and easie 'to break. This Metal is not always equal and of the 'same bounty; for you shall find in one and the same 'Vein, one sort of Metal very rich, which they call '*Cacilla*, or *Tacana*, from which they draw much sil-'ver; and another is poor, from whence they draw 'little. The most rich Metal of this Mountain, is of 'the colour of Amber, and the next is that which in-'clines to black. There is other somewhat red, and 'other of the colour of ashes: finally of divers and 'sundry colours, which seem to such as know them 'not, to be stones of no value: But the Miners do pre-'sently know their quality and perfection, by certain 'signs and small veins they find in them. They carry 'all this Metal they draw out of these Mines upon '*Indian* Sheep, which serve them as Asses to carry it 'to the Mills; the richest Metal is refined by melting 'in those small furnaces which they call *Guayra's*, for

Hist. of the Ind. c. 9. p. 232.

'that is most leady, by reason whereof it is most sub-
'ject to melt; and for the better melting thereof, the
'*Indians* cast in a matter they call *Sorocche*, which is a
'Metal full of Lead. The Metal being in these fur-
'naces, the filth and earthy dross, through the force
'of the fire, remains in the bottom, and the Silver and
'Lead melt; so as the Silver swims upon the Lead,
'until it be purified; then after they refine the Silver
'many times, after this manner of melting. And a little
after he saith. 'At this day the most usual manner
Ut supra c. 12. p. 243. 'of refining in *Potozi*, is by Quick-silver; as also in
'the Mines of *Cacatecas*, and others of *New-Spain*.
'Then after, having related the manner of their get-
'ting and purifying of Quick silver, he sheweth how
'with it they refine silver Ore after this manner. We
'must understand (he saith) there are divers sorts of
'Metals, for some yield much Silver, and waste little
'Quick-silver; others consume much Quick-silver,
'and yield little Silver; and there are others which
'consume much Quick-silver, and yield much Sil-
'ver; and others that consume little Quick-silver,
'and also yield little Silver: and as men encounter in
'these matters, so they grow rich or poor in their traf-
'fique. Although commonly the rich Metal yields
'much Silver, and consumes much Quick-silver; and
'likewise that which is poor yields little Silver, and
'consumes as little Mercury. They first beat and
'grind the Metal very small with Hammers and other
'instruments, which beat this Stone like unto Tan-
'mills; and being well beaten, they search it in a
'Copper search, making the powder as small and
'fine, as if it were Horse-hair. These searches be-
'ing well fitted, do sift thirty quintals in a day and a
'night;

'night; then they put the powder of the Metal into
'the Vessels upon Furnaces; where as they anoint it
'and mortifie it with brine, putting to every fifty
'quintals of Powder, five quintals of Salt. And this
'they do, for that the Salt separates the earth, and
'filth, to the end the Quick-silver may the more easily
'draw the silver unto it. After they put Quick-silver
'into a piece of Holland, and press it out upon the
'Metal, which goes forth like a dew, always stirring
'and turning the Metal, to the end it may be well in-
'corporate. Before the invention of these Furnaces
'of fire, they did often mingle their Metal with
'Quick-silver in great Troughs, letting it setle some
'days, and did then mix it, and stir it again, until
'they thought all the Quick-silver was well incorpo-
'rate with the silver, the which continued twenty
'days and more, and at the least nine days. Since
'they discovered (as the desire to get is diligent) that
'to shorten the time, fire did much help; to incorpo-
'rate Silver with Quick-silver the sooner, they inven-
'ted these Furnaces, whereon they set Vessels to put
'in their Metal, with salt and quick-silver; and un-
'derneath they put fire by little and little, in Furnaces
'made for the same purpose; so as in five or six days
'the quick-silver is incorporate with the silver. And
'when they find that the Mercury hath done his part,
'and assembled all the silver, leaving nothing behind,
'but is well imbrued as a Sponge doth Water, dividing
'it from the Earth, Lead, and Copper, with the which
'it is engendred. Then afterwards they separate it
'likewise from the quick-silver, the which they do in
'this sort; they put the Metal in Caldrons, and Ves-
'sels full of Water, where with certain Wheels they
turn

'turn the Metal round about, as if they should make
'Mustard, and so the earth and dross goes from the
'Metal, with the Water that runs away: The silver
'and quick-silver, as most ponderous, remaining in
'the bottom, the Metal which remains, is like unto
'Sand: Then they take it out, and wash it again in
'great Platters of Wood, or Keelers full of Water;
'still drawing the earth from it, until they leave the
'silver and quick-silver well cleansed. There slips
'away also some small portion of silver and quick-
'silver, with the earth and dross, which they call
'washings; the which they after wash again, and
'draw out the remainder. When the silver and
'quick-silver are cleansed, and begin to shine, and that
'there remains no earth, they put all the Metal into a
'cloth, which they strain out very forcibly, so as all
'the quick-silver passeth out, being not incorporate
'with the silver, and the rest remains as a loaf of silver,
'like to a mark of Almonds pressed to draw oyl. And
'being thus pressed, the remainder contains but the
'sixth part in Silver, and five in Mercury. So as if
'there remain a mark of threescore pounds, ten are
'of Silver, and fifty of Mercury. Of these Marks they
'make Pins (as they call them) like Pine Apples, or
'Sugar loafs, hollow within, the which they com-
'monly make of a hundred pound weight. Then to
'separate the silver from the quick-silver, they put it
'into a violent fire, which they cover with an earthen
'vessel like to the mold of a Sugar loaf, or unto a Ca-
'puchin or Hood, the which they cover with coals,
'and set fire unto it, whereby the quick-silver exhales
'in smoke, the which striking against the Capuchin of
'earth, it thickens and distils, like unto the smoke of a
'pot

Ut supr. p 244, 245.

'pot covered, and by a pipe like unto a limbeck they
'receive the quick-silver which distills, the silver re-
'maining without changing the form, but in weight is
'diminished five parts of that it was, and is spungeous;
'which is worthy the observation. Of two of these
'loaves, they make one bar of silver, in weight 65 or
'66 marks; and in this sort they carry it to the touch,
'custom and mark. Silver drawn with Mercury is
'so fine, that it never abates of two thousand three
'hundred and fourscore of alloy; and it is so excellent,
'that the Workmen are inforced to allay it, putting
'some mixture to it, as they do likewise in their
'Mints where as their money is stampt.

In the next Chapter he sheweth the manner of their making of Assays, which he describeth thus: lb. c. 13. p. 247.

'To give the alloy to every piece, they carry the
'bars of silver unto the Assay-master, who gives to
'every one his number; for that they carry many at
'once, he cuts a small piece of every one, the which he
'weighs justly, and puts them into a Cruset, which is
'a small vessel made of burnt bones beaten: after he
'placeth every crucible in his order in the Furnace,
'giving them a violent fire; then the Metal melteth,
'and that which is Lead goes into smoak, and the
'Copper and Tin dissolves, the Silver remaining
'most fine, of the colour of fire. It is a strange
'thing, that being thus refined, although it be liquid
'and molten, yet it never spills, were the mouth of
'the crucible turned downwards; but it remaineth
'fixed, without the loss of a drop. The Assay-master
'knoweth by the colour, and other signs, when it is
'refined; then doth he draw the crucibles from the
fire,

'fire, and weighs every piece curiously, observing 'what every one wants of his weight; for that which 'is of high alloy wastes but little, and that which is 'baser diminisheth much; and according to the waste 'he sees what alloy he bears, according to the which 'he marks every bar punctually. Their ballance and 'weights are so delicate, and their grains so small, as 'they cannot take them up with the hand, but with a 'small pair of Pincers: and this trial they make by 'Candle-light, that no air might move the ballance. 'For of this little the price of the whole bar depen-'deth.

Now though this way of the refining of silver Ore by quick silver cannot, in great quantities, be practised in *Europe*, by reason of the scarceness, and high price of quick-silver: yet in these passages of *Acosta*, there are many things worthy of a deep remark, and may by diligent and ingenious persons be promoted to great advantages, both in regard of severing the dross, and baser Ores from the more noble; and also in relation to the Art of testing or Assaying of Metals, which wants much of that perfection, that careful skill and observation may bring it to.

But however the way of separating silver from baser Ores by quick-silver in small quantities, we have found very effectual, and cannot but commend it (if performed by a knowing and careful Artist) as the most certain way of probation of Metals, that we have known, and in some respects excelling that by Lead, the Test, and Fire. Which way of separating the nobler Metals from the baser, and one from another, was well known unto that learned and experienced Philosopher and Chymist, *Paracelsus*, who very curtly and acutely

Lib. de Separ. ser. natur. 8. p. 103.

acutely (according to his accustomed manner) doth mention the several ways of purifying several Ores by means of quick-silver, giving therein exquisite Rules, and excellent cautions, to which I commend the curious and inquisitive Artist, the mystery of which, trial and diligence may find out.

But the way of separating Silver from Lead in great quantities, so as to save the greatest part of the Lead, hath been little known or practised in *England*, that I could ever understand, saving by one experienced person that had been in *Holland*, and seen it done there; and did affirm that they could separate the Silver from the Lead, and in a Tun not lose above two hundred weight of the Lead: and that if it held above 5 l. a Tun, they would separate it with the charge of fifty shillings, and make gain by it; and to that end they bought much of our English Lead, and did refine it, and so make a gain of it. And he made me a pattern of the Furnace and Vessel, such as they used, which (to me) seemed a feasible and rational way.

Lastly, The whole company of common Chymists do tell us great stories of *Argentum potabile*, and other medicines drawn forth of this Metal, which they cry up to be excellent remedies for the *Epilepsie*, and other nervous distempers: but they must pardon me if I give no credit to their hyperbolizing fansies; for I dare affirm that they are nothing but vain and ignorant brags, and will perform no more then the small filaments or powder of Silver laminated, which (indeed) is nothing at all, except prepared by the universal solvent, or *Alkahest*, as was that blue or azure-coloured tincture or oyl, containing the saline and sulphureous part of the Metal, the mercurial and indestructible

Archidox.l.2. de Separ.Elem. p.7. Helm. Butl. p 594.

part being left behind untouched, which *Paracelsus* mentioneth. And the reason of this my so positive assertion, I shall give from the experience of that learned Chymist *Van Helmont*, which may bear credit against a thousand of the others; who tells us, That the bodies of Gold and Silver are so closely shut, that for the most part they elude the whole endeavours of Artists (especially those that have not the fore-mentioned key of the *Alkahest* to open them) so as when they think they are most of all opened, they have remitted nothing at all of their former bars or clausure. And that quick-silver, although it seem a tremulous and open body, yet notwithstanding nothing in the whole order of Nature, is more closely shut up then it; and therefore few of a thousand Artificers obtain effectual remedies forth of Gold, Silver, or Mercury; but the other four do more easily and freely obey the desires of Operators. And further he saith, That metallick bodies in respect of their Mercuries, are all equally shut up, with the seal of anatical homogeneity; but that their sulphurs afford us acquaintance and help, if they be rendred familiar. And therefore concludeth thus: *Quoties namque à mercuriis, sales & sulphura distinxi, admiratus sum illorum ignaviam, horumque vero principiorum dignitates.*

Ut supr. p. 594.

De Lithiasi c. 3. p. 24.

So we have finished this tedious discourse of these two noble and perfect Metals of Gold and Silver, and shall now descend to the other, that are called (in comparison of these) imperfect; of which two are compact and hard, of which we shall now treat: and first of Copper.

CHAP.

CHAP. XVI.

Of the descriptions of Copper, of its Ore, Stone, Operation, and striking Passages.

ÆS, or Copper (which was so called from the *Isle of Cyprus*, where it was first gotten in great plenty) is a metallick body, participating of a fuscous or darkish redness, being ignible, and fusible, and is as the mean betwixt Gold and Silver; and is generated of *Argent vive*, impure, not fixt, earthy, burning, red, not clear, and of such a sulphur, it wants fixation, purity, and weight.

Bucel. de re Metal. c. 13. p. 22.

And *Casalpinus* tells us: That Copper doth in colour imitate Gold; for if its redness be a little diluted, it becomes *Aurichalcum*, most like to Gold. And that it imitates Silver in its tractable substance, and slowness of fusion; for it requireth ignition before it be melted. But it differs from both, because it doth not bear the trial of fires (as they do) but is universally burnt; from whence it is noted to contain much of combustible exhalation, for above the rest of the Metals it yieldeth a sulphureous smell and flame. Besides, being madefied, it doth most easily contract a rust, which is called *Ærugo*, of a green colour.

De Metal. l. 3. c. 5. p. 179.

Now for its manner of lying in the Earth, its Stones, and passages, we shall give it from *Basilius Valentinus*, a person of great experience in these matters; which though it be large and something obscure, yet we shall transcribe for the benefit of all diligent and laborious Mineralists; and is thus. 'Copper Ore

Last Will and Test. c. 5. p. 88, &c.

'is wrought in its own and proper ſtone, of good pure 'Salt, and over-hot-burning ſulphur, through an 'heavenly impreſſion into all its parts, tinged red 'thoroughout, not quite freed from a ſuperfluous hu-'midity, in an affinity with iron; becauſe their dwel-'lings, or houſes, are ſet one by another, and is the 'reaſon why the one may eaſily be tranſmuted into 'the other.

'This metalline Ore is much wrought in flat float-'works, which are green flinty; many times it ap-'peareth in a red or brown form, and is ſeen alſo like 'lime-ſtone, in black, and yellow flat-works, like un-'to Coals, in green flinty paſſages, in a twofold man-'ner, either current, or in the manner of a float. 'Sometimes it is red and brown, mixed with a green 'colour: ſome are of a lazure colour, ſome of a Cop-'per-glaſs, flinty, and iron ſhot, or of a white food. 'The Copper Ore in its paſſages, is ſometimes rich 'of Gold and of Silver; as it is accompanied with 'curious Zach-ſtones, and incloſed with paſſable 'ſtones, if ſo be that other Metals and Minerals do 'not intrench upon them, which corrode and con-'ſume them. And Copper Ore is a flat-work alſo, 'mixed with foliated Earth, and the mercurial Cop-'per is hardly brought out of it, at, or in an ordinary 'melting, affords ſtore of iron, and unripe Copper-'food, which rub very much the Copper in roaſting, 'and make it unmalleable.

'The richeſt Copper Ores are found in *Hungaria*, '*Bohemia*, *Sileſia*, *Thuringia*, *Haſſia*, and *Voighlan-'dia*; the like is found about *Trantevan*, where it is 'every where in the manner of a float mixed with 'Sand Ore; and where it breaketh vehemently in 'the

'the flat-work, they call that *Slat of Clifts*: they are 'poor in ſilver, and ſuch muſt be roaſted, or calcined: 'in ſome places it breaks in a fair blue and brown co-'lour, or it looks ruddy, of a Copper-glaſs, and like 'unto green-Oker: and ſometimes it is white-goldiſh, 'which is called white Copper Ore. It groweth 'white at an effectual mixture, becauſe at its uniting, 'it aſſumeth or taketh in much of Silver, and of Lead. 'It breaks alſo of a yellowiſh, and lazure-like colour, 'green flinted upon floats and moving paſſages, in 'lime and ſpongeous ſtones. It breaks alſo of a blue 'colour, like blue Oker; is Copper, glaſſy, and flin-'ty, in great and huge rocky and marble paſſages, be-'ing mixed with a white marble. They are rich in 'ſilver, in green flat-ſtones, which are clear and brit-'tle. It lieth dry and green in clifts, open caves, and 'paſſages, like green frogs inſprinkled one in another, 'in a ſtrange manner diſtinct, or parted with ſtrange 'pleaſant colours; which graduated works are loſers 'in half their works; in theſe rocks are ſtrange clifts 'of marble, and of white Veins; yellow flint is in-'ſprinkled, and mixed with Copper paſſages, which 'yield much Silver, have few flowers, are of a ponde-'rous form, break very flinty, of a red glaſs, of a green 'colour mixed with yellow flowers; theſe flints are 'joyned with white gold marble, of a green colour, 'beſide the rocky paſſage. There is found alſo Cop-'per Ore which is rich of Silver, flinty and not white-'goldiſh is of a white ſhining glaſs, mighty in dry hol-'low flat Mines, ſome whereof are mixed with iron or 'ſorts of Wiſmuth, or fire-ſtones. At the one hang-'ing of ſome paſſages, is wrought the *Chryſocolla*, and 'Copper Ore; on the other hanging of the Mine, is 'wrought

'wrought pure flint, all according to the quality and 'condition of the Ore. And it is to be observed, see-'ing that Copper Ores are usually mixed with sul-'phur, easily unite with the nether Metal, and joyn 'with their stones; therefore green flinty copper Ores, 'which carry in the drie Lead slatty passages, a black 'molben, are mineralliſh, and are not rich in silver, 'nor rich in species, encompassed with immature iron, 'and perfect Copper Ore; and some are free of it, if 'far separated asunder from dry mineral slats, are 'richer in Gold and Silver, according as the stones 'take in a good natured Ore, they usually entrench 'upon Gold and Lead Rocks, or Antimonial Ore; as 'also upon Iron and Silver stones. There are found 'also flinty passages, that have their mineral juices of 'Vitriol and Sulphur, some whereof partake of Al-'lom, and *alumen pluvioſum*. These commonly have 'the best and most Copper passages, which are least 'mingled with other Metals, as lime and tartareous 'stones, in which black floats and slats do break, are 'incloſed with green, and are of mild quality: at '*Eiſleben* and *Mansfield*, Miners put there several 'proper names to it very exactly, according unto their 'nature. Miners in *Miſnia* know least how to distin-'guiſh these; the upper part of clay earth they call '*Putredo*, in which the true earth is also; and when 'they come to the stones, they call it the Day-work, 'because they cover all the rest, and turn quite to 'stone. The third place they come unto, they call 'Night-work, because it is easily lifted, and heaved 'one after another, and is pure: then they come to 'the Cave or Hole-work, which must be hollowed, 'and set; here are the stones that must be broken:

'then

'then they come unto the slat, and below that slat, they 'come unto the Sand-Oar, though sometimes it be 'overgrown at the *Leckwerg*, or Hole-work above the 'slat; then they turn unto the dead earth again. Slat 'and richest Copper Ore at the Silver breathing, lieth 'also on the rocky, horn-stony combustible Ores, 'which have their Gold and Silver passages of your 'special kind, among which there are found several 'forms how each of them are discerned. In *Hunga-'ria* and *Carinthia* the passages yield Copper Ores, 'which Copper is very malleable, and is at a dearer 'rate then any is in the whole *Europe*; as their mi-'nerals also, and especially the Vitriol there, is held 'to be the best, as also their Antimony is counted the 'best. The Vitriol hath the best and rarest vertues, 'which is known to true Naturalists, and experience 'hath found the same to be true. I speak something 'now, which if reason and understanding were an-'swerable, many expences, hard work, and good 'time could be saved; and it comes onely from hence, 'because Gold breaks so near it, and of the same Ores 'is found, where that earth is impregnated with 'goldish seed, and make use of the same food in ma-'ny subtile unitings. Minerals in their generating 'qualities, are better supported among perfect Metals, 'where they are higher and more effectual, and are 'best used for both such perfect Metals, in case Na-'ture be rightly imitated, the ancient Philosophers 'have had experience of, and made trials of it. There 'is a remarkable difference found among Minerals 'which have their descent from Gold and Silver Ores, 'and partly from Copper Ores; they are Minerals 'and Metals, each have their particular nature, and

being,

'being, among which ſome Ores look green, and 'bleach at the day, and grow near other Metals; 'but their ſtones are moſt like unto Lead-ſtones, ſome 'whereof are groſſer, ſofter, and harder then others, 'and ſome are more obſcure, dark, muddy, and ſome 'more green, and ſo forth.

De Mineral. Tract. 1. p. 349. To this we ſhall onely add what *Paracelſus* ſaith of this Metal, which is this; 'Copper is generated of a 'purple ſulphur, a rediſh ſalt, and a yellow Mercury. 'Theſe three colours if they be mingled among them-'ſelves, then Copper is produced. But Copper doth 'contain in its ſelf its female, that is, its droſs or refuſe; 'which if it be ſeparated by Art, and the body redu-'ced, then the male doth appear. But this is the na-'ture of them both, that the male doth not ſuffer it 'ſelf again to be deſtroyed, and the female doth not 'any more ſend forth droſs or ſcorias; and they are 'different in their fuſion and malleability, as Iron and 'Steel differ. And alſo if this ſeparation be uſed, 'either of them being ſevered into its nature, there do 'ariſe two Metals different one from another in eſ-'ſence, ſpecies, kind, and propriety. And further 'ſaith, that though commonly the male and female go 'together, yet they ought to be ſeparated.

CHAP.

CHAP. XVII.

Of ſome ſigns where Copper Ore may be found, as alſo of its ſeveral ſorts, and the divers preparations it undergoes ere it be pure.

ATHANASIUS *Kircherus* doth give us theſe ſigns to know where Copper Ore may be found. 1. That where plenty of the clifts and fiſſures of ſtones are, that ſhew of a yellow and blewiſh colour, there is latent Copper Ore. 2. That whenſoever we find ſtones of a blue colour in or among other ſtones of a grey colour, ſhadowed with little Veins of a green colour, then this is a certain token of the beſt and moſt plentiful vein of Copper Ore. 3. That when we ſee the rocks or ſtones in the Mountains to ſhine like Talk, which is nothing elſe but the birth or foliated off-ſpring of a *Marchaſite*, or fire-ſtone, that it obtaineth the next diſcovery of an hidden vein of Copper Ore. 4. Furthermore, when the vitriolate waters flowing from the Mountains, are of a ſomewhat green colour, and of a metallick ſmell, and which cover over the bottoms of the flouds or rivers, with a certain putrid, green, tenuious, and ſlimy matter, as with a skin; it doth ſhew that the Mountains from whence the water comes, are pregnant with Copper Ore.

Mund. Subter. l. 10 Sect. 4. c. 9. p. 216.

Now for the ſorts of Copper Ore, they are twofold, the one when pure Copper is found in the Mine, which is *ſtatim ſuum*, and needs not to be purified by the fire, and the other muſt be refined, and that often ere it be brought into pure clear Copper.

For the firſt ſort which the *Germans* call Rein ge- 1.

Diegen Kupfer; it is affirmed by several experienced Authors, that it is found pure sometimes in the Mines, and needs no purifying with the fire; and so *Encelius* tells us in these words: That there is found pure Copper in the Copper and Silver Mines, that is such of it self, without excoction by the fire. And that sometimes little veins are found implicated with the stones; and sometimes leaves or plates do embrace the stone, and that *Albertus* was ignorant of this. And *Agricola* tells us thus much: That pure Copper was not onely found in its proper Veins, but also in the silver Mines. This (he saith) the Ancients knew not, neither *Albertus*, although that he writ that the most and best Copper was found at *Goslaria*, and mixed with the whole substance of the stone, as it were a *Marchasite*, so he calleth a fire-stone. But *Agricola* saith, If it be found mixed with the substance of the stone, it is not pure; that is to say, it is not *statim suum*, and much less most pure, but is purified by the help and workmanship of the Furnace. But he further saith, I do not know that great masses of Copper, as there hath been found of Silver, have been digged up; but rather certain little masses of a very various figure: to wit, sometimes in the figure of drops or isicles, of little rods, or little rundlets, or globes. Also its most small leaves or plates do cleave to the stones. But this native Copper, for the most part, containeth somewhat of Silver in it. *Wormius* tells us that he had a piece from the Mines of *Osterdale* in *Norway*, of the figure of little masses, laminated plain, consisting as it were of most small grains joyned together, of a rubicund colour, and truly Copper-like, but exceeding brittle. And although it did seem to consist of

De re Metal. c. 13. p. 24.

De natur. Fos sil l. 8. p. 643.

Mus. Worm. l. 1. Sect. 3. c. 5. p. 121.

of most small grains joyned together, by reason of which it was very brittle and friable, yet it did cleave together, and was hardly to be separated into smaller pieces. He had another piece, to which leaves or plates of Talk were admixed. And he saith that very near a kin to this, was that which *Andreas Chiocus* the Author of the *Musæum Calceolarium* calls the true flower of Copper, and did describe it in these words: The true and legitimate flower of Copper is heavy, friable, and of an astringent sapor or taste, growing reddish with a little shining colour, flourishing forth of its proper Mine of Copper, into most small little grains, expressing in magnitude the seed of wild Poppy. *Rulandus* tells us also, some sorts of pure Copper that needed not the fire: 1. Native red Copper free from other Metals, that was found in the Country of *Mansfield* in its proper Veins. 2. Pure, digged forth of the Mines of Silver at *Scheberg*. 3. Red, at *Mansfield*, which contained Silver in it. 4. That which was native and red *Suaceuse in Alpibus Rheticis*, which did contain gold in it. 5. Of its own colour found at *Gishubelia*, cleaving like leaves or plates to a hard stone of a red colour. 6. Of othersome cleaving to an hard stone, of a whitish ash-colour, other cleaving to a flat stone at *Mansfield*, of its own colour; and from *Moravia*, that was *statim suum*. The honourable person Mr. *Boyl* tells us in one of his *Queries* for Minerals thus: Whether any part of the Metal be found in the Mine perfect and complete? (As I have had presented me good valuable Copper, and pieces of perfect Lead, that were taken up the one at *Jamaica*, and the other by an acquaintance of mine, that took them out of the ground himself in *New England*.)

Mus. Calceol. Sect. 4. p. 444.

Lex. Alchym. p. 10, 11.

Philos. Trans. N. 19 p. 337. Q. 50.

2. Britan. p. 767.

2. For Copper Ore that must be often melted in the fire ere it be brought into the form of good Copper; there are divers sorts, some of which kinds were formerly found at *Keswick*, and *Newland* in *Cumberland*, as learned *Camden* relateth at large, and the Work was continued a long time, and much good Copper made there; but now the Work is quite left and decayed: yet I am informed that some do now melt forth as much very good Copper as serveth them to make Half-pennies and Farthings. Some of the Ore I have, which is like a greyish kind of *Marchasite*, glittering with some goldish sparks, and very ponderous. Another sort I have, that seems a blewish kind of stone, with bright sparks of the colour of gold, and exceeding heavy; and I make no doubt, but that if diligence were used, plenty of this sort of Ore might be found in many places of *England*. And Dr. *Merret* tells us, that Copper was digged up at *Wenloch* in *Staffordshire*; and that in the time of *Richard* the Second there was a rich Copper Mine at *Richmond* in the Bishoprick of *Durham*. But now I do not hear of any gotten thereabouts.

Rer. natur. Pinax. p. 208.

Mus. Worm. l. 1. Sect 3 c. 5. p. 121.

Wormius tells us thus much, saying, Crude Copper Ore obtaineth various differences, in respect of its colour, consistence, goodness, and coction. For the most part it is drawn forth of a *Marchasite*, or Fire-stone, or forth of the *lapis sciſsilis*, which I take to be some sort of that which we call slat stones. Among thirteen peculiar kinds (he saith) I find great difference in respect of goodness and fertility, though they all arise forth of a granulated fire-stone, or *Pyrites*. 1. One kind of this golden *Pyrites* is plainly barren, yielding no Copper at all when it is excocted in the fire.

fire. 2. There are two sorts (he saith) whereof an hundred pound weight of Ore doth afford one pound of Copper. 3. Another a pound and a half. 4. Another four pounds and an half. 5. Another four pound and three quarters. 6. Another six pound and an half. 7. Another nine pound and an half. 8. Another nine pound and three quarters. 9. Another ten pounds. 10. Another fourteen pound and an half. 11. Another fifteen pound. 12. Lastly, another sixteen pounds, which is the highest.

1. For several sorts of Ores he reckoneth first that which is yellowish, in which is inserted whole plates or leaves, in an ash-coloured stone, tending to blackness, being very fruitful of Copper, and having particles adjoyned in certain places of a whitish-coloured flint. 1.

2. A purple Ore of Copper, or of a violet colour tending to blue, called of the Miners **Braun ertz**, having little crums or grains of a fire-stone of a golden colour mingled with it; on the other part purple shining Ore mixed with a stone of a grey colour; on the other part it hath more of blue, in the midst of the body sparks of Copper growing whitish, mixed with golden ones. 2.

3. *English* Copper Ore, consisting of a black stone, and hard, in which doth intermingled shine here and there a golden colour. In some places it shineth with the various mixture of black, blue, and golden colours. 3.

4. A golden Pyrites friable, or crumbling, shaped like dice, having certain spots of a purple and hyacinth colour admixed with it. And from *Osterdale* in *Norway* he had brought without square, and shining with divers colours. 4.

5. A

5. 5. A more base Ore of Copper growing blackish, in which is insperſed here and there golden Veins, going unequally through the body of the ſtone. Then alſo an aſh-coloured ſtone, having golden-coloured grains interſperſed in it in courſe, fruitful in Copper, infected on one of the outſides with certain Oker.

6. 6. An ironiſh Ore of Copper, in which a Vein of a ſquare golden fire-ſtone doth ſhine, and here and there portions of rubiginous iron. I have by me very many ſorts of theſe ſquared or diced golden Marchaſites, and ſome of other figures; but whether they hold Copper or not, I have not tried.

The Author of the *Muſæum Calceolarianum* mentioneth theſe four ſorts of copper Ore:

1. 1. One that is red, containing ſome ſilver in it, from the *Carpathian* Mountain, which is moſt fruitful of Metals.

2. 2. Alſo the Ore of copper at *Kepnice* in *Miſnia*, which is not red, but hath a leaden colour, repleniſhed with certain little yellow Veins; for every hundred pound weight of which, by the help of the Furnace, is extracted two and twenty pound weight of Copper.

3. 3. The Ore of Copper from *Inaceburg*, like to a cloven or flat ſtone, of almoſt an aſh-colour, in which little Veins imitating a golden colour, are ſeen growing, an hundred pound weight of which yields twenty pounds of copper.

4. 4. The Ore of copper from *Anneberg* ſhining with a reddiſh colour, forth of an hundred pounds weight of which, the Vein being poor, yieldeth onely ſixteen pounds of Copper. We have enumerated theſe ſeveral ſorts of copper Ores, that the laborious Miners

ners may be better enabled to judge of the ſeveral ſorts of Ores. Now for the ſeveral preparations that the Ore of copper undergoeth before it be made good valuable copper, *Wormius* tells us, thus, ſaying, I have ſix differences in reſpect of the excoction of copper. Muſ. Worm. ut ſupr.

1. Of which the firſt is the crude Pyrites or fire-ſtone it ſelf, of a golden colour, as it is digged forth of the Mine, and rich with copper.

2. The ſecond is of the Ore, burned by the ſpace of fourteen days, or three weeks. For then the maſs is rendred copper-like, of a blackiſh colour, forth of which *viride æs* doth flower.

3. Thirdly the Ore ſo excocted and fluxed, that it is reduced into thick plates, which the *Germans* call **Kupfer-ſtein.**

4. Fourthly, Theſe plates being put into other Furnaces, are burned ſix or eight times, and are carried forth of one Furnace into another, until they acquire a rubicund colour; this they call **Kobber werk.**

5. Fifthly again, it is excocted into a ſpongious and light matter, black and porous, which they call Raw copper.

6. Sixthly, It is melted again, and then becomes pure copper, fit for uſes. So many mutations it is meet that the Ore of copper undergo, before it become pure Copper.

CHAP.

Chap. XVIII.

Of native and factitious Orichalcum, of Corinthian Copper or Brass, and of some other Compositions that Copper undergoes with other Metals or Minerals, and of the Medicines prepared forth of it.

Rer. Deperdit. Guid. Pancirol. Hen. Salmuth. Comment. Tit. 8. p. 26, 27.

That native *Orichalcum* (and not *Aurichalcum*, as though it were compounded of Gold and Copper, which learned *Salmuth* quoting *Scaliger*, doth deny, and that with reason) was digged in ancient times forth of the earth, so produced (as *Salmuth* and *Kircher* do probably conjecture, by some natural commixture of *Terra Cadmea*, or the *Lapis Calaminaris* with it) not as mixed of Gold and Copper, but a certain kind of native Copper, which had the colour and splendour of Gold, or which was like unto Gold. There is little or no mention made of it by the Ancients, except *Pliny* in these words speaking of Copper, that (he saith) was first found in *Cyprus*. *Reperto in aliis terris præstantiore, maxime Orichalco, quod præcipuam bonitatem, admirationemque diu obtinuit; nec reperitur longo jam tempore, effœta tellure.* That there was better Copper then that of *Cyprus* found in other Lands, especially *Orichalcum*, which for a long time obtained the chief esteem in goodness and admiration; neither was it to be found for a long time before the age of *Pliny*. But *Salmuth* saith there did remain of it certain sorts or masses, and many fragments.

Hist. nat. & Plin. l. 34. c. 2. p. 471.

ments. And that it was of so great esteem with the Ancients, that when it was no where to be had, notwithstanding as if it were to be had, it was esteemed more excellent then gold; and gives thereof some notable proofs, that the Inquisitive may find in the place before cited. And *Pancirollus* saith, *Orichalcum* was a Metal of Copper, which was like to Gold. Of which kind (he saith) I suppose the *Toreumata* were: The *Toreumata* were Works embossed in Metal, which the Ancients (he saith) did suppose to be of *Corinthian* Brass; but falsly: for the *Corinthian* Copper or Brass, was a mixture of Copper and Gold. But that these embossed Works of Metal being destroyed or dissolved, had nothing in them of Gold or Silver: and therefore (he saith) he doth believe them to be of native *Orichalcum*. And though *Pliny* thought it lost, yet (he saith) it is manifest that the Lawyer *Martian*, who lived in the time of *Alexander* the Emperour, in the Year 225. did make mention of it as though it had been extant also in his Age. And that *Lattone* or *Orichalcum* (he saith) that they used in his time, was not the native *Orichalcum* of the Ancients, but Copper mixed with certain powders that give it that splendor. And *Scaliger* (who would seem to know all things) and also *Kircher* tell us, that betwixt *Mexico* and *Darien* natural *Orichalcum* was digged up that could be melted with no violence of fire, which did sufficiently demonstrate the truth of the thing.

Ubi supr.

Exerc. 88. Mund. Subter. l. 10 Sect. 4. c. 9. p. 218.

Now for factitious *Orichalcum*, the several ways by Art to prepare it, the Reader may find in the forecited place of *Kircher*, and we shall only mention one way set down by *Wormius* forth of *Agricola*.

Mus. Worm. ut supr.

They put (he ſaith) the fragments of the beſt Copper, and of *Cadmia nativa* (I ſuppoſe he meaneth the *Lapis Calaminaris*) by courſe (or as the Chymiſts ſay, *ſtratum ſuper ſtratum*) into long pots, which being ſo filled, are ſet in hollowed Furnaces, and the fire is kindled, as it were in certain burrows, channels, or paſſages, and when they are molten together, the Copper being tincted with the colour of gold, is changed into *Orichalcum*, which is that we call Braſs, or by ſome *Flanders* Metal. Which is hard, tractable with the hammer, and to be drawn forth into thin plates or leaves, which being tinged with gall, becomes like gold, and is called of *Pliny*, *Aurum Coronarium*, becauſe the Players did uſe it for Garlands and Crowns about their heads; which is that which we commonly call Horſe Gold, uſed for Embelliſhments in Pageants, Plays, Shews, and ſuch like paſtimes. And of this ſort ſome is more malleable then other, and will ſuffer it ſelf to be drawn forth further; and ſome is of a deeper, and ſome of a lighter colour. Again, There is by Art made divers ſorts of this *Orichalcum* or Braſs, ſome that (as I believe) will abide the hammer in ſome meaſure, of which is made fire-tongs, fire-ſhovels, ſnuffers, Mathematical inſtruments, and of many other ſorts and kinds, that I cannot well reckon up. Some that will hardly abide the hammer, but either cleave, or break aſunder, which is called *Æs Caldarium*, and we call it Pot Metal; of which is made Pots, Pans, Chafing-diſhes, Candleſticks, and abundance of ſuch like utenſils, ſome of a fair golden colour, ſome more whitiſh, and ſome more inclining to redneſs, according to the proportion of the commixture. Again, Copper is mixed often

Vid. Albert. Mag. de Reb. Metal. l. 4. p. 352.

often with Iron, Lead, and ſome other materials, of which is made bullets for great Cannon, Bells, and many other ſuch like things. Sometimes they mix a certain proportion of Copper and Tin, of which little Bells for Houſe-Clocks, and little Alarum-bells, and ſome things elſe are made; and thoſe Bells will ſound ſharp and ſhrilly. And of this Compoſition may be made fine Seeing-glaſſes and Burning-glaſſes, if they be well poliſhed and ſmoothed, and made of a right figure and bigneſs, of which I have ſeen divers ſorts. And with a mixture of Tin and Braſs are made Veſſels that appear very like unto Silver: all which Compoſitions and many more of this Metal of Copper, with other Metals and Minerals, we ſhall leave as ſooner to be learned by practice, and ſight, from Artificers and Mechanicks, then from Books and reading. As for the making of Copper white it is practiſed ſundry ways, ſome do it with Talk, ſome with the *Magneſia*, or Cat-ſilver; and that which we have ſeen done, was with *Arſnick* and *Nitre*; the way of doing which may be found in many Authors, as alſo in Manuſcripts, and written Proceſſes; but I do not account the knack ſo much worth, as to be at labour to tranſcribe it. For both Copper when it is whitened, or made *Orichalcum*, or of a golden colour, will with often fluxing, and keeping long in the fire, burn out the Minerals commixt with it, and return to red Copper again as it was.

Now whatſoever common Chymiſtry may boaſt of the medicaments prepared from Copper, as its Sulphur, Tincture, Salt, Crocus, or the like, we have not ſeen, or experienced any that do deſerve any great commendation, and therefore ſhall forbear to ſay any more

more of them. Onely we shall add this; That even Vitriol, such of the blue transparent sort that is brought forth of *Germany*, and commonly called *Roman Vitriol*, and by Quacks, and others, called *Lapis Cœlestis*, which is of great affinity with Copper; nay, indeed the very off-spring of *Venus*; and that which many account the best, that holds the most Copper, is a most noble Mineral, and even of it self affords much help to an expert Chirurgion; for it is one of the mildest Corrosives that an Artist can use for making of Fontanels or Issues, and is far better then any actual Cautery, and serves better then any thing else for stopping fluxes of Bloud, especially in Amputation, or dismembring, where the great Arteries and Veins are laid open. And the Powder of it is very prevalent in cleansing old ulcers and sores, and by its astringency leaves a good ground for breeding new flesh, and healing. The waters of it also are exceeding profitable for many distempers in the Eyes, sore and inflamed mouths, and for all Erysipela's and the like. And the Phlegm, and oyl of it, as also the Colchotar freed from its Salt, will do a Chirurgion much credit in desperate ulcers and old sores, though but prepared by the way of common Chymistry, if he know how to apply them with judgment and discretion. I speak this to encourage young practitioners, having my self had experience of this Mineral for near forty years, in all things that Chirurgery can require properly to use it in. Yet notwithstanding as to Medicines that may be taken inwardly, prepared the common way, I have not seen any such effects by them as may any way answer the high Encomiums that many Authors that write of common Chymistry, do attribute unto them;

them; for except that the oyl or spirit of Vitriol (as some call it) mixed with liquors or Juleps, doth in some measure allay, and abate the heat and thirst in Fevers, and hot distempers, and sometimes to be helpful in Epileptical diseases, I have known or seen little effect by it. The *Vitriolum vomitivum* (I confess) being duely prepared, and purified, is a laudable Vomit against Phlegm, and such like crude humours annoying and over-burthening the stomach; and is a remedy of much efficacy and value against the Worms, and all Verminous generations.

But there are far higher and more noble Medicines to be had from *Venus*, or Copper (if we may trust the writing of *Helmont*, whose veracity and experience few learned men will question or doubt of) then any of those that are prepared by common Chymistry; by the help of that immortal and immutable liquor the *Alkahest*, by which (he declareth) that the body of Copper is totally destroyed, and the external Sulphur and Salt (in which the medical Virtue lies) is separated, and the internal Sulphur that is inseparable from the Mercury, either by Art or Nature remaineth, by which it may be brought into a white metal. But of this as far as by the *Alkahest* the medical sulphur is separated from it, by which that universal medicine called by *Paracelsus* and *Helmont Mercurius Diaphoreticus*, and *Aurum Horizontale*, by mixing with Præcipitate prepared after *Vigo*'s order, is made; we shall give here, as far as concerneth the Copper in *Helmonts* own words, and the rest we shall mention when we come to speak of Mercury; and thus he saith. 'For the Sulphur of *Venus*, after its separation from its body, and arising again, is made as it were a glo-

De Lithiaf. l. 1. c. 8. p. 64.

rious

rious ſulphur, and therefore it tingeth the ſulphur of
'Mercury (which in the powder of *Johannes de Vigo*,
'by corroſive Mineral ſpirits is extroverted) imme-
'diately, and do mutually imbrace themſelves in an in-
'ſeparable bed: and therefore the force of both ſul-
'phurs do then ſtand outwardly. And a little further
he ſaith. 'Therefore the fire of *Venus*, is not the ſpi-
'rit of Vitriol, however exquiſitely rectified: But
'this fire is the volatile ſulphur of the Copper, in form
'of a green oyl, more ſweet then honey, and fully ſe-
'parated from the mercurial body of it Copper. But
'the remaining part of the Copper doth abide white,
'nor ever waxing green with ruſt, as neither any more
'of the number of the ſeven Metals; becauſe it is be-
'come a new and anonymous Metal. But the fire of
'*Venus* cannot be had, except by the full or plenary
'deſtruction of the Copper, and the volatization of the
'mercurial body of the *Venus* it ſelf. Which, how-
'ever it be made volatile in the form of oyl, notwith-
'ſtanding with an eaſie labour, it is after again reduced
'into a white unknown Metal, and extenſible under
'the hammer. But the fire or ſulphur of *Venus* is not
'any more reduced into a Metal by it ſelf, becauſe as
'no ſulphur is a Metal, ſo every metallick Mercury is a
'true Metal. For the Adeptiſts teach, that the ſul-
'phureous part of a Metal cannot be ſeparated from
'its mercurial and metallick body, except by its total
'deſtruction; which therefore (although abuſively)
'they call elemental; becauſe, to wit, in Metals there
'are two ſulphurs; one therefore they deſervedly call
'external, the other internal. But in the propoſed
'terms of Copper (he perſuadeth) to contemplate
'that which is internal, which doth fix the body in
'the

'the white anonymous and mercurial Metal, and ma-
'keth it ductible under the hammer: when otherwiſe
'the Mercury without the Sulphur could never be co-
'agulated into a Metal. But that external ſulphur of
'*Venus*, is that green ſweet oyl which cannot be
'brought back again into a Metal. Therefore the
'*Symmiſtæ* or Secretaries of this Philoſophy, do univo-
'cally teſtifie, that the external ſulphur cannot be ſe-
'parated from its body, no not by fire in imperfect
'Metals, but alſo the mercurial part doth periſh to-
'gether with it. Therefore ſeeing that external ſul-
'phur (ſuch as is drawn forth of Copper) is not ne-
'ceſſary to the perfection of the Metal: but that ſul-
'phur is added of God to the Copper. Therefore it
'is neceſſary that that ſulphur of *Venus* ſhould have
'its ends, conducing to the neceſſities of ungrateful
'man, to wit, for humane infirmities, above all the
'dignity of metallick perfection.

From which we ſhall commend ſome conſidera-
tions to the ſons of Art to revolve over, and ſeriouſly
to weigh them in the ballance of a right underſtand-
ing, and not ſlightly to paſs them over.

1. To take careful notice of the effects of this in-
comparable liquor the *Alkaheſt*, both in working upon
Vegetables and Minerals; for without it no true na-
tural or radical diſſolution can be made of either of
them. Which if they duely weigh with the true light
of a rational underſtanding, it will lead them as a
thread through all the Labyrinths of darkneſs, to the
bottom of the clue, that is the knowledge of the true
ſubject, forth of which it is prepared. Which ſub-
ject is but one in the whole Univerſe, and is common-
ly known, and may (as *Baſilius* ſaith) with great
praiſe

praiſe be had, and is not any particular of the animal, vegetable, or mineral Kingdom, but in it ſelf (though to outward appearance a baſe and deſpicable matter) is of the nature of them all, but not any common or known ſalt, as many deem, nor no kind of earth (except metaphorically ſo called) nor any univerſal or catholick ſalt or water (as many that do think themſelves wiſe do imagine) drawn forth of the air, or the beams of the Sun, but is in a far nearer ſubject: and therefore I ſhall onely mind them of what *Raymundus Lullius* tells us, ſaying; *Nihil ergo convenit rei, niſi quòd propinquum eſt ei ex ſua natura.* And *Helmont* tells us in ſome place of his writings, that things to be diſſolved, are to be diſſolved *per conſentanea ſuis principiis radicalibus.*

Codicil. p.13.

2. 2. We are to note that this fire, or ſulphur of *Venus* when volatized and ſeparated from its white mercurial anonymous body, is in the form of a green oyl, never again to be reduced into a metallick body, and that in this the whole medical virtue lies. And this is doubtleſs the ſame green oyl that *Paracelſus* in his Book, *De Separatione Elementorum*, ſaith is altogether green, and drawn from the body of *Venus* left white, that may be again reduced into a white Metal, that it cannot be known under what ſpecies it falleth. And this queſtionleſs is that green oyl, or *Arcanum vitrioli* that *Paracelſus* ſo highly commends in curing the Epilepſie, whoſe preparation he in many places mentioneth; but according to his wonted manner, tacitely concealeth the *Alkaheſt*, without which it cannot be truly had or prepared. And forth of this green oyl was prepared that rare ſoporiferous Medicine which he calls *Sulphur Anodynum Veneris*, of excellent

C. de Metal. p.7,8.

De Morb. Ament. l. c.1. p.575, 576.

lent vertue, ſo that it would ſopifie, pacifie, or cure a whole troop of diſeaſes: Of which, and other metallick Sulphurs, he gives us theſe enſuing commendations. And that (he ſaith) I powerfully regard or look into the ſulphureous remedies of Minerals, to wit, into the ſulphur of *Venus*, *Stibium* or *Antimony*, and eſpecially into the ſulphur of the *Glaura Augurelli*, which Nymph hitherto doth want another proper name. For theſe kind of Sulphurs, becauſe they are farther diſtant from humane Nature then the whole company of Vegetables, and in the mean time do obtain notable gifts from God the giver of them; ſo alſo they moſt fully and pertinaciouſly reſiſt, that from the digeſtive faculty they bend not into the Commonwealth of Aliments, and therefore they do preſerve their native powers free and unbroken, to wit, the *Craſis* or temperament of the Minerals doth remain whole or compleat, and more fit to diſperſe their ray into *Duumviratum*, the ſeat of the Soul. For hitherto the ſulphur of Minerals under *Vulcan*, or the Fire, do obtain their higheſt complement of the intention of Phyſicians. Therefore I exhort young *Tyroniſts* or Freſh-men to deſpoil ſulphurs of their ſtrange and virulent force, under the cuſtody of which verily the vital fire is hidden, leading the *Archeus* moſt pleaſantly into deſired ends. For there are certain ſulphurs, to which being corrected and perfected, the whole company of diſeaſes do hearken: whoſe plurality as it were is contracted into the unity of the *Archeus*, as into the fiſt of a man fighting. From whence we may note:

In verb. herb. & lap. l. p.577.

1. That the farther a Medicine is from being changed, or brought into aliment, the more it is to be ac-

counted Medical, and may more vigorously spread its rays to the very center of the diseases.

2. The chief point in curing diseases, consists not so much in the purging of humours, as in the pacifying of the *Archeus*.

3. That the chiefest medicaments for curing the generality (if not all diseases) consists in mineral sulphurs, especially when they are despoiled of their strange and virulent force, which every Artist ought to labour to attain unto.

4. That one of these chief sulphurs is this of *Venus*, before spoken of; another is the sulphur of Antimony, which doubtless must be prepared by the Alkahest; for those two sorts that are prepared by common Chymists, whereof the one is fixed by a *Lixivium* or *Alcali*; and the other volatile, of another way of preparation, though they will do some pretty things, especially that which is volatile; yet come they far short of the vertues of that of *Helmont* and *Paracelsus* preparations: for this sulphur I take to be his *Tinctura Lili Antimonialis*, and account it one of the *Arcana's* of *Paracelsus*: for he saith, In the third place is the tincture of *Lili* also Antimonial, almost of the same efficacy with the former (which is his *Mercurius Vitæ*, which is the off-spring of the whole *Stibium*) although of less force. The last Mineral sulphur that he most respecteth, is that of the *Glaura* of *Augurellus*, which hath no other proper name; and what Mineral it is, many make a great doubt; and truly all I dare reveal of it is, that it is a very common and known Mineral, and of a metallick root and principle, if not the very root of all Metals and Minerals: but I would not have the Reader suppose that I mean it to be (as many that think

Arcan. Parac. p. 790.

think themselves very knowing, do imagine) native Mountain *Cinnober*; for I must assure them it is not, for that is not the root of Metals, as the *Glaura* is. But it cannot be better known then by that apposite description that learned *Augurellus* hath given it. To which I commend the curious Student, and Searcher, and to compare it with what *Paracelsus* hath said, and also *Helmont*, of the *Metallus primus sive masculus*, and the *Electrum minerale immaturum*; and to consider whether they be all one Mineral or not; for I cannot, for many reasons, discover it any further; and I am sure here is sufficient for those whom God will direct to know the secrets of Nature in the mineral Kingdom.

3. We shall here with *Helmont* wish all ingenious Students, and Searchers after Natures Secrets, seriously to consider of, and ponder this white anonymous Metal of Copper, after the external sulphur is separated from it, that it remaineth a true and real Metal still; and that the external sulphur of Metals is not anatically homogeneous, nor essentially necessary to the constitution of that which may be truly called, and is a Metal. And if they heedfully weigh this, and compare it with what *Helmont* elsewhere saith of common Quick-silver; that all of it hath in it less or more of an external Sulphur, that may be separated from it: as also with what *Paracelsus* saith in the forecited Book of *The Separation of Elements*, that though the sulphurs of the seven Metals being separated from their mercurial parts, and are of divers colours, which he there describeth; yet that the mercurial part of all, or any one of them, doth after that separation remain white, and may be reduced into a metallick body, which cannot be known of what species any of them

them are of. If this be well considered, it will manifest that the Adeptists were not men led by Opination and fansie, (as many that would seem Masters of no little Learning, do vainly dream and object) but men that fundamentally and experimentally understood the nature of Metals, and the subject they writ of, otherwise then thousands that are, and have been rigid censurers of them and their Works; but blind men are not fit to judge of colours. And further, if all Metals when divested of their external and combustible sulphurs, be and remain Metals still, although of a white colour; as appeareth plainly from the unquestionable experience and authority of these two persons; then let the Artist and Learned consider what is the difference among them one from another. Is it specifical, or only gradual? Let them speak that are fit to judge, and by this those that can understand and take it, may perceive what that transmutation is that the Philosophers speak and write of, and will open to the Learner the true way he is to walk in, and the real end that Alchymy aims at. And above all it will open the reasons of that most assured and true maxim of theirs, which is, that *omnia metalla in suo interiori sunt Sol & Luna.* Compare this with what we have said before of the Hematine Metals of Gold and Silver. So we will conclude this tedious discourse of this Metal, willing the Reader to look upon what *Sebastian Munster* hath said in his Geography, concerning Copper and its kinds; and so we shall descend to the next of the harder sort of Metals, which is Iron.

Geograph. c. de Arc p. 8.

CHAP.

CHAP. XIX.

Of the descriptions of Iron, its Ore, or Mine, Operation, Stocks, Flotes, and Passages.

THe other imperfect Metal, famous in its hardness, called of the *Greeks* Σίδηρος, of the *Germans* **Eisen**, is a metallick body consisting of little Mercury, and much fixt Sulphur, abiding ignition long, and very slowly fusible, easily contracting rustiness, of a something whitish livid colour. *Rulandus* gives it thus. 'Iron is a metallick body, much livid, 'little red, hard and participating of a whiteness not 'pure. For if a fixt earthy sulphur be commixed 'with *Argent-vive* fixed, and earthy, and both these 'be not pure, but of a livid whiteness, if the sulphur 'bear sway, it becomes Iron. In brief, if the *Argent-vive* shall be porous, earthy, and impure, and the 'sulphur also impure, fœtid, and earthy, and of a fixt 'substance, Iron is generated. *Paracelsus* saith of it 'thus: But on the contrary, Iron is generated of a sul- 'pher, Salt, and Mercury; of all the least fluxible, 'contrary to the nature of Tin and Lead; and is coa- 'gulated into an hard Metal, and is coupled in it self. 'For in one two Metals are conjugated, to wit, Iron 'and Steel: Iron is the female, and Steel the male. 'And this conjugation is like to that wherein Gold and 'Silver, to wit, the male and female, do also grow up 'together. So they may be separated one from another, 'the female into her sex, and the male into his also. 'And the male may be imployed to its uses, and the 'female

Musf. Worm. l. 1. Sect. 3. c. 6. p. 123.

Lex Alchym. p. 206.

De Mineral. l. 2. p. 348.

Last Will and Test. c.6.p.92, 93, &c.

'female also to hers. *Basilius Valentinus* gives us its 'description, and the manner of its Ore lying after this 'order. Iron-stone and Iron Ore is wrought in its 'Mine-stone, according to the heavenly influence of '*Mars*. For he is *Trinus Magnus*, the great Lord of 'War, and an instrument whereby others are forced 'and compelled: of an hard earthly impure sulphur, 'of putrefied Salt, and gross Mercury; which three 'principal pieces in their juncture mix much of earth-'liness, therefore it is a difficult labour to mollifie Iron 'with, or in the fire, carrying much of impurity, by 'reason of its sulphur; and above other Metals, it hath 'a deep, red, quick Spirit, which if it be taken from '*Mars*, then is the Iron gone also, leaveth again a 'putrid earthliness. Iron is not easily mixed or joyn-'ed with other Metals, or united in the casting. Iron 'hath a threefold partition, and several parts in its 'earthly Ore, namely a magnet, a quick metalline 'Ore, which hath its quality from quick Mercury, and 'must hold communion and affinity with Iron, must 'be quickned and renewed with Iron filings, in which 'he lieth like an Hedge-hog, and is indued of *Sol* in 'Nature with glorious gifts and Adamantine vertues; 'at one place and side it attracteth, and at the other 'side it refuseth; which vertues may be augmented 'and increased in it. A true type of just judgment, 'it sheweth after the Sun the true hour in the body of 'the Compass, by Water and by Land.

'Secondly Steel, the hardest and purest, most mal-'leable Iron, of its proper light draining place, where-'in it lieth close tied and knit together in all its parts 'most compactedly, which in all Iron-works is usual-'ly put to the edge and point.

'Thirdly,

'Thirdly, there comes the common Iron Ore, or-'dered together by its earthly sulphur; which three 'ministred good thoughts to the first expert Natura-'list, that Master of Mine-Works, *Tubal-Cain*, who 'made his three principles in all things, and made his 'dimensions in the Mines in three parts, in which such 'metalline Ore was: he found at first the Iron-stone 'wrought in several ways, namely upon standing pas-'sages, and floats, fallings, and proper pieces tinged 'after the four Elements, and colours of the Rain-bow. 'Then he considered exactly its flowers, according 'to the condition of each stone-work, how and out of 'what the Iron may most conveniently be melted, and 'what manner of instruments may be used thereunto, 'where it may best and most fitly be wrought; for 'its Ore affords a threefold ferocity and wildness, 'which are useful; as namely, Glass-heads, which are 'like a sharp blood-stone, breaking in the manner of a 'skull, are scaly, and brown spissie. Secondly, The 'brown stone out of which is made Glass, and iron-'colour. Thirdly, Granulate iron-filings in the float 'work; which is so hard, that it can scarcely be forced 'to be gotten off, or be brought to right; and when the 'iron-stone is come to its perfectness, then it breaketh 'off by piece-meal, through the Stone, and Rock, that 'there are found whole mines of iron-stone, such is the 'Iron Ore in *Styria*. The best iron-stone is black, or 'red-brown, sometimes it inclineth to a yellowishness, 'some is of a Cherry-brown in the floats and stocks, 'some are black, and small spissie, some yellowish, 'which glittereth among the rest, like a Copper stone, 'of a brown black marble, and of a fair Glass; some 'looks like separated float work throughout the whole

'Mine,

'Mine, ſome is cloddy and hoary in clayiſh fields;
'which only is called the driving, is as the ſand-ſtone,
moſt hurtful unto Gold, becauſe it affordeth moſt of
the ſlacks, and very little of Iron. Some ſticks in
the grey clay, which affords moſt malleable Iron,
'but is of a browniſh colour. There breaks alſo good
'iron-ſtone in tartareous and limy Mines; and the
'moſt running is on the ſtanding paſſages, in criſty
'ſandy Dalk ſtones. The groſs cliſt ſtones break
'ſome in their ſlats. It uſually breaks alſo in the fore
'and after Mine-works, where ſome of it lieth off-
'waſhed among the Roaſts, like a brown earth, and
'on the day there is no Ore ſo common as the Iron-
'ſtone; becauſe it aſſumeth, and taketh in other
'Ores, and ſetteth it thorough: thus often it changeth
its colour and nature; after it there enſues Glaſs-
heads, Hemaſites, Brown Stone, Oſemund, Bolus, to-
'gether with the Red Oker, and Iron-ſhell, all theſe
'aſſume the nature of Iron; and the Iron-ſtone re-
'ceiveth the higheſt Metals, Gold, Silver, Copper, Tin,
'Lead, whereby it groweth untoward; but Gold and
'Silver are not hurtful unto it, they make it malleable;
'that which is mixed with Copper, or with other poor
'Metal, eaſily falls aſunder, is brittle; of the ſame
'condition is Iron flint, producing out of many paſſa-
'ges an huge flint, partly porous like unto a black ſlat,
'which beſide the Iron-ſtone, yieldeth another groſſer
'or ſubtiler Iron. Thus the Iron-ſtone is aſſociable
'unto other ſtones, be they metalline, or mineral. At
'*Musbach* there is Copper ſhot Iron, which hath a
'Lead joyning thereunto. Founders muſt be expert
'to deal with ſuch Ores in their melting. Iron-ſtones
'have in many Countries decreaſed, all other metal-
'line ſtones are upon their decay, onely Gold, Silver,
'Copper, and Lead, keep their multiplying condition
'all the World over.

Chap. XX.

Of the ſeveral ſorts of Iron-ſtone, or Ore, and of Medicines prepared forth of this Metal.

OF Iron there are two kinds, one which is native, being found ſuch in the Mines, the other that which is excocted. The pure Native Iron, that is found ſo, of the *Germans* called **Gediegen Eiſen**, (*Wormius* ſaith) is found in the Mine, either like grains, or a maſs. That which was like a maſs (he ſaith) was found in many places in *Norway*: one kind ſharp, rough, and very porous, tincted without with ruſt; but when it was broken, the genuine colour of Iron did ſhine forth, which alſo within a ſhort time would be covered with ruſt. And that he had lately received ſuch like clods or pieces from *Iſland*. That he had another mineral piece, whoſe third part was the beſt and pure Iron, of which he had a little ſquare portion of the length and weight of an ounce. That it was black, porous, and compounded of ſmall lamels or plates unequally, being diſpoſed like unto Talk, and while it was turned towards the Sun, would ſhew a Violet colour. That there were many other pieces ſhewing the beſt Iron, for the moſt part black of colour, and ponderous, which did not ſtand in need of a

Muſ. Worm. l. 1. Sect. 3. c. 6. p. 23.

Lex Alchym. p.208.

longer deſcription. We ſhall add ſome ſorts of pure native iron to theſe, named by *Rulandus*.

1. Pure Iron, of its own colour, found in its own Vein or Mine, in a white flint.

2. Pure Iron found in *Styria* in the ſand of the Rivers.

3. A vein of Iron at *Giſhubeliah*, of a liver colour, ſolid, pure, and ponderous.

Theſe are the ſorts of Iron found pure, that we in particular can find recorded by any Authors of credit, which may be ſufficient to clear the matter, that pure native Iron may be found, which we commend to all inquiſitive Miners to ſearch after, that they may be able to ſatisfie themſelves, and others of the truth in this particular, ſeeing we have ſeen none ſuch to aver it of our own knowledge.

Now for the ſeveral ſorts of Iron-ſtone, Ore, or Earth, (for there are of all theſe ſorts, that yield Iron plentifully) there are ſo many named by Authors, and alſo ſuch plenty and variety found in his Majeſties Dominions, that we account it needleſs to enumerate them, being ſo commonly and vulgarly known. Only we ſhall ſay thus much, that of thoſe ſorts that we have, or have ſeen gotten in *England*, ſome are of a black colour, and ponderous; ſome more brown, and reddiſh; ſome more yellowiſh, and ſome of a grey whitiſhneſs, that all yield plenty of indifferent good Iron. The Veins or Ore of Iron, when they are excocted, do melt ſo that they may be poured out, which when it is cooled, the droſs and recrements being removed, it is heated in the fire, and doth grow ſo ſoft, that it may be beaten with the hammer, and doth ſuffer it ſelf to be extended into Plates, and ſometimes into very

very thin ones, as are thoſe that are after covered over with Tin, and called commonly *Long-lane* Tin, and Plate; of which are made very many utenſils for houſhold, and divers other uſes, though they laſt not long, but the Tin weareth from off them, and then the Iron ruſteth, and ſo they ſoon decay. But Iron thus excocted and depurated, is not all of one ſort or goodneſs: for ſome is very tough and limber, which is accounted the beſt; ſome is Copperiſh, rough, or brittle, and frangible; of which they make bullets for Cannons, and cannot commodiouſly be beaten forth with the hammer, but is burſt, and therefore accounted more baſe. Another ſort holds it ſelf in a middle manner, and may in part be beaten forth with the hammer in great Works, in part not. But we here in *England* do for the moſt part make choice of Iron according to the ſeveral uſes men intend it for, and ſo ſometimes chooſe *Engliſh* Iron, ſometimes that which was brought from beyond the Seas, and both of theſe of divers ſorts, which are better known to the Merchants and Mechanicks that work in this Metal, then to me. Now for Steel, which *Paracelſus* makes but the male, and Iron the female; ſome make it to have a proper Vein, or Ore of it ſelf, others to be but the pureſt part of iron, drawn from the other that is more droſſie and earthy: Of which *Wormius* ſaith, Of Iron more often molten and purged, is made Steel; which alſo is brought forth by nature in ſome certain places. Elſewhere Iron is often being hot extinguiſhed in certain waters, that thereby it may be made very hard, but ever thereby loſeth much of its weight.

Muſ. Worm. ut ſupr.

Rulandus tells us, that a pure Vein of Steel, was

Lex. Alchym. p.448.

found in *Voidtland* near to *Fichtelberg*, and alſo that it was excocted forth of a Steel Ore, as alſo drawn forth of pure Iron. Our Workmen at the Forge do uſually diſtinguiſh it into two ſorts; one they call *Coldſel*, and another *Redſel*.

Laſtly, as to this point I ſhall onely mind the Worker in this metal of a paſſage in *Diodorus Siculus*, an ancient Author, who tells us; That the *Celtiberians* did thus prepare Iron to make their weapons of War of. For they hiding Iron plates in the earth, did ſuffer them to be there ſo long, until the weaker part of the Iron was waſted, and the ſtronger remained. Then of that they made Swords, and other Arms for the uſe of the War. To theſe thus made, all things or Arms would yield, that neither ſhield nor helmet, nor any other Armour could reſiſt them. And I have known ſome that have found old ruſty Knives that had long lain in the earth, that being grinded anew, would cut better then the beſt new Knife that could be found. But this I leave to be conſidered of by Artificers.

H.ſt.l.5. c.9. p.145.

For the medicaments that are by common Chymiſtry prepared forth of this Metal, they are either uſed in outward applications in Chirurgery, or are inwardly adminiſtred. For thoſe that are uſed externally, as the *Crocus martis*, it will in ſome meaſure help to ſtop ſmall Hæmorhages or fluxes of bloud by its conglutinative quality, or help phlegmatick and watery ulcers by deſiccation. Alſo there is an oyl made ſometimes of it, with the help of Salt Armoniack, that is a very fierce and painful Corroſive, but will (for thoſe that can abide it) cleanſe rotten and filthy ulcers, and painful and virulent ſcabs: but this that ſeemeth of

of an oyly ſubſtance, will with long keeping decay; and the Salt will ſeparate it ſelf in the form of Water, and leave the parts of the Steel, as a red earth, or Crocus; becauſe it was but a forced confuſion or mixture, and not an homogeneal union, nor any true oyl from the Steel, but wrought by the ſharpneſs and pungency of the Salt, more then by its own nature, except ſome of the atoms of its Salt might commix with the Sal Armoniack. But there is another oyl of *Mars* to be prepared according to the order ſet down by that learned and experienced Chirurgion, *Felix Wurtzius*, which appeareth in the true form of an oyl, and will ſwim upon the top of water; that will much honour a Chirurgeon in curing malignant and deſperate ulcers.

Now for the medicaments prepared forth of it by common Chymiſtry, neither the *Crocus* for aſtringency, or ſtaying fluxes, nor the *Aperitive Crocus* (as they call it) for opening obſtructions, will perform half ſo much as they have been commended for. But I rather extol the *Sal martis* (if prepared by a careful and expert Chymiſt), then either of the two former; a Medicine that ſome of the moſt learned Phyſicians that *England* had; have much praiſed, and have gotten both profit and credit by it. And I am confident that thoſe medicaments drawn forth of this Metal, ſo extremely extolled by *Baſilius* and *Helmont*, were not had but by the help of their univerſal diſſolvent or *menſtruum*, though they do not openly declare as much. For the later of them ſaith thus. And that nothing doth ſo equally glorioufly work upon the radical moyſture, as the firſt *ens* or Being of Copper; nor that is more benigne, or beneficial to long life, then

Butler. p 594.

then the ſulphur of Vitriol, which notwithſtanding doth indigitate the ſulphur of the Philoſophers. Compare this with what we have before written concerning the ſulphur of *Venus*.

Laſtly, *Mars*, though moſt vile in price, and deſpiſed by reaſon of a numerous iſſue, notwithſtanding is not reputed by *Paracelſus*, the laſt in a war-like nature. Let this be ſeriouſly conſidered of, and examined.

Chap. XXI.

Of the deſcription of Lead, its Ores, Mine, Condition, and ſtriking paſſages.

NOw we come to the ſofter Metals, of which Lead is the moſt ſoft of any that is in an hard and coagulated form (not to mention Quick-ſilver that is fluid) and is by the *Latines* called *Plumbum nigrum*, to diſtinguiſh it from Tin, which they called *Plumbum album*; and from *Biſmuth* or Tin-glaſs, which they called *Plumbum Cinereum*, becauſe of its colour. And many accounted theſe three ſorts to be all but Lead, and ſo to differ but in ſome degrees, accidents, and the like: but omitting this opinion, we ſhall handle them as diſtinct Metals.

And this Metal which they called *Plumbum nigrum*, the *Germans* call ſimply **Bley**, and we Lead, without any other addition, and of *Rulandus* is thus largely deſcribed. Lead is a metallick body, livid, earthy, and ponderous, participating of a little whiteneſs, and hath much of an earthy ſubſtance, and is turned into Tin by lavation, or waſhing. From hence it is manifeſt that Tin is a certain thing more perfect then Lead. And Lead hath more of the ſubſtance of fixed ſulphur to its compoſition then Tin hath. For Lead is an impure body, imperfect, procreated of *Argent-vive*, not fixed, earthly, and feculent, a little white in appearance, but red in ſecret, and compounded of ſuch a like aduſtible ſulphur in ſome part. It wants purity, fixation, colour, and ignition. And to this doth *Encelius* agree word for word, as though *Rulandus* had tranſcribed it from him, as in likelihood he did. *Wormius* deſcribeth it thus: Lead is an imperfect Metal, ſoft, livid, ponderous, not ſuſtaining the fire long, infecting the hands of thoſe that handle it with blackneſs, generated of much crude Mercury, and impure and fœtid ſulphur, and comes neareſt unto Gold in weight and gravity. And *Cæſalpinus* ſaith: For Lead doth imitate Gold in heavineſs, and giveth forth no ſound, therefore they call it mute. I deſire thoſe that have opportunity, exactly to try whether it come near to Gold in weight or not, for I much doubt of it.

It is not amiſs here to give the differences betwixt white Lead, or Tin, Biſmuth, Tin-glaſs, or aſh-coloured Lead, and this common Lead, which they call black Lead; according as *Agricola* hath ſet them down: who ſaith; The white Lead or Tin, before it be poliſhed, doth ſhine much; but poliſhed, much more; the aſh-coloured much leſs, the black not at all. The white is more perfect and precious then the black, the aſh-coloured holds the mean betwixt them. The black is moſt eaſily melted, and doth not long indure in

Lex. Alchym. p. 263.

Muſ. Worm. l. 1. Sect 3. c. 7. p. 124.

De Metal. l. 3. c. 7. p. 180.

Lib. Foſſil. 7. p. 644, 645.

in the melting-pot, nor conserve its species, but is partly changed into that which we call the Spume of Silver, partly into that we call the foam of Lead, or *Molybditis*. The black is soft, and therefore most easily handled, and dilated with the hammer; the white is more hard, the ash coloured most hard of all. The white is tough, the black fragile, the ash-coloured most fragile of all. The black doth not give forth any sound, the ash-coloured doth sound, the white doth make a noise or crash. The white is light, the black is ponderous, the ash-coloured keeps a mean betwixt them. The vapour of Vinegar doth make Cerus's both of the white and black, being corroded. That white is made of the white, or of Tin, is called *Spanish* White, that which is made of the black, is called white Lead, or Cerus's. Also of the black being burned, or calcined, is made a sort of artificial Minium, sometimes of an high red colour, which we call red Lead; and sometimes of a lower yellowish red, which we call *Calx Saturni*. The white hath more of driness, the black more of moisture. Therefore of the ash-coloured and the white, without the mixture of the black, vessels, or utensils can hardly be made; but with the mixture of the black they may be made easily, as are many and sundry sorts, and all our common Pewter. There is also made of Tin by calcining, a Powder which the Artificers call *Putty*, of great and excellent use for burnishing or polishing any instruments made of Iron, Steel, Copper, Brass, Glass, and the like. As also a very fine curious powder of a yellow colour, called *Masticot*, of singular use for Painters. Also that which we commonly *Litharguron*; adding, because that some of it is of a white silver colour, and some of a more

Vid. Agricol l. Fossil 9 p. 651.

more red-goldish colour, that it is Litharge (and that, to speak in *English*, is but stone-silver, or stone of silver) of Gold and Silver, when it is known to all experienced persons, that it is nothing of Gold or Silver, but onely the Lead, that in the separating of the Silver from it, is by the force of the fire, and the Bellows blown into, and (being cooled) hardened into those lumps like stones, and may all or the greatest part of it, be again melted down into Lead as it was before. Now we shall shew something what *Basilius Valentinus* saith of this Metal, its Ores, and the manner of their passages in the earth.

Last Will and Test. c. 7 p. 95, 96, &c.

The Lead Ore (he saith) is wrought under that heavenly impression of the black and cold *Saturn*, by an undigested waterish Sulphur, impure Mercury and Salt. First, there is wrought generally a brittle glittering Lead colour in that Ore, which is called Glass Ore (the *Germans* call it **Glantz ertz**, because being broken, it is smooth and shining, though *Agricola* rejects the reason of this appellation of his Countrymen; but without reason, for they call it not by this name because of its transparency, but because it is smooth, and shining, as that which we call Pottern Ore is) breaking in many rocks, containeth Gold and Silver, yields gross and lasting Mine-works. Some Lead-stones are very broad, because Glassie Ores are mixed with it, with flints, or marchasites, partly they are glassie, red-goldish, white-goldish, silvery, Copper-glassie, and of Copper. Some Lead Ores turn to a blue colour, mixed with a white transparency, like unto a shot Bolus; some is like unto the Stone-salt and Allom; some are of a dark green like unto green floats, which lie gritty in a yellow or Glue-coloured clay;

ſome are of a brown black, ſome are yellow-red like Minium, ſome is pure and compact, ſome is inſprinkled and moving, ſome is mixed with Iron, ſome with Silver and Lead, ſome are mixed with Marbles and Flowers, ſome breaks alſo upon ſtanding and level moving paſſages, and ſome is wrought in pieces here and there in ſlate Mines, where black Lead lieth along through the whole Mine, ſome is Glaſſie in Lime-ſtones, and ſome is very rich of Silver in huge marble paſſages. There is a two-fold Marble; the ſilver paſſages have an earthly mixed groſs marble, white, red-goldiſh, red-glaſſie, and ponderous. But the Lead paſſages have a ſubtile light, and glaſſie brittle marble, which looks like the glaſs upon Gold Mine-works, is of a curious white glittering quality.

Lead Ore is wrought ſeveral ways, and the colour of it changeth after the manner of the Ores, eſpecially in the ſorts of Glaſs Ores. For if *Saturn* lieth below, or is in ſubjection unto others, then the Glaſs hath no power to bring *Saturn* unto *Saturn*, an imperfect mineral, which either is too hard or elſe untoward; and the *Nodus* of *Venus* is a *Miſpukel*, or a mixture of Lead, and Silver, which is knitted very hard; but if ſoft, then it is Water-lead glaſs, of the which is found in Gold juices, and Tin Ores, a kind of Iron-glaſs, or Iron-mole, but is heavier and more brittle then Iron-glaſs, by reaſon of its terreſtreity or earthlineſs, which keeps in the Metal, and is neither too ſoft nor too hard, and is glaſſie, white-goldiſh, red-goldiſh, and falls into the beſt metalline Ores. True Lead-glaſſes and Ores afford half, or the third part of Lead, mixed with ſome other Metal, and if one of the other

other Metals be found in the Glaſs, which keeps the predominancy, then Lead paſſages are ſimply good, and Lead is united with Gold, and theſe are mixed ſtones; for the Stones of Mine-Ores are more wonderful in their ſingular accidents.

Thus is here the Lead alſo in its fall, and bleak, after the heavenly impreſſion, which the Higheſt hath ſo indued, that it is ſubject to other Metals, and is the ſupreme Finer in the eſſential fruits of others. It eaſily mingleth naturally with other Metals, and the qualities of other Ores, together with the leaves, bulk and roots, into other ſtones of Earth. And *Saturn* in his degree and power is the higheſt, in a ſingular diviſion of all his Works, in which he ſheweth himſelf in a clarified tranſparent ſoul, runneth into Antimony with its ſweetneſs, which ſhould merely imbrace the Gold: This is done ſo, not without a cauſe, for in its ponderoſitie it yieldeth the lighteſt remedy to all melancholy and heavy bloud. As heavenly Aſtrals are ſeveral, the clouds under them are of all ſorts of colours; ſo the one Lead is purer and more malleable then others, as that in *England*, and at *Villach*; it is ſeen in the Lead-ſtones alſo.

For Lead Ores which are mixed with other ſtones, eſpecially with ſuch as contain Silver, Iron, or Copper, yield much of light ſtones and Lead work, which are pickt out for ſeparating, and the rather if they be rich of Gold. Such worthy Metals there are in *Hungary*; leſs pains are taken about them in their fining mineral flints with their unripe juices in the weak joynings of Lead Ore, unite the Saturnal Glaſs; if without any mixture, affords to Potters a green glazure, if all be not melted into Lead: but if you get a

brittle mixed flint, there the glass is half upon Iron, and such that are most pliable afford melting glass, for fining such sturdy wild Ore, which will not melt. Artists may prepare such Saturnal glass, mingling with it a small quantity of metalline flowers, which will look as fair as if it were a natural one. There may be extracted from Lead an effectual medicine for Mans health.

If slate Ores are found with another mixture, there are generated most fix and firm Copper, Vitriol and Calamy also, as they are at *Goslar* in *Harlynia*. The best Lead is in *England*, and at *Villach*.

Man cannot well be without any of his members; Metals according to Gods Ordinance are of the same quality, if Man knew to make good use of them; for Nature hath provided richly for him in that way; if men work these ignorantly, what utility can they have of them? Of the metalline Soul is made a chain which linketh together the junctures of Gold and Silver: these are indued with a special spirit, which is distilled into a Water, through a transparent head. Nature congealeth under ground in the passages such Water into Ice, for a sign that there is at hand a Vein of Lead, and Silver, or of pure Lead; and if there be a mixture of other Metal about it, it is the better.

The best Lead passages are such Waters, blue, scaly, Talky, slate stones and fluid streaked Marbles at length, or curled insprinkled ones, and not wrapt or wound about with moving passages, almost not unlike unto Silver Ores. Some Lead Ores are of a white, scaly, Talk-slate, full of wild Granats, in which Lead Ore doth appear, which is rich of Silver.

If the Reader think we have been tedious in transcribing so much forth of *Basilius*, he may very well believe it was not done without cause, neither in respect of the common Miner, nor of the mystical Philosopher, for there is matter enough for them both, if they seriously weigh it, and can penetrate the depth of his meaning, which I commend to them both heedfully to ponder and judge of.

Chap. XXII.

Of the several sorts of Lead Ore, their Coats and Matrixes, and of Medicines prepared forth of this Metal, and of such things.

Lead hath such several sorts of Ores, and is accounted so base a Metal, that few Authors have given description of them. But we shall note such as we find, and add those several that our own Country yieldeth.

Lex. Alchym. p. 365.

Rulandus reckoneth these: 1. Lead Ore, of its own colour, but impure.

2. A vein of Lead among the *Ubil*, that is whitish like unto white Spar or Fluor, that is not pellucid.

3. A Vein of Lead that is like to transparent Spar, or Fluor, which is very rich; for forth of an hundred pound weight, they draw above sixty pound of Lead.

4. At *Caldeborn*, like unto ash-coloured Marle.

5. Like unto a white Sand-stone.

6. Like unto a metallick flint, in which little veins of live Sulphur appear, and forth of *Poland* mixt with native Oker.

The

The experienced *Ercker* enumerateth theſe ſorts.

Lib. Mineral. 4. p 113.

1. That which the *Germans* call **Glantz ertz**; and it is commonly called, or rendred Glaſs Ore, or Glaſſie Ore, that is, that hath a fine ſhining gloſs, and is ſmooth; not becauſe it is tranſparent as Glaſs: and this is often rich, and holdeth more then half Lead.

2. Alſo a white Lead Ore, which they call **Wieſs Bley ertz**, like unto a Sand-ſtone.

3. Alſo a red Lead Ore, which they call **Rot Bley ertz**.

4. Alſo yellow Lead Ore, mixt with grey; alſo found in Pebbles, which they call **Rieſs**.

For the Ores of Lead that are gotten in *England*, they are very many and of divers ſorts, Mr. *Boyl* reckons theſe, Frim Ore, Steel Ore, Pottern Ore, &c.

And I ſhall number up ſome of the ſorts that I have either ſeen, or that I keep by me.

1. And firſt, That which the Workmen commonly call Potters Ore, becauſe therewith (being beaten to powder) the Potters do glaze their pots, of a greeniſh, pale blewiſh, or browniſh colour: and this Ore is hard and brittle, of a fair ſhining glaſs or gloſs, and is (as I conceive) the very ſame that the *Germans* call **Glantz ertz**, and is eaſie to be broken with the ſtroke of a ſtone, or hammer, and doth commonly break into ſmaller ſquare pieces; wherefore ſome of our Miners do call it Dice Ore: and this is generally the moſt rich of Lead, and eaſie to be molten.

2. The Ore that they call Steel Ore, either of its blackiſh dark colour like Steel; or becauſe of its hardneſs, being more hard then any other ſort of Lead Ore, and very ponderous, and ſometimes containeth ſomething of Silver in it, and is ſo hard to melt, that they

they are fain to mix two or three ſorts of the ſofter Ore with it, to make it run, or melt the more eaſily, and this oft containeth ſtore of Lead in it.

3. The Ore that they call Frim Ore, is that which is very brittle, and will almoſt crumble with the hand like a Sand-ſtone, of a whitiſh or grayiſh colour, and ſometimes of other colours, and holdeth not ſo much of Lead as the former.

4. Soft-Ore, that is near the colour of Lead it ſelf, and is far ſofter then any of the former; inſomuch that ſometimes in beating it bruiſeth, and ſpreadeth abroad with the hammer, ſo that the Workmen are fain to mix much of the harder ſorts with it, otherwiſe they could not get it beaten ſmall enough for their purpoſe; and this ſort often containeth good ſtore of Lead.

5. There is Ore of Lead that lieth inſprinkled in Spar, Cauk, or grayiſh ſtones in ſmall grains of a bright colour like ſilver, and yet containeth very little of that Metal in it, but holdeth very well of Lead; and of this ſort there is very much gotten in theſe Northern parts, and ſo there is of all the other ſorts.

There is beſides theſe named, which may have many ſubdiviſions, and are of exceeding great variety, a ſort of Ore found in the Lead Mines, that looks well, and in appearance is like other Lead Ore, but yieldeth no Metal at all, but being mixt with good Ore, doth rather hurt and conſume it. And this the Workmen (if they mean to melt their Ore themſelves, and not ſell it) pick forth, and ſeparate it from the good Ore: but if they mean to ſell the Ore when beaten and waſhed, then they beat and mix this with the good Ore, and oftentimes Spar or Cauk beaten with it,

it, which this kind of barren Ore will in the washing colour of a leadish hue, and so doth augment it in bulk and weight; but then it yields not so much Lead in the fusion, as in proportion the Ore would do, if it were separated from it. And this kind of barren Ore our Miners commonly call blue Blindake, and I judge it to be the same that the *Germans* call **Blend**, which they say is barren, and containeth no Metal in it all.

Here it cannot be amiss to say something of that which we commonly call Black-Lead, because it discoloureth the hands far more then common Lead, and is that whereof Pencils are made for Painters and Scriveners, and many other such like uses. In the North we usually call it Kellow, and some call it Wadt; of which there is still a Mine near *Keswick* in *Cumberland*, which is opened but once in eight or ten years; either by reason of its scarceness, or to keep up the price of it, of which learned *Cambden* saith thus:

Britan. p. 767. Here also is commonly found that mineral kind of earth, or hardned glittering stone (we call it Black Lead) with which Painters use to draw their lines, and make Pictures of one colour in their first draught: which whether it be *Pingitis* or *Melanteria*, spoken of by *Dioscorides*, or Oker, a kind of earth so burnt with heat, that it becometh black; or whether it were unknown to the old Writers, I cannot certainly aver, and let others for me search it out. But I am perRer natural. P nix. p. 218. suaded with Dr. *Merret*, that the Ancients had no perfect knowledge of it, however they left us no clear description of it, nor no peculiar name for it, and therefore he not unfitly stiles it *Nigrica fabrilis*.

The Ores that are commonly gotten in these parts lie

lie either dispersedly, which some call floats, some loose or shaken Ore; and this is for the most part in black bituminous earth, or in yellowish red clay (which some call the Brown Hen, and then say her blue Chickens are not far off) Marle, and among small stone; or in a continued course, or line, which some call strings, some veins, which commonly lead to a greater stock or trunck; and these are enclosed sometimes in one sort of Coat or Matrix, and some in another. In *Darbyshire* these commonly lye near the Lead, Cauk, Bastard Cauk, Black Chert, Wheatstone, Sheaf. In these Parts most usually in Spar, or in Cauk, or in Flints, Slates, and other kind of Stones of divers colours, but most what of a grey or ash colour. The Spar is something transparent, the Cauk not so, but more ponderous, and both help the fluxing of the Ore. Ut supra

For Spars which the *Latines* call *Fluores*, the *Germans* **Fluss**, they are Stones found in the Mines like unto Gems, but less hard. The Miners call them *Fluores*, because with the heat of the fire, as Ice by the Sun, they melt and flow. And they are the rudiments of Gems, and the like, and are of these sorts. Lex. Alchym. p. 217, 218.

1. Of a Red colour, and seem at the first view crude red silver Ore, although this be sometimes translucid. They look also like Carbuncles, but though perspicuous they shine more faintly. And those that are not transparent, are by that distinguished from Carbuncles; but the *Fluores* or Spars, as soon as they feel the fire they flow; but Carbuncles will not melt with the fire.

2. Of a dilute purple colour. They look like the more greenish Amethysts, such as are found in many

places in *Bohemia*, and are not very much unlike them; and therefore many are deluded by them.

3. Of a white colour like Cryſtal.
4. Of a yellow colour like a Topaz.
5. Of an aſh-colour.
6. Of a very black colour.

And of all theſe ſorts, and ſome more, he reckoneth many diverſities and differences both in colour and figures. To whom and *Wormius* we refer the Reader.

As for Spars or *Fluores* either tranſparent or not, I ſhall recite ſome ſorts, ſuch as I have in my cuſtody.

1. And firſt I have divers ſorts that are white, and very tranſparent, like the coarſer ſort of Cryſtal, and in ſome of them the Rudiments, as it were, of Diamonds growing in them, finely angled, and more bright then the Spar in which they ſeem to grow.

2. I have ſome that is black as Jett, with fine angled and pointed Diamonds, (if I may ſo call them) of the ſame colour, that notwithſtanding the blackneſs, will againſt the light ſhew a kind of luſtre, or reſplendency.

3. I have Spar purely tranſparent, that is of a fair blue sky-colour, very delightful to the eye.

4. And ſome of the very colour of the Amethyſt, that if poliſhed, and ſet in Rings with a right ſoyl or water, were able to deceive a very skilful Lapidary.

Now though we have ſpoken ſomething before concerning *Gur*, that is a peculiar mineral juyce, and little know nor enquired after; we ſhall here add ſomething concerning the *Medulla lapidis*, or *Lapidea*, which the *Germans* call **Stein marck**; ſome of which is agreeable to the *Gur*, or of its nature, and ſome of a different temper; of which ſorts *Rulandus* reciteth theſe.

1. Of

1. Of a white and fluid kind, which was found in the Rocks of *Torgenſe*.

2. A ſort that is white and fatty, found in the ſame place.

3. A white metallick matter growing in the Veins of ſilver, which when it is firſt taken forth, it is in colour like liquid Cheeſe, but forthwith in the air it waxeth hard, ſo as notwithſtanding, being holden in the mouth, it melteth like butter.

4. A ſort that is a metallick ſubſtance moſt white, fat, and ſoft, found in the Iron Mines of *Sachſenfield*; and in touch not unlike to that which is called Soap-ſtone or Earth.

5. A red ſoft matter, found in the Mines of *Rochlicenſe*, which they uſe with great profit, in ſtead of *Bole* of *Armenia*.

Laſtly, As for Medicaments prepared forth of Lead, there are ſome ſtore uſed in Chirurgery, as Litharge of both ſorts, Ceruſs, Red Lead, *Plumbum Uſtum*, and the like, which are common and vulgar.

For Medicaments prepared forth of Lead by common Chymiſtry, I know none of any value, (and that by the opinion of the moſt of them, except *Hartman*, not to be taken inwardly) is that which they call *Saccharum Saturni*, which I confeſs in inflammations and the like diſtempers, will do very handſom and commendable things. But yet if we will believe *Ripley*, *Lully*, and ſome others, we might be induced to believe that in this Metal there are contained far more noble ſecrets and Medicines: For *Lully* tells us this in few words. *Scire debes quod ex plumbo Philoſophorum extrahitur oleum quoddam aurei coloris, vel quaſi, cum quoſi lapidem mineralem, vel mixtum, vel animalem*

Epiſt. Accurtat. P. mihi, 371.

lem poſt fixionem primam ſolveris tribus vel quatuor diebus, vel vicibus, excuſabit te ab omni labore ſolutionum, & coagulationum. Ratio eſt, quia hoc eſt oleum occultum, quod facit medicinam penetrabilem, & amicabilem, & conjungibilem omnibus corporibus, & augmentat ejus effectum ultra modum ſic, quod in mundo hoc, ſecretius eo non eſt. But there is a learned French Author (who for ſome reaſons we ſhall not name) that deſcribeth the drawing of an Oyl of extraordinary vertue forth of this Metal, and giveth *Lully*'s words in a ſhorter ſenſe thus. *Ex plumbo nigro extrahitur oleum Philoſophorum aurei coloris vel quaſi, & ſcias quod in mundo nihil ſecretius eſt eo.* This is enough for thoſe that do, or can underſtand, and therefore we ſhall add no expoſition. And *Ripley* ſaith thus;

XII. Gates Prefac.

An Oyl is drawn out in colour of Gold,
Or like thereto, out of our fine Red Lead.
Which Raymond *ſaid, when he was old,*
Much more than Gold would ſtand him in ſtead.
For when he was for age nigh dead,
He made thereof Aurum potabile,
Which him revived, as men might ſee.

Compare this with the Latine quoted by the aforeſaid *French* Author, and with the Latine ſet forth by *Combachius*, and ſome paſſages in *Ripley*'s *Medulla*, and then (perhaps) the truth may be more apparent. But that we may ſharpen the appetite of the ſtudious ſearchers into the ſecrets of myſtical Chymiſtry, we muſt affirm that neither the ancient Poets nor Philoſophers did ſpeak ſuch great things of *Saturn* and his off-ſpring, without juſt and great cauſe, whatſoever the

the moſt cenſorious Critick may ſay to the contrary; and the reaſons are ſufficiently known to the Secretaries of Nature, and for others they may be as well contented with the Huſk as the Kernel. And that I may put thoſe that are inquiſitive into a more ſerious ſearch in this particular, I ſhall commend unto them one *Stanza* of that which ſpeaks Sir *Edward Kelley* a learned Adeptiſt, and not ſuch a perſon as *Weaver* in his Funeral Acts and Monuments would perſonate him to be, miſtaking the one born in *Worceſterſhire*, for the other born in *Lancaſhire*, and hardly to be reconciled by any near touch of Chronology, nor other circumſtances; who after he hath ſpoken candidly enough to the Sons of Art, ſaith thus:

Theat. Chym. Brit. p. 333.

Remember alſo how the gods began,
And by deſcent who was to each the Sire,
Then learn their Lines and Kingdoms if you can,
Their manners eke, with all their whole attire.
Which if thou do, and know to what effect,
The learned Sophies will thee not reject.

But to knit up this diſcourſe (which ſome may deride, which we ſhall leave to their own extravagant fancies) we ſhall give you the teſtimony of two eminent perſons, of the ſecrets contained in this Metal. And firſt that of *Paracelſus*, who though a dark Author (as many account him) yet few come more cloſe to the mark, whoſe words are theſe, where he maketh *Saturn* ſpeak of himſelf: *Mundo minime foret utile, ſi cognoſceret, aut ſaltem crederet, quidnam in me lateat, efficereque poſſim: utilius foret, ſi mecum id, quod poſſum facere calleret: Alchymiſtarum artes omnes deſere-*

Cœl. Philoſ. p. 122.

rens, hoc solo, quod in me est, & per me fieri potest, uteretur.

Butler p. 594. Lastly, to bring up the Rear, as a most stout Champion, we shall give the witness of the experienced Adeptist *Helmont*; who having shewed the difficulty to obtain medicaments forth of Gold, Silver, common Mercury, saith thus: *Sunt ergo præterea quatuor Metalla, quæ facilius ductui, & optatui artificum parent. Adeo ut non frustra Paracelsus glorietur, solo plumbo, forte ducentas morborum Classes superari posse.*

Chap. XXIII.

Of the description of Tin, of its Ores, Operation, Stocks, Floats, Fallings, and striking Passages, and the like.

IT seems that betwixt the *Stannum* or Tin of the Ancients, and that which later Authors call *Plumbum album*, White Lead, which now is taken to be our common Tin, there are many that have made a difference. But if there were any such thing, it is now unknown, therefore we shall say nothing of it, but proceed to that which is commonly known by that name, which *Wormius* thus describeth. Tin is an imperfect Metal, soft, and consisting of a plentiful Mercury, less fixed, and of a white impure Sulphur; of more difficult fusion then Lead, scarcely contracting rust, and will ring, or make a sound.

Musf. Worm. l. 1. Sect. 3. c. 7. p. 124.

Rulandus thus, Tin is a metallick body, white, not pure,

pure, livid, participating of little earthliness, of *Argent-vive*, pure fixt, and not fixt, clear and white in its outside, and red in its inside, and of such a sulphur, it onely wants decoction or digestion. Lex. Alchym. p. 445.

Basilius writeth thus of it. Tin Ore is wrought in a Sand-stone, having its influence from *Jupiter* above, wrought of a dark brown purple coloured, grayish, black, shining mercurial salt, and some sulphur mixed with it, interlined with an unkind gross sulphureous fume; all these incorporate together, making the body of Tin. This unkind fume is the cause of the brittleness of Tin, and maketh all other Metals that are melted with it, unkind and brittle. This Tin or Quitter groweth or breaketh in a threefold manner, *viz.* it slideth, it is full of fumes, and it groweth in pieces. It hath a threefold wildness also, as Shoal, Flint, and Iron-mold, which causeth Lead-works. Their colours are black slate, brown, and yellow. These Sand and Quitter Ores, are environed or inclosed in mighty broad standing passages, which appear to the day with Quitters: some contain also rich paint-work, some of these flints must be calcined, some are mixed with store of Talk and Cat-silver, which is a food unto Quitter, and loveth to stay there; some there are which groweth in a Glimmer, or Cat-silver, and is Iron-mold; others also do strike in a Fire-stone or Flint, so that fire must be applied thereunto, others are in a soft stone, and as it were swimming along: some are richer then others. That which groweth pure, and in black small stones, and heapeth together that natural work, that giveth the greatest gain. And because *Jupiter* is the potent Lord of it, therefore it hath a mighty Throne and seat, that is, a mighty huge Mine- Last Will and Test. c. 8. p. 99, 100.

Mine-Ore, out of which Tin is made by heaps, and is of that nature and property, that it preſſeth outward, and bloſſometh to the day, thruſteth off Soap-work, whence come the waſh-works of Tin-Soap. For Quitter doth not grow in the ſand of Earth, beſides in its body it is removed further from the ſeat of its Throne to the Foot-ſtool, maketh for it ſelf a two-fold dominion; in one it bordereth, and reacheth to ſlates, and other ſtones that lie about it, inſomuch that his dominion increaſeth; in which is not a little, but much on the blue ſtones, fallings, floats, paſſages, ſhoals, and clifts, which incline one upon another, and do joyn. Many times a mighty Tin-ſtone is wrought, which ſinketh down among its own cinder and ſlate, and at its ſinking purgeth it ſelf, and there come other fumes like clouds, which at all ſides ſhoot into, and then breaketh again as good as ever it did before; and it is of that good condition, that it deſpiſeth no lodging, nor paſſeth by any; but as poor and as deſpicable the ſtone is in that place, be it red, brown, freſh, or ſtale, broad or ſmall, it will preſs into, and mingle it ſelf with it, and will not be forced out of it, making it ſelf great, little, groſs, mild, tame, ſubtile, and pliable, even as the reſt will have it, and all this in a natural way. It loveth to border upon Silver, and Iron-ſtone, that Tin and Iron be united in a mighty fixt Silver and Copper Ore; all which are found at their ſeveral marks. Tin Ore is in this place better and malleable; if found afar off from flint-paſſages, and are leſs mingled with Iron-mold, eſpecially of Copper-ſtones, which in calcining can hardly be ſeparated, proves Lead work, without any fair glaſs. Some of it is ſo mild and ſoft, that when

when they are cleared, and calcined, ſtill loſe ſomething; for flints and ſulphureous matters which are volatile, and cannot indure any great heat, corrode ſomewhat of the metalline Tin, which appeareth by the white thick fume, at the calcining. They are calcined thus hard by reaſon of Bake-Iron, elſe they might yield as much again, for they loſe extreamly in calcining. It is ſtrange to ſome why they ſhrink together to ſo ſmall a quantity, being they get a greater quantity of Lead, with good Qwitter, at firſt brought out of the Mine.

As for the ſeveral ſorts of Tin Ore, I find little mention of them in Authors, onely Doctor *Merrett* ſaith that the Mine-men in *Cornwal* and *Devonſhire* do diſtinguiſh their Tin into that which they call Pyran, Murdick, and Block Tin, and that they call their Tin-ſtones Shoad. And the learned Mr. *Boyl* doth tell us, that ſtore of excellent Tin is ſaid to be found in ſome parts of *Cornwal*, at the ſides, and in the channels of running waters, in grains like Sand or Gravel, which they call Corn-Tin.

Rer. natur. Pinax. p. 208.

Philoſ Tranſ. n. 19. p. 337.

Now for the Tin Mines in *Cornwal* and *Devonſhire*, which have been ſo ancient, that it may well be an argument that Nature neither decays, nor that Minerals ceaſe to grow, take what learned *Camden* ſaith in theſe words. The Inhabitants do diſcover theſe Mines by certain Tin ſtones lying on the face of the ground, which they call Shoad, being ſomewhat ſmooth, and round. Of theſe Mines or Tin-Works, there be two kinds, the one they call Load-Works, the other Steam-Works. This lieth in lower grounds, when by trenching they follow the Veins of Tin, and turn aſide now and then the ſtreams of water coming in their way:

Brit. Cornw. p. 185.

That other is in higher places, when as upon the hills they dig very deep pits, which they call Shafts, and do undermine. And a little after he ſaith, There are two ſorts of Tin, Black Tin, which is Tin Ore broken and waſhed, but not yet founded into Metal, and white Tin that is molten into Metal; and that is either ſoft Tin which is beſt Merchantable, or hard Tin leſs Merchantable. And again: That the ancient *Britans* practiſed theſe Tin-works (to omit *Timæus* the Hiſtorian in *Pliny*, who reporteth, that the *Britans* fetched Tin out of the Iſle *Ictis* in Wicker Boats, covered and ſtitched about with Leather) appeareth for certain out of *Diodorus Siculus*, who flouriſhed under *Auguſtus Cæſar*. For he writeth, that the *Britains* who inhabited this part, digged Tin out of ſtony ground, and at a low Water carried the ſame in Carts to certain Iſlands adjoyning.

Now I ſhall give the Reader ſuch informations as I received from one *Thomas Creber* of *Plimpton St. Mary* in *Devonſhire*, who was one (and all his Anceſtors before him) that had wrought in the Tin-mines; and theſe particulars I had from him.

1. The Hills where they get Tin Ore, near that place where he lived, are called *Yelsborrow* and *Woollack*.

2. Black ſtones that hold Tin, they call Tin-ſtones, and lie either in a load, or in a ſtring.

3. There is other Tin Ore that is ſofter, and lies in a dun ſtone, and is of a yellowiſh colour, but will melt neer both alike.

4. Pure Ore, which they call Corn Tin, being found in grains, and is the hardeſt to melt.

5. Another place they call *Armed Pit*, which holds Ore

Ore they call *Zill Tin*, which is as ſmall as Grit or Sand, and needeth nothing but waſhing, and is the moſt eaſily melted of all other ſorts of Tin Ore, and lieth in Chalk and Clay; and this ſmall Ore, becauſe it is rich, they call it fatty Ore.

6. The black ſtones, if they find them at the top, do continue in the whole Mine or Work. Sometimes it is in that they call ſtrings, running through earth, or ſtones, like ſmall twigs or ſtrings: and ſometimes it is all in one, like a great branch or trunk, which they call a Lode. Sometimes it runneth in Spar, ſometimes in a black ſtone that will ſtrike fire, ſometimes in white ſtones that are ſoft.

7. Their ſmelting houſes roofs, after certain years they pull down, and find ſtore of Ore in that ſtuff, that in their former meltings was forced from the fire.

8. The Corn Ore is found at the bottom of the Hills, being there digged into, and lieth ſometimes in one ſort of earth, and ſometimes in another. And the Zill Ore is found in the ſame order.

9. The uppermoſt part of their Work they call Cooping; and if it be good or rich, the Lode or Strings underneath are good: If bad or indifferent, thoſe underneath, are ſometime good, and ſometime bad.

10. They call that part of the mineral, that is found waſhed down, or otherwiſe brought down into the Valleys, Shoad.

11. They have a thing they call Mundick, ſometimes found in the Ore, which they ſeparate leſt it ſhould ſpoil the Ore; ſome of it is yellow, which is the worſt, and ſometimes of other colours: and the Mundick after ſmelting the Ore, is blackiſh and hard. Of it Mr. *Boyl* ſaith thus. Mundick I have had of a fine

Philoſ Tranſ. n. 19. p 317.

fine golden colour; but though it be affirmed to hold no Metal; yet I found it in weight, and otherwise, to differ from Marchasites, and the Mine-men think it of a poysonous-nature.

12. They have a thing they call *Maxy*, mixt with the Ore, which cannot be separated by the water, but by the fire, and then smells very ill, and is of a blewish colour.

13. Lastly, They also find something like bright Ore, which they call *Shim*.

And thus much of this Metal, seeing there is no need to speak of any Medicaments prepared forth of it, because I have not had experience of any such.

CHAP.

CHAP. XXIV.

Of the several sorts of Mercuries according to the Mystical Philosophers, or Adeptists.

THough I may be censured variously by several sorts of men for intermeddling in such a mysterious and high a subject as this Chapter importeth; yet without valuing them, I shall lay open some things that have not been much noted, or understood by many that think themselves sufficiently knowing in these matters, and leave them to those, that with me do understand the Authors from whom I have these things I now treat of; being assured that these things are not for those that are led by fansie and opination, but for those that are understanding, and the genuine Sons of *Hermes*. I find in the heedful and diligent search of the Writings of that profoundly learned, and experienced person *Paracelsus* (*absit invidia verbis*) that he understood four several sorts of Mercuries, which we shall rank in this order, and so handle them.

1. There is the Mercury of the Philosophers, which is a thing in a various sense, *Mercurio vulgi communius*.

2. There is that which he calleth *Mercurius Corporis*, which is made *astraliter* by the Tincture forth of another Metal, as when Lead, Tin, or Copper is transmuted into true running common Mercury, or Quicksilver; or it may be (as *Libanius* recordeth of *Kelley*) that common Gold is changed into Quicksilver; Rer. natur. l. 9. p. 113.

ſilver; of which he thus ſpeaketh. *Sic etiam Mercurius Corporis è metallo alio factus aſtraliter, multo nobilior, & fixior eſt Mercurio communi.*

3. There is *Mercurius Metallicus*, or *Corporalis*, that is extracted, drawn and ſeparated from the perfect or imperfect Metals; as is that mercurial part of Copper mentioned by *Helmont*, after the external and combuſtible ſulphur be ſeparated from it, which may be reduced into a white and anonymous Metal; and this not to be had but by the help of the Alkaheſt.

4. The vulgar Mercury, or common Quick-ſilver.

And of two of theſe we ſhall ſpeak, to wit, of the Philoſophers Mercury, and of common Quickſilver.

1. 1. Concerning the Philoſophers Mercury, we would admoniſh the ſtudious ſearcher after Natures Secrets, that theſe kind of Authors did not write to ſuch ends and purpoſes as the moſt of other Authors did, plainly and openly to reveal their Art; for it was not lawful for them ſo to do, and that for weighty reaſons known to themſelves, and not fit to be divulged. But to declare the truth in riddles and parables; therefore let them take this rule from a learned Author, who ſaith thus: Let a Lover of Truth make uſe of a few Authors, but of beſt note, and experienced Truth; let him ſuſpect things that are quickly underſtood, eſpecially in myſtical names and ſecret operations; for truth lies hid in obſcurity, nor do Philoſophers ever write more deceitfully, then when plainly, nor ever more truly then when obſcurely. And therefore *Geber* tells us, *Ubicunque aperte locuti ſumus, ibi nihil diximus, ſed ubi ſub Ænigmate aliquid poſuimus, & figuris, ibi veritatem occultabimus.* Again, Let

Arcan. Herm. p. 168.

Let the ſtudious Reader diligently mark, in what points they agree in, for there neceſſarily the truth is to be found, for Concord is the ſtrongeſt evidence, and Truth conſiſts onely in unity. For *Trevi-ſan* ſaith, *Conſideravi potius quibus locis, libri maxime convenirent in eundem ſenſum, ibidem exiſtimavi latere potiſſimum veritatem, quæ non poteſt in pluribus, ſed in uno tantum exiſtere: hac viâ mihi facta eſt obviam veritas: In quibus enim maxime convenire videbam in unum, hoc ipſum fuit, quod tam anxie quæſieram.* Laſtly, obſerve this. Let the ſtudious Reader have a care of the manifold ſignification of words; for by deceitful winding, and doubtful, yea, contrary ſpeeches (as it ſhould ſeem) Philoſophers vent their myſteries, with a deſire of keeping and hiding, not ſophiſticating or deſtroying the truth. And in nothing have they been more dark and obſcure, then about this that they call their Mercury, which they have made manifold; four ſorts of which we ſhall onely handle.

Bern. Treviſan. de Alchym. p. 756.

Ut ſupr. p. 188.

1. They do ſometimes call perfect Elixir, and colouring medicine their Mercury (though with ſome impropriety, as to other appellations of it, being perfectly fixt, and not volatile) becauſe of the likeneſs and great conformity it hath with heavenly Mercury, or with the Planet ſo called, which accommodateth it ſelf, to the nature and quality of every thing it is joyned withal. The like this uncertain Elixir worketh, for that being tied to no proper quality, it imbraceth the quality and diſpoſition of the thing wherewith it is mixed, and wonderfully multiplieth the vertues and qualities thereof. And in this ſenſe for the moſt part the Philoſophers underſtand it, and not in reſpect

respect of common Mercury, or its volatility. For *Sendivogius* saith thus: *Dicitur Mercurius propter ejus fluxibilitatem, & uniuscujusque rei conjunctionem, non propter essentiam, assimilatur sulphuri propter internum calorem, & post congelationem est humidum radicale.* For the Philosophers Sulphur or Tincture before Fermentation is (in this sense) truly mercurial and universal; but after it be fermented, that universality is determined, and specificated according to the nature of the Metal with which it is fermented, and so it is no more an universal, but a particular. *Et ante fermentationem tamen est catholica ac universalis vere, & in omnia sublunaria agit universaliter, & catholice. Post fermentationem autem est specificata ad naturam metallicam.* And again; *Et est vere universalis ante fermentationem, post eam specifica.*

Nov. Lum. Chym. Tract. 6. p. 320, 321.

Theatr. Chym. Vol. 4. p. 471, 472.

2. There is another matter which they call their Mercury, which is the most universal that is in nature, and forth of which in the first creation all specificated bodies were produced, and still continueth both the efficient and material cause, and matter of all generations, and productions, and this they called Hyle or Chaos, and *Raymund Lully* the *genus generalissimum* of all things. And doubtless was no other then *Aristotles materia prima*, first Essence, or first Element, which few of his Interpreters understood, and many others derided, as though because they did not know it, therefore others did not: when indeed that learned *Grecian* understood much, that in his Writings he opened but darkly, and therefore however the proud and ignorant may scoff and jeer, we do affirm that there is such a matter *in rerum natura*: though in some respects it be a truth, that it is, *neque quantum, neque quale, neque quid, neque quicquid eorum, quæ cernuntur*; and this the ancient Sages knew and understood well enough, and sometimes called it *Anima Mundi*, or *Spiritus Catholicus*, and by many other such like names. And it is of this that the learned Lord of *Nuysement* epitomized by *Combachius*, writ that learned Treatise, *De vero Sale secreto Philosophorum, & de universali mundi spiritu*: who saith in one place thus; *Ego vero tracto de materia universali nondum specificata, quæ proprie materia prima hujus materiæ primæ metallicæ appellari potest, tanquam generalissimum genus generum, à Raymundo Lullio adeo celebratum.* And as the Philosophers did understand this to be the first true matter of all things, so they had an universal matter that was mineral, from whence all Metals did spring and arise; so that by allusion and comparison, they often expressed the nature of the one by the other; which many (and they very learned too) not discerning the confounding of these two together, have often taken the one for the other, and so have both been deceived, and also deceived others; of which thing learned *Ripley* giveth us this caution:

De sal Philos. c. 4. p. 158.

In the beginning when thou madst all of nought,
A Globous matter, and dark under confusion
By the beginner marvellously was wrought,
Containing naturally all things without division,
Of which thou madst in six days dear distinction.
As Genesis *aperily doth record,* (*Word.*
Then Heaven and Earth perfected were with thy

The 12 Gates Prefac. p. 122, 123.

So thorow thy will and power out of one mass
Confused, was made all things that being is;
But in thy glory afore as Maker thou was,
Now is, and shall be without end I wiss;
And purified souls up to thy bliss
Shall come a principle, this may be one,
For the declaring of our Stone.

For as of one Mass was made all thing,
Right so must it in our practice be;
All our secrets of one Image must spring,
In Philosophers books therefore, who list to see,
Our Stone is called the less World, one, and three.
Magnesia *also of Sulphur and Mercury,*
Proportionate by nature most perfectly.

Here the careful Reader may observe, not onely the description of this matter that he calleth Globous, known, and understood of so few, as also the comparison of it, to the matter of their great Stone.

3. The matter forth of which they prepare their artificial Water, they call their Mercury; which thing Nature hath produced ready for the Artist to begin his work withal. And though it be conversant before the eyes of all the World, and be a common known despicable matter, yet it is one of their greatest secrets, which they have most hid and veiled, and the most difficult for an Artist to know, that this is the true subject that he must begin to work upon. But when it is truly known, men will rather wonder why they knew it no sooner, then at their knowing of it after they do understand it; for the Ancients have declared the proper marks and tokens so fully, that hardly

hardly can it be done more largely, except they should in plain and vulgar words have named it, and said this is it: which hath caused divers of the later Adeptists the more to obscure it, and to put their Readers into the greatest dubitation about it. This is it that they have called their metallick seed (and indeed is really so) and have given it so many various names and descriptions, according to its furthest, midd, or near nature, that without divine assistance, or a faithful Master, it is hardly to be comprehended, or known. Therefore *Sendivogius* tells us, *Semen Metallorum vel minerale creat natura in visceribus terræ, propterea non creditur tale semen esse in rerum natura, quia invisibile est.* And, *Minerale semen à Philosophis cognoscitur.* And again, *Semen Metallorum tantum filii doctrinæ noverunt.* And *Combachius* saith, *Metalla similiter suum habent semen, sed hoc videri non potest nisi a veris Philosophis, qui illud ex subjecto suo proprio magna industria extrahere norunt, quanquam illud etiam facilius ratione concipi, quam corporis oculis videri possit.* Here if thou understand, I have said enough; if thou dost not, I have said too much.

Nov. Lum. Chym. Tract. 6. p 318, 319.

Tract. de Sal. Philos. p. 7, 8.

4. The last sort of their Mercuries that we shall name, is that which by the Artist is prepared forth of their true and proper matter, and is as *Lully* often tells us, never left prepared by nature, but must be made by the Artist. And of this, thus *Sendivogius* speaketh in his practice: *Sed hoc admonitus sis, ne accipias aurum & argentum vulgi, nam hæc sunt mortua, accipe nostra quæ sunt viva, postea pone in ignem nostrum, & fiet inde liquor siccus; primum resolvetur terra in aquam, quæ Mercurius Philosophorum dicitur, & illa aqua resolvit illa corpora solis & lunæ, & consumit ea*

Nov. Lum. Chym. Tract. 11. p 332, 333.

ut non remaneat nisi pars decima, cum una parte, & hoc erit humidum radicale metallicum. From whence note:

1. That first they have that which he calleth their Fire, into which their *Sol* and *Luna* are put, and this their Fire is a Water; for their Water is a Fire, and calcineth the bodies of *Sol* and *Luna* more then common Fire can do; according to their maxim, *Vulgus cremat per ignem, nos per aquam*; and this is that Water which *Helmont* calleth *ignis Gehennæ*, and *ignis-aqua*, which he calls an immortal and immutable liquor, and is (notwithstanding the opinions of all men to the contrary) the very same that he and *Paracelsus* call their *Alkahest*, and was that very Water by which *Helmont* and *Raymund Lully* fixed common Mercury, and is by *Lully* called *Aqua Cœlica*, *Aqua Lunaria*, *Menstruum vegetabile universale*, and *Aqua ignis*.

2. To note that their *Sol* and *Luna* are not the Gold and Silver of the Vulgar, for they say *aurum nostrum non est aurum vulgi, neque in colore, neque in substantia.*

3. That after their earth be dissolved in their Fire or Water, then it is called the *Mercury* of the Philosophers, and so doth but at the best differ gradually when the earth is dissolved in it, from the Fire or Water that did dissolve their earth.

4. That this Water doth dissolve those bodies of *Sol* and *Luna*, and consume them, and then it is *humidum radicale metallicum.*

5. Observe that in saying there remaineth but the tenth part with one part, he truely teacheth the proportion of the earth and water in this conjunction, if thou canst rightly understand him.

Lastly,

Lastly, He tells us of this Water thus much in another place. *Et hoc vobis dico, quod opus est rem quærere aliquam, quæ occulta est, ex qua fit (miro modo) talis humiditas, quæ aurum sine violentia seu strepitu solvit, imo ita suaviter & naturaliter, sicuti glacies aquæ calidæ beneficio liquescit, si hoc inveneritis, habetis rem, ex qua aurum à natura productum est: Et quamvis omnia metalla, & res omnes ex illa ortum habeant, nil tamen ita amicatur ei, sicut aurum, nam aliis rebus adhæret impuritas, auro autem nulla, propterea instar matris est ipsi.* Compare this with the former, and seriously consider of it, for there is much hidden and couched in it. Æniq. Philos. P 351.

From whence we may consider the reasons why they use this propriety in calling all these Mercuries theirs, or Mercuries of the Philosophers; and those chiefly we conceive to be these two following:

1. The most of these (or at least two of them) are called theirs, because Nature hath not brought them forth in that perfection that the Philosophers desire and stand in need of. But it is the Philosophers Skill, Art, and Industry, that exalts them to this preheminence, which Nature had not contributed unto them, and therefore are truly and properly called theirs, for none but true Philosophers indeed can bring them to that height of perfection.

2. The other universal Mercury or Hyle, hath not its vertues and excellencies known to any but to true Philosophers, who well understand the nature and qualities of it. And that other Mercury which Nature produceth of it self without Art, and is the principal matter, and seed of which Metals are generated in the bowels of the earth, they also call (as they do

many,

many other things) theirs; and that because though it be commonly known, and be to be had; yet none but true Philosophers know the hidden, and secret vertues thereof (though it be conversant before the eyes of all the World) nor that it is the seed from whence Metals are produced.

But notwithstanding all this that hath been said, there are many so wedded to the great Opinion that they have of common Mercury, that either they believe that it is that true seed of Metal the Philosophers speak of; or at least that forth of it the Philosophers Mercury may be made; both of which are clear wide from the mark: For *Sendivogius* tells us plainly in these words, *Et quamvis corpus metallorum, ex mercurio sit procreatum, quod de mercurio Philosophorum intelligi debet, tamen hi non sunt audiendi, qui putant mercurium vulgi, semen esse metallorum, & ita corpus loco seminis accipiunt, non considerantes, quod & dictus vulgi mercurius, suum in se habeat semen.* Therefore to put this forth of doubt, we shall give the differences of the Philosophers Mercury, from common Argent vive, forth of their own mouths.

Nov. Lum. Chym. Tract. 6. p. 320, 321.

1. The Mercury of the Philosophers is a meer product of Art forth of a fit natural subject, and is never to be had but by the assistance of Art. But common Quicksilver is a product of Nature without the help of Art; for there is much of it found in its own form, which the Workmen call Virgin Mercury.

2. The Chymical Fountain, or Philosophers Mercury, doth produce all things, and vivifie all things; and on the contrary, it destroyeth all things, corrupteth all things; and worketh all other things that concern life and death: but so doth not common Mercury.

3. The

3. The Chymical Fountain is fiery and hot, but common Argent vive is cold and moist.

4. The Chymical Fountain with the most easie distillation is changed into a spirit, and a volatile body. But the common Argent vive is all spirit, and in distillation is not changed into a watery spirit, but ascendeth corporally, no whit changed from it self.

5. The spirit drawn from the Chymical Fountain, is fiery, and pontick, and so penetrating and subtile, that it also dissolveth Metals, and being so dissolved, doth deliver them to death. But common Argent vive cannot be converted into a watery, pontick spirit by distillation, nor kill or destroy the Metals, but only hides them in its belly, and doth vomit them up again, by separating it self from them, with any easie heat.

6. The Chymical Fountain doth dissolve it self, and congeal it self, and perfect it self, without any other thing added unto it. But common Quicksilver doth not dissolve it self, unless it be dissolved of another; nor congeal it self, nor by any means perfect it self.

7. The Chymical Fountain hath in its belly and inward parts, salt fixed, red, and white, yea it is totally salt, and springeth and ariseth forth of a saline den. But common Argent vive is nothing else but a running Metal, movable, and slippery.

8. The Chymical Fountain hath *Sol* and *Luna* in the neareſt power, and with only simple coction, they are reduced into the ultimate act: which we can bring forth of common Argent vive by no kind of Artifice.

9. Of the Chymical Fountain, without any thing added

added to it, is made the Elixir, and true Philosophick Tincture: which by no means we can obtain from common Argent vive.

10. The Chymical Fountain hath in it self in the neareſt power all Metals, seeing it is the immediate, and next seed, forth of which they are generated and compounded. And it is the father, efficient, and material cause, out of which common Quicksilver is produced, which cannot be said of the other.

11. The Chymical Fountain doth compound precious stones in the bowels of the earth, and all those others which Nature hideth in her bosom, by the congelation, and coagulation of the Fountain into stones, which we cannot say of vulgar Mercury. *Hydrogr. Spag. Pet. Fabr. l. 3. c. 12.*

13. Vulgar Mercury doth not so dissolve Gold and Silver, that it never can again be separated from them. But the Philosophers Argent vive doth so dissolve Gold and Silver, that it is never again separated from them, but is as water commixt with water.

13. Vulgar Mercury hath combustible and evil sulphur, with which it is made black. But the Philosophers Argent vive hath in it self sulphur incombustible, fixt, good, white, and red.

14. Vulgar Mercury doth make bodies black, and staineth them. But the Philosophers Mercury doth make bodies white as Crystal.

15. Vulgar Mercury by præcipitation is turned into a Citrine or red powder, and an evil sulphur. But the Philosophers Mercury by virtue of heat, is changed into most white sulphur, good fixt, and fluxible.

16. Vulgar Mercury, by how much more it is decocted, by so much the more it is made volatile, and fluxible.

fluxible. But the Philosophers Mercury by how much it is more decocted, by so much more it is thickned, and made fixt. *Sendivog. Tract. de Sulphur. & de tribus principiis.*

These are the differences that these two Authors quoted have given of the differences of common Mercury, and that of the Philosophers, but indeed are so full of equivocations and evasions, one while meaning their Elixir, another while the catholick Mercury or Hyle, sometimes their artificial Mercury, and but seldom, if at all, the matter out of which they prepare their own Mercury, or universal liquor. So that they may well buzzle the brains of a person reasonably well versed in their terms, and Art. But to be a little more candid, we shall shew some agreements betwixt the matter of which they prepare their Mercury and common Quicksilver, that the doubt of their being both one, may be put forth of all scruple.

1. Their matter, and vulgar Mercury agree in this, that they are both of a mineral and metallick root and principle.

2. They differ in this, the Philosophers matter is the true root, seed, and principle of all other Metals, as is known by observation and experience; but vulgar Mercury is not the seed nor root of Metals, nor ever was known to grow, or change by nature into a more perfect Metal.

3. The Philosophers matter is no one of the vulgarly known Metals, but is rather *omnia metalla*, and the true Lunary and Solary Tree; but common Mercury hath ever been taken for one of the vulgar Metals, and is no true *Electrum*, nor hath plurality in it at all.

4. The Philosophers matter is a thing that is far more common then common Mercury, and is never so well appatelled, nor so specious to the eye, as is common Quicksilver.

5. That it is threefold both in Name and Nature, and yet is but of one and the same root, and so is not common Quicksilver.

6. That it hath both fixt and volatile parts, and so hath not Quicksilver.

2. 2. We come now to the second main point that we proposed in this Chapter; to wit, to the considerations of common Quicksilver, as some have given it forth; and herein we must propose something from *Paracelsus* that is singular, and (that we know of) not mentioned by any other Author; which is this.

Chir. magn. p. 152. He saith that Mercury containeth in it self three bodies.

1. The first is that out of which it is generated, before it perfectly be that which it ought to be.

2. The second is that which it is.

3. The third is that unto which it may be prepared by Art.

1. The first (he saith) is to be taken in its Mineral, and Ore, while it flowereth, and is to be prepared so as the Art of preparing Mercury doth command.

2. The second requireth that the Ore be separated from the Mercury by the artifice of fire.

3. The third is, that the same Mercury be prepared into the form of an adust, or burnt Metal.

Morbill. l. p. 243. In another place he tells us almost the same thing; Mercury, he saith, is concluded with three bodies.

1. First, As it is in its Mineral, or Ore, with its bloud, and is to be as Mercury prepared by Art.

2. Se-

2. Secondly, the Body separated from the Ore, is to be purged by fire.

3. But that the third body is that when it is reduced into an adust Metal.

Now for the two last we shall speak of them hereafter, onely here we shall say something of the first, which seemeth a strange matter; for he seemeth to shew that the Ore of Quicksilver may be found and had in its Mine, when it is in its flower, and before it be hardened into that body which we call Cinnober; for in his Preparations he saith: Take the Ore out of which Mercury doth arise or grow, as it is found in its first coagulation, before it grow hard, or be made into a body: And calls it after it be prepared, the liquor of the immature Mineral. Again he saith, Take of that Ore forth of which Mercury is generated, as it is found to consist in its first coagulation: but yet it ought to be so coagulated, that it hath not yet passed into an hard and solid body. By all which it plainly appeareth that this experienced Author (than whom, no man that we read of, had seen more Mines, nor was more expert in Mineral knowledge) had seen, found, and had the Ore of Cinnober, or Quicksilver soft, which is a thing (doubtless) of that rarity, that few have had knowledge of it. And therefore I heartily desire all the Learned that have Interest in foreign Parts, and all other ingenious persons that travel, to be inquisitive, whether any such Ore of Cinnober be known, found or to be had as is soft, and not yet grown hard, because besides the knowledge of such a mineral secret, there may no doubt some excellent Medicine be made forth of it. Ut supr. p. 244.

Chap. XXV.

Of the Description of Quicksilver, of Cinnober, and its several Ores, and Passages, and how it is gotten, and refined in divers places, and the like.

THe description of common Mercury is by most of the mystical Authors omitted, that thereby they might obscure the nature and quality of the matter from whence their Mercury is taken. For asserting Sulphur and Mercury to be the principles of Metals, they therefore usually left out the description of Mercury, that thereby their Readers might think that common Quicksilver was that principle of Metals which they made mention of: It being ordinary for those sort of Authors to set men at gaze after one thing while they intended another, and to make themselves bread of the best of the Wheat, while others had but the Husks, or Bran.

Art. Aurifer. vol. 1. p. 260.

For the description of Argent vive *Avicen* hath a long discourse of it, but may rather agree to another Mercury then to that which is common; and therefore we leave it to the Reader to consider of according to the quotation in the Margine.

Lex Alchym. p. 67.

Rulandus describes it thus, It is no other but a viscous water in the bowels of the earth, of a subtile substance of white earth, united by a total union, by a most temperate heat, until the humidity be tempered with the siccity, and the siccity of the humidity equally. This

This description any one half-eyed may see will not altogether agree with the nature of common Quicksilver, but so they use to mock with fresh-water Soldiers.

Musæum Worm. l. 1. Sect. 3. c. 9. p. 126.

The learned *Wormius* of it tells us thus; That by proper speaking it cannot be said to be a Metal, seeing the definition doth not agree unto it, for it melts not in the fire, it is not hard, solid, ductile, nor malleable. But it is a mineral liquor consisting of a viscous metallick water, and a sulphureous earth, full of spirit, volatile, cold to the touch, but indued with an hot virtue, ponderous, of the colour of silver, fluid as water, but not wetting the hands. And of this he reckoneth two sorts, first either native or factiticus, for that which is factitious we do not now meddle. And as for the Cinnober, or *Minium*, it is either mixed with stones, or pure. For that which is mixed with stones, it is sometimes found in a slate-stone of an ash-colour, grown together in the manner of leaves, or plates, sometimes in a most white metallick stone, as at *Hartenstein*. Of pure Minium, or native Cinnober (he saith) he had two sorts; one rubicund, like the crude Ore of red silver, ponderous and elegantly tinging with a rubicund colour, found in *Hassia* near *Marpurg*. The other is more black, of a liver-colour, also ponderous, being like the stone *Hæmatitis*, or *Schistus*, in which grains of Quicksilver, as though it were enclosed drops, do appear, tinging with hard affriction with a rubicund colour.

Last Will and Test. c. 9 p. 109.

Basilius gives his relation of it thus: Mercurial Ore is wrought in its proper Mine-stones, by the quality of its salt earth, and its nimble volatile earth, in a moist, greasie, slimy, waterish oleity, which is mixed with

with a moſt ſubtile, red ſulphureous digeſted earth, with a moſt weak ſlow binding, like an unripe pleaſing fruit, of all particular Metals. Mercury ſheweth its virtue in many things admirably, and worketh effectually upon Minerals and metalline Sulphurs, and upon ſuch which border upon Antimonial ſtones or Ores, it loveth to be in ſuch places where the Tin Ores lie higher then Silver paſſages. It requireth many iterating effectual operations unto other Ores, and is multiplied upon other ſtrange ſtones, and is drawn through the juices of Minerals and Metals which are in affinity one to another, and produce many miſcreants, this is the reaſon why it is ſo pleaſant unto Metals, Goldſmiths amalgame and gild with it. It is uſed alſo for metalline colours, and is prepared to an oyl, and water, for mans health, and is ſublimed to corrode the worſt of poyſons, and is a true robber, taketh along whatever coſts have been beſtowed on him; but if he can be catched in his nature, then is he in ſubjection and obedience unto quick and dead. He is very effectual in Medicines, eſpecially for outward ſores; he is naught to naught, and good to good; and is not every bodies friend, though he is willing to do what you put him upon. His metalline ſtones are of the ſame nature with pure white ſlate earth, inclined to a water-blue, in freſh intermingled white marbles, in a glaſſie, grayiſh or porous Glimmer, or Cat-ſilver, which lie beneath betwixt the ſlates, in a floar way, which are mingled in their metalline paſſages with onſled marchaſites, and with the ſubtileſt ſmall ſtreaked white Talk, and are thorow grown with two ſorts, ſtanding and float-ſtriking paſſages, in which is wrought a curious red-ſhining Quickſilver Ore, not unlike

unlike unto red Mine Sulphur, and ſometimes floweth purely out of the clifts, and caves of the paſſages, ſtands in a ſink, or puddle together like water, which its natural quick ſubſtance ſufficiently evidenceth.

Paracelſus tells us theſe things of Quickſilver. For that they ſay Argent vive is a Metal, is far from the matter. For it is of the kind of other Minerals, not a Metal, not a Stone, not a Marchaſite, not a Saphir, &c. It is a peculiar product of Nature, gifted with its body, and endowed with its proprieties, as the reſt. Again he ſaith, Argent vive is Mercury, not admitting ductibility, but oppoſing it ſelf againſt it. This the *Archeus* doth caſt forth, changing it into a ſingular Metal void of ductibility. And though of all Metals it be moſt eſpecially aſſimilated to Mercury, notwithſtanding it differs in this, that it doth not obtain ductibility, by reaſon of its debility, which it conceived from Salt and Sulphur entering into it, in too little quantity. From hence it is manifeſt that by Spagyrical practice, to wit, of addition, it may be made a ductible Metal, as the Philoſophy of tranſmutation doth demonſtrate. For it may be turned and changed into every, or any Metal: Therefore, to wit, becauſe it remaineth from the operation of all Metals that may be drawn into ductibility. In another place he deſcribeth it (almoſt to the ſame purpoſe) in this manner. Moreover there is a certain kind of metallick body, that can neither be hammered, nor fluxed, or melted, and it is a mineral water of Metals. As water is amongſt other things, ſo is this amongſt Metals. But it therefore ought to be a Metal, becauſe it is reduced by Alchymy into malleation and fabrication: notwithſtanding commonly

De Miner. l. p. 346.

De Elemen. Aq. Trac. 3. c. 7. p. 281.

De Mineral, Tract. 1. p. 349.

monly it is not constant, sometimes it is constant. It is to be holden that it is the first matter of the Alchymists, who of it do prepare Silver, Gold, Copper, &c. which the event sheweth. And perhaps Tin and Lead may be made of it: for its nature is manifold, and wonderful, neither altogether to be sought out with easie pains or labour. But this notwithstanding is evident, that it is the first matter of the Alchymists, in the generating of Metals; and furthermore, is a most noble medicine. It groweth by such a subtileness from Sulphur, Mercury, and Salt, that it floweth, or is liquid, and yet doth not moisten; it runneth and yet hath no feet, and is the most heavy of all Metals.

From these dark sayings of this mystical Author, we may gather these things.

1. That in propriety of Language it is not a Metal, as abiding neither fusion nor malleation; and that it is a Metal, or may be made one by the Art of Alchymistry, but not without addition of something, which doubtless is their Tincture, or Elixir. And then it may be turned into any other Metal, according as the Elixir was fermented, and so in that respect is by them truly called Mercury: and yet that of its own kind it is a mineral water, and of a metallick nature.

2. That it is of a strange and wonderful nature not easily by labour found out: which made *Helmont* confess that he had spent thirty years *sub ferula Mercurii*, and that it had not its compeer in Nature.

3. That when he saith that it is the first matter of the Alchymists in generating of Metals, he speaketh the positive truth, yet must he not be understood to mean that it is the first matter that Nature useth to frame or generate Metals of in the bowels of the earth, for

for that first matter it is not, neither the first matter (as too many vainly dream) whereof they make their Elixir: But it is the first and principal matter by which with their Elixir they change, or generate Metals by the rules of Art. For *Helmont* tells us, and that truly; *Eo quod Æternus, non creaverit humiditatem, constantiæ sui, Mercurio metallico assimilandum.* And again he tells us, *Si Mercurius esset divisibilis in partes Heterogeneas, ars Chymica non esset vera: ac ipse Mercurius ineptus operi esset. Etenim nisi mercurium vidissem, ita subsistentem, negarem artem esse veram.* Progym. Met. 70. Tria prim. Chym. p. 408.

4. Where he saith that Quicksilver is the most heavy of all Metals, it must be understood with a grain of Salt.

Rulandus and *Encelius* tell us of two sorts of Native Quicksilver. Lex. Alchym. p. 69.

1. That which is of its own colour without excoction, which is found such among Metals, in the cavities into which it hath flowed forth of the Ore.

2. That which is had forth of the Ore by washing or excoction, and this Ore is that which was called *Nativum Minium*, or *Cinnabaris Metallica*; and the *Germans* call it **Berg Zinober**: and was found in their Mines; of which he noteth these sorts:

1. A Vein of Cinnober in which the Argent vive did grow, that as often as it was broken the Argent vive distilled forth drop by drop.

2. Like to crude red silver Ore, that was brought from the Valley of *Joachim*.

3. Like to Scarlet in a fire-stone of Gold.

4. Like to the same in an ash coloured slate, or cleaving-stone.

5. A Vein rich of Quicksilver, of a Liver-colour.

6. Like unto crude red, transparent silver Ore, in Car-silver, of the colour of silver.

7. From *Hydria* black with a reddishness, which smitten with the hammer, did drop forth little grains of Argent vive.

8. At the same place of a light red colour.

9. Of a yellow colour, in which was mingled in channels a fire-stone of a golden colour.

Agricol. Berm. p. 698. Anat Spagyr. Mercur. l. 1. c. 5. p. 415, 416, 417, 418.

Much-what agreeable to these doth *Agricola* mention, to whom I remit the Reader. *Matthias Vultterus* tells us of divers places where Argent vive is found in its own form and colour without excoction. And one sort, especially in the Mountain *Gimmanede*, six miles from *Cracovia* in *Poland*, which of its own accord at certain times of the year doth break forth to the superficies of the Earth, but especially about Autumn, although also about the Feast of St. *John Baptist*, the Author of the *Tyrocinium Chymicum* doth testifie, that he had gathered many grains like Pease, in the roots of the Grass, and saith that notwithstanding that Mercury was too waterish, and inferiour far in goodness and vertue to that of *Spain* and *Slavonia*. And of Native *Cinnober* or *Minium* he reckoneth the same sorts, and colours, and nameth the places where they are gotten, and saith that Native Cinnober, and the *Lapis Schistus*, are as it were the Parents of Argent vive; to which, to eschew repetition, I refer the inquisitive Reader.

Tyr. Chym. l. 2. c 13. p 305.

Philos. Trans. n. 2. p. 21, 22, 23, &c.

There is a notable, ingenious, and succinct Extract of a Letter, written from *Venice*, by the learned Doctor *Walter Pope*, to the reverend Dean of *Rippon*, Doctor *John wilkins*, concerning the Mines of Mercury

cury in *Friuli*. Where he exactly relateth that about a days Journey and an half distant from *Goritia* Northwards, at a place called *Idria*, situated in a Valley of the *Julian Alps*. There he describeth the nature of the soyl, and the depth, and quantity of their Mines, and their manner of Working, washing, and the like. The Ore he describeth thus. They (he saith) dig the Mineral with Pick-axes following the Veins: 'tis for the most part hard as a stone, but more weighty, of a liver-colour, or that of *Crocus Metallorum*. There is also some soft earth, in which you may plainly see the Mercury in little particles. There are also several Marchasites, and Stones, which seem to have specks of Gold in them; but upon trial they say they find none in them. These round Stones are some of them very ponderous, and well impregnated with Mercury, others light, having little or none in them. And so he describeth the manner of getting the Mercury forth of the Ore or Stones; which for brevity I omit, and leave the Reader to the more full relation of the Extract it self. Onely he relateth that they have their Mercury two ways, the one is by the means of the fire; the other he relateth thus. All the Mercury got without the use of fire, whether by washing, or found in the Mines (for in the digging some little particles get together, so that in some places you might take up two or three spoonfuls of pure Mercury) is called by them Virgin Mercury, and esteemed above the rest. I enquired (he saith) of the Officer, what virtue that had more then the other; he told me, that making an Amalgama of Gold and Virgin-mercury, and putting it to the fire, that Mercury would carry away all the Gold with it, which common Mercury would not do.

De difficult. Alchym. l. in Theatr. Chym. Vol. 1. p. 144.

Theeb. de Hogheland of *Middleburgh*, tells us a Story not unlike this recited; that travelling to view, and examine Mines with their several Ores, he came to the Mountain *Idria*, where by good fortune at that time, Argent vive, which of its own accord had flowed forth of the Mine, was gathered forth of the River hard by, of which by gift he received fifteen pounds weight. And then purposing to travel to *Schonbach*, a little Town of *Misnia* or *Voitland*, by reason of a famous Mine there, of native and rubicund Cinnober; he turned to *Norenburg*, and there he obtained a piece of native Cinnober from the same Mine, almost of two pound weight; he went no further, but turned to *Cruitznach*, a Town of the *Palatinate*; and from thence, and divers other places, he got good store of Argent-vive, or of native Cinnober, and so ceased.

The History of the *Indies*, c. 11, 12. p. 237, 238, 239, 240, 241, &c.

Also *Josephus Acosta* tells us: That at the *Indies* Quicksilver is found in a kind of stone, which doth likewise yield Vermilion, which the Ancients called *Minium*, and at this day they call the Images of Crystal Miniades, which are painted with Quicksilver. After he saith, It is a rock of most hard stone, interlaced all with Quicksilver, and of that greatness, that it extends above fourscore Vares or Yards in length, and forty in breadth, in which Mine they have many Pits and Ditches, &c.

For native Cinnober I have by me three sorts, that with much difficulty I have procured, it is so scarce to be gotten here in *England*.

1. One of them is a ponderous Ore, of a dark red colour, but indifferently rich of Quicksilver.

2. Another is pretty reddish in some parts, but some-

something whitish in the other parts, but very full of the Argent-vive, that appeareth in very small grains.

3. The third sort is in small pieces, the greatest not much bigger then beans, of a very rubicund colour, and shining, which being broken, do shew very small grains, like the points of Pins, of the Argent vive; and this I procured forth of *Germany*, and they call it **Berg Zinober**, or *Cinnabaris Montana*. Also I have had intelligence from some learned *Germans*, that there is some of this sort that is transparent, but is but rarely found, and therefore hardly to be had. Of which *Quercetan* gives us this account. *Quod ad nativum & naturale Cinabrium attinet; natura nobis in quibusdam Aurifodinis in Hungaria, profert genus quoddam Mineralis Cinnabaris ponderosissimæ, ac longe artificiali rubicundioris: Imo etiam quæ usque adeo transparens, ac dilucida est, ut non minoris pretii, ac majoris quam ipso auro æstimetur.* And commends it highly in vertiginous and epileptical distempers, even taken by it self, without any preceding preparation.

Pharmacop. c. 10. Not. 13. p. 672.

Now for either Argent-vive, or the stone it groweth in, called Native Cinnober, (though *Agricola* seem to intimate as much) I could never hear of any that was found either in *England*, or *Scotland*, onely Dr. *Forden* gives us this account. In *Scotland* three miles beyond *Berwick* (he saith) I found a red stone, which I take to be *Minium nativum*, seeing *Agricola* makes mention of it in *Scotland*, but by a mischance I could not try it. From which hint I could desire all ingenious persons that live near that place, to make diligent search, if any such stones be there to be found, that thereof trial might be made.

CHAP.

Chap. XXVI.

Of several sorts of Medicaments prepared forth of common Mercury, both by the way of vulgar Chymistry, as also by the mystical way. And of the Præcipiolum *of* Paracelsus *and* Helmont.

THere are so many several Medicaments prepared by common Chymistry forth of Quicksilver, that it would be very tedious, and too large to recite them all; as is easie to be seen in *Crollius*, *Beguinus*, *Hartman*, *Schroderus*, *Quercetan*, *Putzerus*, and the like; and therefore we shall onely enumerate some few of the principal of them.

1. And first there is that which they call *Mercurius vitæ*, which whether it participate solely of the Antimony, or solely of the Mercury, is not so easie to determine, there being Authors, that hold it stiffly on either side; and we never accounted the Experiment either so luciferous, or frugiferous, to make it our business to attend trials, and exact observations about it. As for the *Mercurius vitæ* we have administred it very frequently for the space of near thirty years, and can give it no further commendations, then that it is a strong and churlish Vomit, fit only for robust bodies, and beneficial onely in some Phlegmatick distempers, and far unworthy of those high praises that are usually attributed unto it, and therefore now we do very rarely, or never use it, having found other mineral

mineral Vomits, that are far more safe, and of more effectual operation then it; and I wish all Tyronists to take care of its preparation.

2. The next we shall name is their *Turpethum Minerale*, which is indeed a mercurial one, and that sharp and desperate enough, if not very carefully and skilfully handled. In our younger years when we had too high an esteem of Chymical Medicines, we have often used, and administred the same, and that with no bad success, especially in some sorts of Epileptical distempers; But shall warn all young Physicians to be both careful in their preparing of it, and in their administration of it also, especially in that great point *de ratione victus*. And all I can commend it for (if that may be called a commendation) is for that woful and dishonourable way of curing by flux or salivation, which indeed is a way of cure, almost as bad as the worst of diseases.

3. The next we shall name, is that preparation of it which they call *Mercurius dulcis*, which is of very frequent use, and exceedingly extolled by many; we confess it may have a commendable use in Chirurgery, and may to sundry good purposes be mixed with Plasters and Unguents; and is of singular effect in Ointments against all Verminous distempers, and taken inwardly doth the same; and is a pretty purger, or promoteth the working of other Cathartick; but heed must be taken, that it be not administred too often near together, for fear of a sore mouth, loosness of teeth, or a flux. And yet for the Worms may the crude Quicksilver it self, or the water wherein it is boyled, be taken with as much or more safety, and as good effects.

4. The

4. The laſt we ſhall name, is ſome ſorts of Præcipitates prepared forth of Mercury; not to mention the common Præcipitate prepared after *Vigo*'s order, or the white one, which (if uſed inwardly) are far more likely to kill then to cure. One of the beſt, is the Quickſilver præcipitated *per ſe*; which notwithſtanding is a violent Vomitive Medicine, yet may be tolerably uſed by a skilful and careful Phyſician. But the beſt that ever we have ſeen, is a Præcipitate prepared with the good and pure ſpirit of Nitre, and afterwards often cohobated with the diſtilled water of the whites of Eggs, whereby it will become of a fine red colour as any red coral, and almoſt as ſweet as honey, and hardly to be diſtinguiſhed from the true *Arcanum corallinum* that is prepared with the great liquor *Alkaheſt*; and though it be vomitive in ſome meaſure, and be far ſhort of the eminent vertues of the other *Arcanum*, yet will it never diſgrace a skilful Artiſt, that knows its due preparation and way of adminiſtring, but will without vomit or purging (if rightly handled) even cure deſperate Agues by ſweating onely.

But I will conclude of all theſe with that of *Helmont*, who ſaith; *Antimonium dum vomitum movet, & Mercurius dum vivificari poteſt, non ſunt boni viri remedia.*

We deſcend now to treat of thoſe great *Arcana's* that are no ways to be obtained but by that univerſal ſolvent, the *Alkaheſt*, that noble liquor, that is the ſole glory of a Philoſopher in this frail life. Which is that Key that onely opens the Roſary of the Philoſophers, and revealeth the hidden ſecrets of the Animal, Vegetable, and Mineral kingdom; without the knowledge

knowledge, and poſſeſſion of which no man is worthy to ſit at the golden Table of the Adeptiſts, nor indeed truly worthy the name of Phyſician.

Nec prius ante datur telluris operta ſubire
Auricomos quàm quis diſcerpſerit arboreſætus.

Of theſe Arcana's prepared by this liquor forth of this Mineral of Mercury, *Helmont* firſt mentioneth the *Mercurius Diaphoretius*, of which he ſaith thus, *Quarto loco eſt Mercurius Diaphoreticus, melle dulcior, & ad ignem fixus, ſolis horizontis omnes proprietates habet. Perficit enim quicquid Medicus & Chirurgus poſſint optare ſanando; non tamen tam potenter renovat, ut præcedentia.* In his anſwers to the queſtions propounded unto him concerning this, he maketh this reſponſion, to wit; That as the Sun is thought to ſpring up in the Horizon of the Hemiſphere: ſo Mercury, while it is made Diaphoretick, ſweet as Honey, and fixt as Gold, is Gold in its Horizon, and is in medicine, by ſo much more noble than Gold, as much as an Oriental Pearl is nobler than a Scotch one. And after he telleth us, that the glorious Sulphur of Venus being raiſed again doth tinge the Sulphur of the Mercury (that in the Powder of *John de Vigo*, by ſulphureous corroſive Minerals was extroverted) immediately, and did mutually imbrace one another in an inſeparable bed: And that therefore the vertue of both the Sulphurs did ſtand outwardly. And therefore by this conjunction the Diaphoretick Mercury from thence ariſing, did perform whatſoever the Phyſician or Chirurgeon could wiſh, either in reſpect of curing acute or chronical diſeaſes.

1. Arcan. Paracel. p. 790.

De Lithiaſ. l. c. 8. p. 69.

De Febrib. l. c. 14. p. 52.

Again, in another place, he largely deſcribeth the vertues and effects of this *Mercurius Diaphoreticus*, in relation both to Internal, and External Diſtempers. And of its Preparation tells us thus much; Its deſcription (he ſaith) is as well in *Paracelſus* Book *De Morte Rerum*, as in his *Chirurgia Magna*, and ſaith, he will declare it ſomething more manifeſtly. Take the Powder of *John de Vigo*, prepared with thine own hand: For otherwiſe it is adulterated with artificial *Minium* or red Lead; as the moſt Chymical medicaments that are to be ſold, are full of deceit. This Powder, the element of fire extracted from the Vitriol of Venus being affuſed, or poured upon it, is five times to be cohobated with *Aqua Regis*, at the end increaſing the fire; for it is fully fixed, and is a Powder very corroſive. Which then is to be cohobated ten times, with *Aqua vitæ* dephlegmed the beſt that may be, and renewed at every time, until it have carried off all the corroſiveneſs with it. And then this Powder is ſweet as Sugar. Therefore the Spirit of Wine is there called *Saltaberi*, or *Tabarzet*, which ſoundeth Sugar, not that it is ſweet in it ſelf, but that it carrieth away the corroſive ſpirits with it. So far, that the remaining Powder doth excel in its own ſweetneſs, not with a ſweetneſs borrowed elſewhere. For beſides, that the fire of Vitriol is ſweet, the very Sulphur of the Mercury, then turned outwardly, is of greateſt ſweetneſs. This Powder is fixed, and is called Horizontal Gold. Therefore (he ſaith) I have finiſhed a ſecret in few words, which doth ennoble a Phyſician. But to have prepared it the firſt time, is of huge labour, and its direction dependeth of his hand, to whom all honour is due,

due, becauſe he revealeth theſe ſecrets to little ones, which the world knoweth not of, and therefore diſeſteemeth. From all this we ſhall animadvert ſome few things to be conſidered of, by the learned and ingenious.

1. To conſider the high excellency of this medicine, that is ſo noble, that in operation it effecteth whatſoever a Phyſician or Chirurgeon can deſire: And therefore may well inſtigate all of thoſe Profeſſions, that they may bend all their ſtudies and endeavours both day and night to the obtaining of the ſame.

2. That it is no wonder that they call it Horizontal Gold, which if one ſeriouſly conſider the great medical vertues, is an appoſite name, and to be eſteemed far more precious than common Gold, that cannot afford ſuch rare and almoſt incredible effects.

3. To remember that it cannot be perfected without the Sulphur or fire of Venus, which though he call the Sulphur or fire of Vitriol, yet it is not the Spirit of Vitriol, however rectified; but is the Sulphur of Copper it ſelf, which cannot be had, but by the total deſtruction of its body, and the leaving of its internal and incombuſtible Sulphur, inſeparable from its remaining white, anonymous metallick mercurial body; and this to be performed by no ſublunary body but only by the Alkaheſt.

4. To note that the fire of Venus muſt be poured upon the Powder of *John de Vigo*, prepared by ones own hand, whereby it appeareth that it muſt be in a liquid form, otherwiſe it might be mixed with it, but not poured upon it, and therefore certainly is in the

form of a green Oil, as both he and *Paracelsus* do make manifest. But one chief point is here tacitely concealed, that is the quantities of either of them, which the studious Reader must labour to find out.

5. It may be some that are very critical, may question what sort of *Aqua Regis* this Author meaneth, but it is plain that it is the common sort, and no mystical kind, because he telleth us plainly that after five times cohobation with it, and increasing of the fire, it remaineth an exceeding corrosive Powder; and therefore must be cohobated ten times with the best dephlegmed *Aqua vitæ*, every time being renewed, or fresh used, and that thereby the corrosive spirits are all carried off with the Spirit of Wine, and the Powder left as sweet as Sugar. And if we consider what this Author hath told us elsewhere, then we are to know, that it is no rectified Spirit of Wine by any common way, but prepared by the Alkahest, which is required twice in this Preparation, once for the fire of Venus, and also for the Spirit of Wine.

6. As for the places in *Paracelsus* in his Book *De Morte Rerum*, and in his *Chirurgia Magna*, though that Author seem dark enough, yet to an attentive and understanding Reader he hath shewed things that are sufficient to understand its Preparation by, and hath omitted nothing in the forecited places, but only the naming of the Alkahest, which in all his great Preparations he commonly leaveth out: Though in other parts of his Writings he hath spoken more fully, (both as to the matter forth of which, and the manner how, that great liquor is to be had, and prepared) than any other Author that I know of, and those that cannot learn it from his Writings, will

will hardly understand it in other Authors.

2. The next great Arcanum to be had forth of common Mercury, is that which he calleth *Arcanum Corallinum*, or *Corallatum*, of which he saith this. And there is the purgation *Diuceltataſſon*, which cures the Gout no less than Fevers. And its Arcanum is called *Corallinum*, which is prepared out of the essence of Horizontal gold, after this manner: Draw off the liquor Alkahest from vulgar vendible Mercury, which *Paracelsus* remembreth 2. *de viribus membrorum, c. de hepate*, which is done in one quarter of an hour. For *Raymundus* saith, my friends being by, and the King present, I have coagulated Argent-vive, and none except the King knew the way or manner. In which coagulation, this is most singular, that the said liquor Alkahest doth prevail the same in number, weight, and activity, so much the thousand action, as much as in the first; because it acteth without the re-action of the patient. Therefore the Mercury being so coagulated, without any remnant of the thing coagulating, then make small powder of it: and distil from it five times, the water of the whites of eggs distilled, and the Sulphur of the Mercury, that by its former coagulation was drawn outwardly, will be made rubicund as Coral: and although the water of the whites of eggs doth stink, notwithstanding this powder is sweet, fixed, bearing all the fire of the bellows. Neither doth it perish in the examination of Lead, notwithstanding it is spoiled of its medical virtue while it is reduced into a white metal: but it is given to eight grains for the most part, because it purgeth the body of man as long as it is foul, and not perfectly sound. Also it healeth Ulcers of the bladder,

De Febr. l. c. 14. p. 52.

Arcan. Par. p. 790.

Vol. Vivent. &c. p. 387.

der, of the Larinx, and Oesophagus. And in another place he reciteth it almost in the same manner, but not so fully. In another place he saith of it thus. Therefore the purgation by the Arcanum Corallinum, doth destroy the Gout in its seed. But this Arcanum is not the colour or tincture of Coral, (as the ignorant company of Chymical Writers, to be laught at, do interpret) because the apposite words of *Paracelsus* (which is of the essence of Gold) do sound another thing.

Also the colour of Gold, the Sulphur, or Tincture, do not loose the belly, or purge: but this Arcanum is in substance, metallick; in colour, coralline; in taste, like honey; and in essence, golden. Truly not that ever it was a malleable body, but is the Horizon of Gold, a shut-up body, and fixed; whose Sulphur is sweet, and to be commixed with our Constitutive parts. In this Sulphur the Omnipotent hath collected all the virtues of the Sun, to whom only all honour and glory is due.

We have before, where we spoke of the Alkahest, said much to what from all this might be observed: only we shall add these few things.

1. That the Learned may note, that the Writings of *Paracelsus* (by many so much condemned) do bear in them a far deeper sense and meaning than even common Chymists do imagine; and are not to be weighed according to the letter, but according to the depth of that Learning the Author was master of. And therefore we may here observe that *Helmont* understood him otherwise (and that according to the truth of his meaning) than many hundreds have done besides.

2. That

2. That he that will understand the matter out of which the Alkahest is prepared, and its manner of preparation also, can never find either of them by any surer way than by truly considering and understanding the effects of that liquor. And I am bold to tell all searchers, that no effect of it doth more declare the matter from whence it is taken, than this that he hath related in what I have before quoted; and therefore let it be observed.

3. Where he saith, That the Mercury being coagulated by the liquor Alkahest, hath its Sulphur extroverted: but if it be melted down into a white metal, that then it loseth its medical virtue. The reason of which is, (though we may be condemned for discloshing it) that the medicinal virtue consists only in the external and separable Sulphur, and not in the Mercurial part, which is not to be destroyed either by Art or Nature; and therefore in fluxing it down into a white metal, the external Sulphur is wasted in the fire, or burnt off, and so the medical virtue must needs be lost, which consisted only in the Sulphur.

The last thing that we purposed to handle here, is the Præcipioluni of *Paracelsus*, for from him *Helmont* had it; and therefore might well confess (though in many things he is very injurious unto him, even sometimes to attribute those Theorical notions to himself, that he plainly stole from him, and yet laboured to deprive him of the honour) that by his Writings he had profited much. But ere we give our censure about this Præcipiolum, we shall fully give the Reader an account what they both say in the matter. And first, *Paracelsus* thus: The condition of Mercury is, that it be precipitated in its Mineral or Ore, and be

separated

De Hydropiſ. l. p. 623.

ſeparated from it dead; for ſo it is not Argent-vive, but Mercury: for when dead, it is Mercury; but living, it is Argent-vive.* If therefore, as the preſcribed manner of its preparation, it be mortified; its doſe is two grains, the proceſs being obſerved, that the Schole delivereth, neither need it be included in the Text.

Ignot. Hydrop. p. 521.

The relation of *Helmont* is thus. But *Paracelſus* approveth his Præcipiolum or Mercury, drawn forth dead out of its Mineral or Oré, above other remedies: but other ſimples, for the degree of affinity, by which they come near this metallick Mercury. And a little after he ſaith, In the mean time I confeſs, that that ſame Mercury hath always anſwered to my deſires. Truly its acquiſition is difficult, but the doſe of two grains three or four times exhibited doth ſuffice. But the Diaphoretick Mercury once being had, it ſufficeth to many myriads of diſeaſed perſons, as well for the Phyſician as for his poſterity.

That which we ſhall move from hence is this, That there are ſome learned men with whom we have converſed, or had intercourſe by Letters, that are of opinion that this Præcipiolum, or dead Mercury, is ſome artificial preparation by the Alkaheſt: but ſaving the judgments of thoſe men, we cannot be of their opinion, for theſe reaſons.

1. Becauſe both the Authors ſay that it is drawn dead forth of its Mineral or Ore, and therefore in likelihood muſt be by nature mortified in its Ore, or elſe it could not be ſo drawn forth of it, except it were dead before.

2. *Helmont* ſaith it is of difficult acquiſition, not of difficult preparation, ſo that only the difficulty muſt be

be in finding or obtaining ſuch of its Ore as hath the Argent-vive mortified in it when it is digged forth of the earth, and not made ſo by Art.

3. He compareth the Diaphoretick Mercury with it, and extols it far above it, as able to ſerve the Phyſician and his poſterity, being once but had, but doth not ſay ſo much of the Præcipiolum.

Therefore I would intreat all ingenious and learned perſons to take notice of theſe two things.

1. That *Paracelſus* tells us, that while Argent-vive is living, it is Argent-vive, but Mercury when it is dead, or ſo fixed that it cannot be revived again; for then it is like the Planet *Mercury*, able to exert its virtues, when before it is (though a tremulous body, and ſeeming open) moſt of all ſhut, and doth utterly deny its help to humane bodies. So that *Longè aliùs eſt ſenſus Sophorum, quam vulgarium literatorum.*

2. To move all inquiſitive perſons that either travel where Mines of Quickſilver are, or have correſpondency with any that live near them, or work in them, to endeavour if any ſuch thing may be found as the Ore that hath the Argent-vive dead in it.

Chap. XXVII.

Of Antimony or Stibium. Of Wismuth, Bismuth; or Plumbum Cinereum, or Tinglass. Of Zinetum, Zinck or Spelter. Of Cobaltum. And of their Qualities, Ores and Medicaments, prepared forth of some of them, and of native Electrum.

HAving now ended our Collections and Discourse of the seven Metals, vulgarly accounted so; we now come to some others, that many do also repute for Metals; and if they be not so, at least they are semi-Metals, and some of them accounted new Metals or Minerals, of that sort that were not known to the Ancients; of which we shall speak in order.

Mus. Worm. l. 1. Sect. 3. c. 8. p. 125.

Of some of these *Wormius* saith, We call those of their own kind *sui generis*, and improperly Metals, which have great affinity with those that are true Metal, if thou mark the rise, manner and place of Generation: But they differ in certain proprieties that are agreeable to true Metals, for they are not ductile or malleable, but brittle or frangible.

1. ubi supra.

Antimony or Stibium, which the Germans call **Spiesglass**, seems to be a Metal of its own kind, although *Paracelsus* put it in the number of Marchasites, *lib. 6. Archidox.* where he calleth it the *Marchasite* of Lead, doth consist of a combustible mineral substance, and of a suliginous Mercury, coagulated of a certain earthly matter. Its Ore is found in the moun-

mountains as other Metals, and from thence is drawn by various operations. It is found in *Italy*, and the best in *Hungary*, in *Germany* at *Hoenstein*, and in *Bohemia*. In times past it was sold as it was digged forth of the earth: that which was most approved of by *Dioscorides*, was that which most shined with rays; and when it was broken, would be divided into shells or crusts, being friable, or to be crumbled, void of earth and filth, which *Pliny* called the female. Now it is sold by Merchants in loaves, or measures, as if melted: outwardly it is crusty, and of a leaden colour, for the most part infecting the fingers; within, full of capillary veins, glistering and shining as polished Iron; in bursting and breaking, easie: but when it is made into powder, it loseth its splendor, and assumeth the colour of burnt Lead. And a little after he saith, The Hungarian Ore of Antimony is most beautiful, wholly consisting of Cylinders, or small Columns, of the thickness of a small Needle, but wonderfully knit together, for they are to be seen right, parallel, oblique, transverse, *&c.* because this matter is porous, and appeareth with a splendid blue colour, like polished Iron. From hence a sulphureous and yellow matter doth sweat forth, rendring the mass divers coloured, the gift of Doctor *Custerus*.

De nat. Fossil. l. 10. p. 657.

The like to those in a manner doth *Agricola* write of Antimony, and saith, That it is something like in colour to the *Lapis Plumbarius*, or Lead Ore, but that it shineth more, and is more white. *Rulandus* tells us, that the Ore of it was found in their mines of *Germany*, and doth reckon up these sorts.

Lex. Alchym. p. 417.

1. That it was digged up at *Rome* in the Flaminian Circuit, and was soft, and black, and crusty, or shelly, like Cat-silver.

2. Digged up that was friable, or would crumble, like to poliſhed Iron, from the Iſland *Ilna* in the *Tyrrhene* Sea.

3. Digged up in *Bohemia*, in a white Flint-ſtone.

4. At *Iſfeld* in *Hercynia*, which is as it were conglutinated together with little, long, and round-angled little cruſts, in a white Flint.

5. At *Stolberg*, in which there are white ſix-angled fluores, that are pellucid.

6. In *Pannonia*, in which there is Gold, and Black Lead.

7. A Vein of Stibium like to barren Galena.

8. In an hard Stone, like a Fire-ſtone or Marchaſite, of the colour of Silver.

9. A Vein of Iron, in which is found Stibium.

10. Growing near the Stone Schiſton beſides *Priburg* in *Miſnia*. *Cambden* tells us, neither only Lead, but Stibium alſo, called in the Apothecaries ſhops Antimony, is here found by it ſelf in Veins. And Doctor *Merrett* ſaith, that Antimony is found in the Lead Mines of *Darbyſhire*; and I am informed by divers that have long wrought in *Darbyſhire*, that there is good ſtore of it, eſpecially in ſome places, but I have not been able as yet to procure any of it. That Ore of Antimony that I had forth of *Germany*, is of a bright blewiſh colour, and lieth in a yellowiſh, grayiſh ſtone, and is moſt like to that ſort of Lead-Ore which they call Steel-Ore. I could earneſtly deſire all our Engliſh Miners to be vigilant and careful to diſcover where any of the Ore may be gotten, for it is a good vendible Commodity, and much gain and profit might be made of it. *Baſilius* of it ſaith thus: Antimony comes from perfect Mercury, wrought

Darbyſhire, p. 556.

Plin. re. nat. p. 209.

wrought of little Salt, and a wateriſh fluid Sulphur, though it ſhineth black naturally, and its outſide is of an Antimonial form, yet it graduateth the noble nature of Gold, and doth much good unto man. But thoſe that would be more fully ſatisfied of the excellent properties of Antimony, may ſeriouſly weigh the *Currus Antimonii triumphalis* of *Baſilius*, and the Writings of *Paracelſus*, who not only have written largely of its virtues, but alſo underſtood the intrinſecal nature of it, better than any other two that can be named. And for the Medicines that may be, or are prepared forth of it by common Chymiſtry, which are very numerous, the Reader may find them in *Sala*, *Hammerus*, *Poppius*, *Schroderus*, and almoſt in every Diſpenſatory: ſo that we need not inlarge here to recite them, for there is ſcarcely any one Mineral that is more largely treated of than Antimony; only we ſhall ſpeak a little of thoſe great Arcana's that *Paracelſus* and *Helmont* prepared forth of it by the Alkaheſt.

Laſt will and Teſt. c. 10. p. 102.

1. The firſt Medicine that *Helmont* nameth, prepared forth of Antimony, is the *Mercurius vitæ*, of which he ſaith thus; *Sequitur dein Mercurius vitæ, ſtibii proles integri, quæ omnem morbi nervum penitùs abſorbet.* Which though he call *Mercurius vitæ*, as having Mercury joined with it in its Preparation, yet is the off-ſpring of the whole *Stibium*, and none of the Mercury joined with it. And doubtleſs is not the *Mercurius vitæ* prepared by common Chymiſtry, that doth both violently purge and vomit, but is of a far more noble nature and virtue, as being prepared by the Alkaheſt, and therefore doth not only cure diſeaſes, but in ſome meaſure, renew Nature alſo. The

manner

manner of its Preparation he no where (that I can observe) doth mention, but *Paracelsus* according to his dark fashion doth set it down in his *Archidoxis*, as also in his Book *De Vita Longa*, and in both places tacitly concealeth the Alkahest.

L. 2. c. p. 20. Lib. de Vit. Long. c. 6. p. 64.

2. The second is the Sulphur or fire of Antimony, of which *Helmont* made so great account, and questionless is the *Tinctura Lili Antimonialis*, for *Helmont* saith, *Tertio loco est Tinctura Lili, etiam Antimonialis*, almost of the same virtue with the former, although of less efficacy. And the reason why we so boldly affirm these to be prepared by the Alkahest is the authority of the said *Helmont*, who saith, *Probabo primò, quod liquor Alkahest, ens primum salium, Lili, primus metallus, Mercurius Diaphoreticus, sive aurum Horizontale, unum inquam, qualecunq; ex illis (nam cuncta unius dissolventis consanguinitate, conspirant in unisonum) sat sit ad quorumlibet morborum sanationem, utut momis crepent ilia. Imprimis norunt Adepti mecum, quantum hinc distent dispensatoria Seplasiæ, in.ò & quam remoti absint scriptores, qui Basilica, & Tyrocinia Chymica ingenti gloriolæ pruritu, adhuc ipsimet Tyrones ediderunt.* But the Preparation of the *Tinctura Lili*, that is Antimonial, you may find in the Writings of *Paracelsus*.

Arc. Parac. p. 790.

Resp. Auth. p. 524.

Chir. Mag. tr. 3. c. 5. p. 67.

2. *Plumbum Cinereum* was known to the Ancients, but little said of its use, or vertues, and by this name *Agricola* calls it, the Miners call it *Bismutum*, *Cæsalpinus* a Silver Marchasite, the *Germans* **Bisnut, Wythin**, and **Counterfeit.** It is rather, I think (saith *Wormius*) a Metal of its own kind, than to be referred unto Lead. For it differeth from both Tin and common Lead in colour, and hardness. It sometimes shineth

Mus. Worm. l. 1. S. 3. c. 8. p. 125

shineth with a silver colour, and sometimes with a dilute purple, like to *Stibium* or Antimony, according to its figure, but more excellent in colour, being like the *Regulus Stellatus* of Antimony. The Ore from whence it is drawn is like to *Galena*, but it infecteth or coloureth the hands, which the *Galena* doth not. And it is found solid, which admitteth cutting, and doth not break, or leap asunder as the *Galena*. It is also more black, and of a leaden colour, which sometimes containeth Silver in it, from whence in the places where it is digged up, they gather that Silver is underneath, and the Miners call it the Cooping, or Covering of Silver. Its masses do use to cleave to a Stone that is most hard, except it contain *fluores*; or have Nitre in it, which maketh the Stones friable. It is found in *England*, and *Misnia* in the Silver Mines. They use to mix it with Tin, that it may confer splendor and hardness to it, and that being melted it may run more easily. They also make of it Vessels of divers sorts, which are like Silver in colour.

As for the Ore of this Metal, or Semi-metal, which they call *Bismuth*, or *Wismuth*, and our Artificers in *England* Tin-glass, I could never hear of any that was gotten in his Majesties Dominions; and therefore should desire all ingenious Gentlemen that are inquisitive after Minerals, and all other persons that seek or dig for Ores, to inquire if any may be heard of or discovered in this Nation, for it would be a commodity of great worth, for the Metal is very dear. Neither have I ever been so happy, as to be able to procure any of this Ore, and therefore cannot of mine own knowledge give the Reader any satisfaction about

bout the properties of it. Neither do I know that much use is made of it, in this Nation, except by the Pewterers, from whom we commonly buy it at dear rates; but that there is some use made of it in soldering the many Vessels, and Utensils that are made of those thin Plates that are made of Iron, and tinned over, we commonly call it *Crooked-lane Tin*: Neither have I seen any Vessels made of this Metal only, and if they be, they must be made by molding or casting, for of it self it will not abide the hammer.

De Nat. Fossil. lib 2. p. 575.

Agricola numbreth this amongst Metals, and reckoneth up many places where the Ore is gotten, both in its own Mine, and also where it is found among other Metals, much-what after the order before rehearsed, and therefore we shall not need to say more of it here. And *Rulandus* speaketh but to the same purpose.

De Vet. & no. Metal. l. 2. p 677.

Of this Metal *Basilius* writeth thus: Wismuth is wrought in its own Mine-stone, not quite freed from a protruding Silver, or Tin-stone, of an imperfect, pure Quicksilver with Tin-salt, and fluid silver Sulphur, of a brittle immiscible earth, partly of a crude fluid Sulphur, partly of a mixed exiccated Sulphur, according as it hath got a matrix, after it was conceived: Then it turneth a bastard of a brittle nature, easily uniteth with Mercury, and is wrought naturally in a twofold form, the one is fluid and metalline, is melted with dry Wood, being mixed with Clay, yieldeth much of white Arsenick. The other is small streaked and spissie, remaineth an unripe substance, yields a fixt Sulphur instead of Arsenick; both these are silver Wismuth.

Last Will and Test. c. 10. p. 101, 102.

Of

Of these two fore-going, *Paracelsus* saith thus; There is found a twofold Antimony, one vulgar and black, by which Gold is purified, being molten in it. This hath the neareſt affinity with Lead. The other is white, which also is called *Magnesia*, and *Bisemutum*. This hath the greatest affinity with Tin. As for any Medicines drawn forth of this Mineral either by the way of common Chymistry, or otherwise, I do not know of any.

Cœl. Philos. Can. 5. p. 122.

3. The next we come unto, is that which *Paracelsus* called *Zinetum*, the *Germans* Zinck, and our Artificers Spelter, a Metal that hath not been known unto the Ancients, but may well be ranked among the new Metals. I do not find that *Basilius* maketh any mention of it, except he name it once, which is all that he doth in all his Works that I have perused, to the best of my remembrance, unless we should imagine (as some do) that it should be that Mineral of which he saith thus, when he speaketh of Minerals and Metals: Among these I happened to get one Mineral, composed of many colours, which had many and rare vertues in Medicine, I drew (he saith) its spiritual Essence from it, whereby in few days I cured my diseased Collegiate. Though some (and that with more likelihood) do take it to be the *Cevillus* or *Ludus Paracelsi*.

Of the great Stone of the Ancient Philosophers, Preface.

The most that we find of this strange Metal, is that which *Paracelsus* hath recorded of it, whose knowledg and experience in Minerals exceeded all other Authors that ever we have seen or read.

1. And first of this, and *Bismuth* he saith thus; When therefore the Metals are generated after this manner, to wit, when the true metallick flux, and

De Elem. Aq. c. 9. p. 282.

ductibility, is taken away, and is distributed into the seven Metals, a certain residence doth remain in the Ares, like the births or off-springs of the three first things. Of this Zinck doth grow, which is a Metal, and not a Metal. And so *Bismuth*, and others like to this, which are partly fluid, partly ductile. But although they a little adhere unto Metals in their flux, notwithstanding they are nothing but the spurious off-spring of the Metals, that is to say, they are like unto Metals, but are not Metals. Zinck for the greatest part is the spurious off-spring of Copper, and Bismuth of Tin. Of these two there are of all others the greatest dregs and remnants made in the Ares.

De Mineral. Tract. I. p. 349.

2. He saith further also, there is a certain Metal not commonly known as *Zinetum*, or Zinck. It is of a peculiar nature, and seed: notwithstanding many Metals are adulterated in it. This Metal by it self is fluxible, because it is generated of the three fluxible Principles. But it doth not admit malleation, but only fusion. Its colours are diverse from other colours, so that it is not like to the rest of the Metals as they grow. This is such a Metal (that he saith) that its ultimate or last matter is not yet known unto me. For in its propriety it cometh most neer of all unto Argent vive. It doth not permit permixtion: nor doth it permit the fabrications of other Metals, but is by it self, or alone.

Chron. Cinnabr. p. 247.

3. He hath a notable passage of this Metal, which though the *Latine* Translations have not mentioned what particular Ore it is, but have omitted it, (for what reasons I know not, except to hide it) yet in the High *Dutch* it is plainly thus, where he speaketh of

of the Metals and Minerals that are found in *Carinthia*. There are found also certain Mines of the Ore of Zinck, the like whereof *Europe* it self knoweth not. This is a singular Metal, and truly admirable by its rarity. But for its vertues in Medicine or Bismuth either; neither this Author *Helmont*, nor few of the common Chymists have said any thing; only we shall give the Reader an account what that honourable person Mr. *Boyl* doth write of them both. Some modern Chymists (as particularly *Glauberus*) have of late prepared remedies not unuseful out of Zinck, or Spelter. Of the other he saith thus; And though Bismutum have not, that I know, till very lately been used, unless outwardly, and especially for a Cosmetick, yet the industrious Chymist *Samuel Closseus*, by Calcination and addition of Spirit of Vinegar, and *Cremor Tartari*, makes two Medicines of it, which he highly extols in the Dropsie; And (to reserve for another place, what I have tried upon Tin-glass) a very expert Chymist of my acquaintance, doth by preparing it with common Sublimate (carried up, by which I remember, it hath afforded a very prettily figured body) make it into a Powder (like *Mercurius vitæ*) which he assures me he finds in the Dose of a few grains, to purge very gently, without being at all (as *Mercurius vitæ* is wont to prove violently enough) emetick. I know not what use is made of this Spelter, but only that the Brasiers do mix it with Copper, and thereof make their Cement or Soulder, for from them we have it, and that at very dear rates. The Ore of it I have not seen, nor as yet could procure, and I should be very glad to hear that any of it could be obtained, or any of it found in *England*.

Of the usefulness of Experimental Philosophy, part. 2. p. 139.

Ibid. p. 134.

C. Starkey, nat. Explic. p. 306. Pyrotech. asserted, p. 148.

I cannot pass by one thing, which a learned person, and a great Chymist, now dead, affirms to the World, in these words, speaking of *Paracelsus* his *Metallus masculus*, doth say, that it is Spelter, and is the Sulphur *Glaræ Augurelli*. And in another place saith thus; That a Sulphur may be extracted out of Venus, the *Metallus masculus* (which in a Parenthesis, I tell thee is Zinck) and so out of Lead and Tin. But though we might assert that the *Metallus masculus*, and the *Glaura Augurelli* are both one, yet we must modestly affirm, that Zinck is not the *Metallus masculus*; for Zinck is not *radix nec pater metallorum*, as the *Metallus primus* is.

4. De re Metal. l. 1. c. 21. p. 35.

The next is that which *Paracelsus* calleth *Cobaltum*, and in my judgment doth not understand it, to be the same, that *Encelius*, and many others, make to be the *Cadmia nativa*, the *Lapis æroſus*, or Stone forth of which Copper is drawn, but of another sort, which yieldeth a new, and unknown kind of Metal, otherwise he could not have described it, as he doth. For of the Copper-stone, or *Cadmia nativa*, *Schroderus* Pharmacop. l. 3 c. 18, p. 123. saith thus; The Cobalt, native Cadmia is metallick, and digged forth of the Earth, and is an earthly Mineral, almost black in colour, partaking of Copper and Silver: And is plentifully digged up, not far from *Goslar*. And that it is of so Caustical a quality, that it exulcerateth the hands and the feet of the diggers, and is reckoned among Poysons. But that *Cadmia nativa*, or Copper-stone, that we have gotten here in *Cumberland*, is not black, but pretty shining, like to a golden Marchasite, but far more heavy. Of this Mus. Worm. l. 1. sect. 3. c. 10. p. 128. *Wormius* speaketh to the same purpose, calling it *Cadmia Metallica*, to distinguish it from the *Lapis Calaminaris*,

minaris, which he calleth *Cadmia Fossilis*, of which we shall say more hereafter. Now *Paracelsus* description is after this order: Further, there is another Metal made of Cobalt, that is melted, and floweth like Zinck, having a peculiar black colour above Lead or Iron, appearing with no splendor or metallick shining, it is beaten out, and hammered, but not so far that it may be fitted for use. Neither truly is the last matter of this yet found out, nor its preparation; and it is not to be doubted but that the Female and Male are here both joined together as Iron and Steel; and these are not beaten forth, but remain as they are of themselves, until that Art do find forth the separation of them. From whence it is manifest, that this Metal, drawn from this that he calleth *Cobalt*, is neither in colour nor other properties like the Metal of Copper that is drawn from the metallick Cadmia, or Copper-stone, though they may call it *Cobalt* also. And *Rulandus* description of Cobalt seemeth to agree to this, from whence (perhaps) he had it, which is thus: Kobolt, or Kobalt, or Collet, is a metallick matter more black than Lead or Iron, sometimes Ash-coloured, wanting a metallick colour, yet it is melted and brought into places; therefore it is not fixt, but carrieth away the better Metals with it by smoak. De Mineral. l. Tract. 1. p. 349. Lex. Chym. p. 271.

Concerning native Electrum, that it hath been produced by Nature, but is now accounted by *Pancirollus* as a thing lost, and therefore he ranks it in the number of his *rerum deperditarum*; and *Salmuth* saith, that it was naturally found in the mines, and was of great esteem with the Ancients, both for its clear shining, and for its discovery of poison. And seeing it hath been found in former times, there is no doubt but that sometimes 5. Rer. deperdit. l. 1. t. 33. p. 120, 123.

it

it might be found ſtill, becauſe (however many may be of opinion that Nature decays both in general and in particular) Nature is the ſame that ever it was, and worketh as it did in former days: onely it is want of care and diligence in ſeeking and obſerving, and the covetouſneſs of men that gape after nothing but Silver and Gold, or thoſe things that they may make preſent gain of; ſo that thereby many particular Minerals are neglected, and caſt by, becauſe they know not how to make preſent uſe or profit of them; or becauſe their Ores being but rarely found, they are not known, and therefore thrown by, as hath hapned by ſome others as well as this. Alſo becauſe Art hath found out a way to commix Gold and Silver in ſuch a proportion as to the ſplendor and eye-ſight may ſatisfie, though it want the intrinſical virtue; and ſo that which is native is not ſo much ſought after, as hath hapned in the native Orichalcum, ſeeing that by Art it is now counterfeited. But that it may poſſiblybe found at ſome time and places, this inſtance from another Author both of credit and veracity, may beyond exception ſufficiently evince, who ſaith thus: I ſaw alſo a great piece of pure Electrum, of the which Bells, and Apothecaries Morters, and many other ſuch veſſels and inſtruments may be made, as were in old time of the Copper of *Corinth.* This piece of Electrum was of ſuch weight, that I was not only with both my hands unable to lift it from the ground, but alſo not of ſtrength to remove it either one way or other: they affirmed that it weighed more than three hundred pound weight, after eight ounces to the pound; it was found in the houſe of a certain Prince, and left him by his Predeceſſors. And albeit that in the days of the inhabitants

Pet. Martyr. Decad. 1. li. 4. p. 27.

tants yet living, *Electrum* was no where digged, yet knew they where the Mine thereof was; but our men with much ado could hardly cauſe them to ſhew them the place, they bore them ſuch privy hatred; yet at the length they brought them to the Mine, being ruinate, and ſtopped with ſtones and rubbiſh: it is much eaſier to dig than the Iron Mine, and might be reſtored again, if Miners and other workmen skilful therein were appointed thereto.

6. To theſe we may add another, little written or ſpoken of, but that Doctor *Forden* ſaith thus of it: Calaem may be reckoned among thoſe, which is a kind of white metalline Cadmia, brought out of the *Eaſt-Indies*, which hath both metalline ingreſſion, and metalline fuſion, but not perfectly malleable. This (if my memory fail me not) is alſo mentioned by *Linſchot* in his Voyages, but the place I remember not. I have much laboured to get ſome of it, but as yet could never compaſs any of it.

Of Nat. Bath. c. 9. p. 43, 44.

7. There is alſo ſomething ſaid of Bell-metal, that it ſhould be found natural in the bowels of the earth, of which the Author before-cited ſaith thus: Bell-metal is thought to be a mixture of Tin and Copper Ores, as *Kentman* judgeth, and is found in our Tin and Copper Mines in *Cornwal.* As for Granates that hold Metal, we have ſpoken of them before.

CHAP.

Chap. XXVIII.

Something more of Galena, Lapis Plumbarius, *native Cadmia, &c. As also of Chrysocolla, or native* Borax, *Cæruleum, native* Blue, *Ærugo, native Green,* Talk, *Magnes, the Load-stone, Hæmatites, the Blood-stone, Schistus; The Lazul-stone, and of Metallary stones, and the like.*

1. ALL that we shall say he reconcerning *Galena, Plumbago, Lapis Plumbarius*, and *Molybdena*, (*Encelius, Rulandus*, to whom we may adjoin *Wormius*, do make a long discourse, and bring many Arguments to prove that they are all one) is that there is much said to little purpose, and that in some respects they may be taken for all one; seeing it is a truth that no Lead Ore is found so poor, but that it containeth something of Silver, (as all experience will make good) yet often so little that it is not worth the charges of refining; and oftentimes in so an extream minute proportion, that it will deceive the best and most curious Artist that doth but try it by small quantities in the Cupel or Test. But if the Workman will take a pound of the poorest Lead that may be, (that hath not been refined before) and calcine it in an Iron Vessel until all that can of it be turned to Litharge, then let him take that small quantity, and purifie it upon the Test, he then shall find it will yield some Silver, whose quantity in a pound or more of the Lead may soon be calculated. And

Vide Encel. de re Metal. l. 1. c. 34. p. 66. & Ruland. Lex. Alchym. 374. & Musc. Worm. li. 1. Sect. 3. c. 10. p. 127. Agricol. li. de nat. Fossil. 10. p. 655.

And therefore the most experienced Essay-masters will not use any Lead that hath not been calcined into Litharge, and blown up again into Lead, lest thereby they be deceived in their trials. But however, that in this respect they may be accounted all one, in regard that there is none of them but they hold both Lead and Silver, yet notwithstanding I hold that the main difference lieth in this, that it is to be accounted *Galena* when it holdeth a sensible quantity of Silver, or however when it holdeth as much Silver as may make it a Mine Royal: but if it hold no sensible quantity of Silver, then it may be called *Plumbago*; and this I wish every Test-master and every Miner seriously to mind and consider of.

2. Besides what we have before said of native *Cadmia*, which we have shewed that the Germans call it **Kobalt**, and containeth Copper most commonly, sometimes Copper and Silver, and sometimes Gold, Silver and Copper. The best distinction of it is to call it *Cadmia Metallica*, thereby to difference it from the *Lapis Calaminaris*, which the Germans call **Galmei**: It is of yellowish colour, and of a more soft stone, or of the nature of more hard earth. They use it to ting Copper into a golden colour, that thereby it may be made artificial Orichalcum. *Wormius* saith he had three sorts of it, one of an Ash-colour, another rubicund, the third something yellowish.

Musc. Worm. ut supra, p. 128. Vid. Lexicon Alchym. Ruland. p. 120, &c

3. For native *Chrysocolla* (for we speak of none else here) which by the Greek name signifieth as it were the glue of Gold, because its use was to glue or cement Gold; the Germans call it **Steingrun, Schifergrun, Bergtgrun.** This Nature produceth in fibres and holes, and it is sometimes found like to

Musc. Worm. ut supra.

Sand, sometimes a metallick matter doth cleave unto it. It is digged up in *Hungaria*, *Bohemia*, at *Goldberg* in *Silesia*, and in other places. *Rulandus* saith, it was gotten in a thousand places in *Germany*, and might be called *Chrysocolla viride sciſſile*, as *ærugo* is called *Viride æris rasile*.

Lex. Alchym. p. 146.

The native *Chrysocolla* is only in Metals that hold Copper, and is only made out of Copper; and if it be sometimes found in Gold, Silver, or Lead Mines, the Veins of those Metals are mixed with Copper. Its goodness is esteemed by its colour and strength: for all that which is native is green, some to a full green; and by how much more it cometh nearer the greenness of the Emerald, by that it is esteemed better: othersome is a weaker green, which is the worst, and there is some of a middle sort. I have some native green that was gotten in the crevises and little holes of stone, that seemed like unto Cadmia or Copper-stones, and were gotten in a Lead Mine, a little distant from the Lead Ore, and had a vein or rake of stones or Copper Ore of the same nature. And great plenty of it might have been got, but that the Workmen seeking only for Lead Ore, and knowing no use to be made of it, would follow it no longer: but whether it be the native Chrysocolla, or native Ærugo, I am not yet satisfied, nor can be certain whether or no they be two different things, or but one; for Authors seem to make them two, but shew no distinction except the names, of which more anon.

Musæ. Worm. Loc supra, p. 129.

4. Cæruleum or native green, (which is like that which our Women in *England* use to make their blue Starch with, and they call it Powder-blue, and is artificial, and made forth of the *Lapis Lazulus*, or *Armenus*)

menus) is found in many several places, and *Rulandus* reckoneth these sorts.

1. That which is ultramarine, or from *Cyprus*, which is most fair, found in an Ash-coloured earth, and like the best sort, that is factitious.

Lex. Alchym. p. 161.

2. Very famous natural green from *Sneberg*, something cloddy and hollow within, which is digged forth of a white sandy earth.

3. From *Padua*, which is found in clods of earth of a deep Ash-colour.

4. Native, from *Thuringia*, which is digged up besides *Muchel*.

5. Native, copiously found adhering to an hard, thin, Ash-coloured earth.

6. Native, and pure from *Poland*.

7. From *Poland*, with hard sandy white earth.

8. Found with a rude white stone.

9. Native, from *Spain*, in which Gold doth appear.

10. From *Sneberg*, cleaving to rude or bare stones.

11. From *Islebia* in a Slate-stone.

12. Native, from *Goldberg* found with Chrysocolla in a vein of Iron, in a white stone that melteth in the fire.

13. Native, from *Sneberg* with Chrysocolla, being pure, sticking in a white Flint distinctly.

14. Native, at *Gieshubelia* in a Fire-stone, out of which Silver is drawn; it is mixed with a concrete green juyce, and sometimes placed like Girdles or Zones, out of which it flowereth with pleasantness forth of the Vein. *Encelius* tells us, That it was found in the Pits or Mines of *Cyprus*, and that it was found in their Gold and Copper Mines, as at *Lanterberg* in

De re Metal. c. 22. p. 123.

Saxony, at *Hircynia*, and at *Goldberg* in *Silesia*: And that the best sort of it was found there, and they call it **Schifer blaw**, and that it grew in *Hungaria* and *Lotharingia*. I have gotten good store of this of a pure blue colour, in those stones that I mentioned last above, that were something like Copper stones, pretty pieces almost as great as Hazel-Nuts, contained in the holes of the stones, that were full of such cavities or holes, and also the green stuff (which is either Chrysocolla or Ærugo) in small pieces, and contained in lesser holes. I have been the larger in this particular, because our English Miners do altogether neglect these, and such other like things, as knowing no use or profit to be made of them, when doubtless they might both be of benefit and good use.

6. As for native Ærugo, which the Germans call **Kupffergrune**, or **Spangrune**, I find little of it, only *Eucelius* tells us, it is found in the Metals of *Cyprus*, the stones having something of Copper in them, out of which it flowereth, but that this is little, and the best, and that it was also found in Copper Mines in *Germany*. Whether this and the native Chrysocolla be all one or not, I shall not take upon me to determine, but leave it to the experience of others, though I should rather incline to believe that they are but all one.

De re Metal. l. 1. c. 27. p. 53.

7. Concerning Talk, there are many opinions among Authors about it, some taking it generally, and comprehending under it the *Lapis Specularis*, *Amianthus*, and *Talcum* strictly taken; *Agricola* calls it *Magnetis*, but seems to confound it with Mica, Cat-silver, or Glimmer; and that description that *Rulandus* gives of it, agreeth rather to Mica, than to that Talk that we

we have sold in shops; and therefore we shall only take what *Schroderus* and *Wormius* say of it, and the former thus: The Talk of the shops is like the *Lapis Specularis*, but it is more thin and rough, or full of scales, of a greenish colour, resisting the fire, and fixt. It is called of some the stare of the earth, and by the Germans **Talck**; there is found also red Talk and black, but they are less used in shops. That is thought the best which is brought from *Venice*, that from *Muscovia* is equally as good, that is most approved of that is chiefly greenish. *Wormius* saith thus of it: It is a soft stone like to the *Lapis Specularis*, to be divided into plates, bending, and variously intricate, of a Silvery white colour, bluish gray, sometimes blackish, unconquerable by the fire, for it is neither to be melted, nor burnt, nor loseth its colour, except by great violence. It is found in many places of *Germany* and *Norway*, and its kinds are distinguished according to its colours. He saith he had clods or lumps of white and Silvery Talk brought forth of *Germany*; but the more impure and grayish was brought from *Norway*. He also had some small pieces of a golden colour. There was also black brought from *Norway*, which had joined the Ore of Gold with it, that gave great hope of gain. The Talk that I have commonly seen and had, is much agreeable to these descriptions, it being white and Silvery with some greenishness, and may be severed or cleft into small tires or threds, and doth long resist the fire, and hardly to be consumed by it. It is a good vendible Commodity, and therefore may concern the Miners to take care to enquire and search after, for there is little question but some of it may be met withal in some of our Mines in *England*.

Phorm. Min. Chym. l. 3. c. 8. p. 42.

Mus. Worm. l. 1. Sect. 2. c. 7. p. 57.

land. *Paracelſus* reckoneth three ſorts, white, red, and black Talk.

7. As for the Magnes or Loadſtone, we mean no further to treat of it here, but as far as may enable our own Country-Miners to know and ſearch after the ſame. *Wormius* deſcribes it thus: It is an hard Stone, ferrugineous, or irony, and blackiſh, which draweth or rejecteth Iron, or another Loadſtone, and ſheweth the quarters of the World. It is found in divers places, for the moſt part in Mines of Iron, from whence alſo it containeth much Iron in it ſelf. For all that body that doth attract, is not the Magnet, but there is in it a Magnetick Vein: Therefore in certain places in *Germany* they draw moſt excellent Iron forth of it. In *Italy* in the mountains of *Viterby*, and in *Ilna* where it is found, outwardly it is of a ruddiſh colour, within when it is broken waxing black, and a little tending to blewiſhneſs though obſcure; in attracting very efficacious, while it is ſmitten it trembleth, being covered with a certain dawn which goeth to the Iron, if it be admoved unto it. Alſo it is digged up in divers places in *Germany*, near the Valley *Joachim*, *Swartzberg*, *Sneberg*, &c. Alſo (he ſaith) they had it brought from *Norway* of great ſtrength, of which he could ſhew ſome. Like this deſcription are thoſe fragments that we buy at the ſhops, as alſo that which we have capped with Steel, and bound with Braſs or Silver, and thoſe round ones that we call Terrella's. Doctor *Merrett* ſaith, That there is of it of good note found in the Rocks of *Dartmoore* in *Devonſhire*, and of worſe ſorts elſewhere. And I have had it from ſome Gentlemen of very great worth, that lately there is found good ſtore of it in the foreſaid County, of very excellent

Muſ. Worm. l. 1. Sect 2. c. 9. p. 62.

excellent force and virtue. And I make ſmall doubt, that ſeeing we have ſo many Mines of Iron-ſtone in his Majeſties Dominions, if the Workmen had skill in knowing of it, and were diligent and obſervant, it might be found in many places; which I commend to all ingenious and laborious Miners.

8. Of this ſtone Hæmatites *Wormius* ſaith, That it is ſo called either becauſe it is of a ſanguineous colour, or elſe being rubbed againſt wet Whetſtones, it yieldeth a bloody colour, or becauſe it is prevalent in ſtanching of blood. It is a ſtone of the colour of coagulated blood, but more obſcure, hard, and indowed with ſtreaks like Antimony; it is cloddy, and ſtayeth bleeding. It ſeemeth to be of a middle nature, betwixt Earth, Stone, and Metal, when it is compacted into a ſtony ſubſtance, from the ſhavings or ſediment which the water hath worn from Ruddle, or ſome red ſtone. It is in divers places in *Germany*, betwixt the Mines of Red Oker or Ruddle and Iron, as in the Valley of *Joachim*, and near *Hildeſheim*; but above the reſt, that which cometh from *Spain* is commended; that which is brought from *Compoſtella* is of an angled figure, having the colour and ſplendor of blackiſh Iron. It is decocted into Iron, and containeth Ruddle in the cavities, ſometimes it is obſerved to attract Iron obſcurely: of this *Rulandus* reckoneth theſe ſorts.

Muſ. Worm. l. 1. Sect. 2. c. 9. p. 64.

1. That which is of a black colour, found at *Goſlaria*, yielding a yellow juice, moſt hard, and is unknown to the ſhops. Lex. Chym. p. 250.

2. It is digged up in many places in *Haſſia*, and is of a purple colour, and to be cloven.

3. Very fair is digged up in *Geurg*, and *Anneberg* of

of *Salfield*. This the Goldſmiths commend, becauſe it is moſt hard upon the Whetſtone to poliſh Gems. It is black, and ſharp like a Topp. So the moſt that we have from the ſhops is of the aforeſaid figure, and of a bloody or Liver-colour.

9. The next is the ſtone *Schiſtus*, for which I want an Engliſh name, and Authors do diſagree much about it. Some by it underſtand ſome kind of the Amianthus, or the *Lapis Specularis*, or *Alumen Scaiolæ*, or a cleaving ſtone, which they vulgarly call **Quartz**. But (ſaith *Wormius*) I take it with *Agricola* and *Cæſalpinus* to be a certain kind of the Hæmatites, or Blood-ſtone; and *Agricola* would that the name of Schiſtus be attributed unto it, not either that it is eaſie to be cloven, or that it is cloven, but that after a certain manner that it ſeemeth ſo. For by the mutual Compoſition of its parts, which have increaſed ſtraight like wood, it is like to Ammoniack Salt. As well the Schiſtus as the Hæmatites are either like to concreted blood, or to Iron, and then ſometimes ſome of the external parts are of the colour of Saffron. In this at the leaſt it ſeemeth that a difference is ſet, that the Hæmatites or Blood-ſtone is almoſt always in the figure of a clod; but the Schiſtus, either in one part or both, is formed like a Wedge. The ſum is as much as may be gathered from *Agricola*, that he acknowledgeth no difference betwixt them, but that which conſiſteth in the figure.

Muſ. Worm. Ut ſupra.

To this (as near a kin) we may ſubjoin the ſtone called *Smiris*, in the High-Dutch **Smirgel**, and we after the French name call it **Emerg** from its abſterging faculty. It is a ferrugineous or irony ſtone, inclining to blackneſs, ſo very hard, that the Lapidaries do

Muſ. Worm. Ut ſupra. p. 64, 65.

do uſe it to ingrave in Gems, and to poliſh Arms. Becauſe to the watery Touchſtone or Whetſtone it yieldeth a ſanguineous juyce; of ſome it is accounted a certain hard ſpecies of the Hæmatites. It is found in the Iron Mines. Theſe we have enumerated, that all ingenious perſons might ſearch after them; for if we could find any Smiris, or Emery in our own Country, it would be of great profit unto many.

10. The *Lapis Lazuli*, which the *Germans* call **Lasurſtein**, is an hard ſtone of a blue colour, adorned with little pricks, and veins of a golden colour. It hath great affinity with the *Lapis Armenus*, according to colours: but the *Lapis Armenus* is not ſo hard, neither hath it golden veins, and eaſily yieldeth into Powder and friability. They ſet down two ſorts of it, one indureing the force of the fire, the other not. That which is fixed, and doth not change its colour in the fire, is brought forth of the Eaſt, from *Aſia* or *Africa*, and is called *Oriental*, and is known by its fixedneſs. That which is not fixed, is found in certain places of *Germany*, and is of a middle kind betwixt the *Armenus* and *Lazulus*, for this is ſofter, that is harder. I have ſpoken thus much of this Stone, becauſe it is a good Commodity, and ſold dear, and it may be that ſome of it might be found in our Nation. That which I have ſeen of it is of a fine blue colour, interſperſed with little lines, or ſmall ſparks of a pure golden colour, and is very hard: Some have called it the Marchaſite of Gold, and do believe that Gold doth grow in it, and may be drawn forth of it; but I could never yet procure ſo much of the beſt ſort of it, to wit, that which is full of golden ſtreaks, as to make any certain or conſiderable trial of it.

Ut ſupra.

11.

Mus. Worm. l. 1. Sect. 3. c. 11. p. 150.

For metallary Stones they are of divers sorts; growing or cleaving to the Metals, sometimes on one side, sometimes on another, and sometimes on both, and are as it were the Matrixes, or Coats, wherein the Metals lie inclosed: Forth of which also Metals are drawn, or decocted.

1. The first is the *Saxum Fissile*, which I take to be that which we call slate, which may be cloven into thin parts, and is of divers colours, as blue, sometimes blacker, sometimes whiter, and the like; some refer this to a Fire-stone, and some to other things.

2. The second sort is that which the *Germans* call **Quartz**, which sometimes is most white, sometimes a little yellowish, sometimes grayish. To this sometimes sparks of Gold do adhere.

3. The third is *Spatum*, (for which I know no *English* word) that is more smooth, and hard than the rest; by some it is called *Metallary Marble*. Of this (he saith) he had divers kinds brought from the Mines of *Norway*, where Silver was gotten. One that was barren, and contained no Metal nor other Mineral, white, and cut into pieces. Some mixed with Fire-stone, or is with barren Galena, or with Galena, Fire-stone, and Silver. By which we may discern what various mixtures Nature exerciseth in the Mines.

4. The fourth is *Saxum Corneum*, or Flint, **Horn-stein**, which appeareth most hard, of the colour of Horn, whose parts are sometimes so continuate, that one cannot discern one from another, sometimes conspicuous by some Intersection.

5. *Lapis Arenosus*, as though compounded of Sand, called **Sandt-stein**: this is that which we call Free-stone,

stone, some of it being of a very small grain, and is hewed for building withal, and some of a far coarser and rougher sort, and some hard, and some so soft, that it may be crumbled with the fingers.

6. That which they call *Mica*, or *Magnetis*, is a metallick body, that doth shine in Marbles and Sand, as also in Stones, but cannot be separated from them, the *Germans* call it **Katzensilber**, and **Glimmer**, that is Cat-silver, because it shineth in the night like the eyes of Cats. Of it (he saith) he had some sorts, one alone, not having any admixture, another in a Stone with a Fire-stone, a third in Sand. That it is not fixt, but is consumed with the fire, and is almost of no use. *Encelius* tells us that it hath the colour of Silver, and is of no use, and in the opinion of the Vulgar is consumed in the fire. But (he saith) if we consider more warily, it is not consumed, no more than the true Amianthus, but is only purged, and assumeth another colour, otherwise it is of no worth. I confess I know not what this is, nor could ever yet perfectly learn of any person, unless it should be some of those silver-coloured Marchasites or Fire-stones, of which we have plenty, that are of a glorious shining white colour, but being fired yield only a stinking smell of Sulphur, and leave some black dross behind them, but are of no use at all.

De re Metal. l. 3. c. 29. p. 213.

Chap. XXIX.

Of the Transmutation of Metals.

Concerning this great dispute of the transmuting of one Metal into another, we intend not here to demonstrate the possibility of it, for as the Philosopher said well: *Quæ experimento oculari videntur, probatione non indigent.* Only we shall labour to examine, and open the nature of Transmutations, and to shew some sorts of Transmutation, that are common and obvious, and full as strange as this of Metals, and thereby shew that it is no such impossible or wonderous thing, as many that would seem wise and learned do labour to make manifest. So leaving general Arguments, as either to confirm or confute, we shall stand upon some instances that may sufficiently demonstrate the way and manner thereof.

And as for Mutation, Transmutation, or that which is commonly called Generation, we shall not stand upon the strict logical definition, which we do not perceive, yet is perfectly known, but rather make a search what the nature of it may be; that hereafter it may be better understood and sought into, yet (we suppose) that thus much may be granted, that there can be no Generation, but of necessity there must be Mutation; for though that all Mutations be not Generation, yet must every Generation of course be a Mutation, and it is most certain that no Mutation can be but by motion; so that in this the Schools have not far missed it (to give them their due, where, and when

when they deserve it) that all Generation is some kind of Mutation, and so must needs be a species of motion: But yet by all this we come not perfectly to know what Generation is in its true nature and intrinsical essence and operation, nor the plain and true manner how these Mutations are wrought, by the means of motion in or upon matter, but only are left to be puzled with hard terms, and blind notions, as any person may very well perceive that shall read and seriously consider what these few Authors quoted in the margent have written upon this subject.

Arist. 5. Phys. c. text. 4. 8. Physiol. Jo. Magyri. l. 1. c. 5. Jac. Zabarel. l. de gener. & interit. c. 3 4, &c.

We might here fall into those strange Mutations that happen in the Animal and Vegetable Kingdom, that appear in the Generation of those things; but that would lead us at too far a distance, though they would mightily conduce to open and illustrate the matter we have in hand; and therefore we shall leave them, as things that have been both learnedly and accurately handled by that learned Physician *Sennertus*, *Fabritius ab Aqua pendente*, the incomparable *Johannes Marcus Marci*, in that curious piece of his styled *Idæa Idearum Operatricium*, by our never-sufficiently-praised Country-man Dr. *Harvey*, in his profound piece *De Generatione*, as lastly, by that learned Physician and Anatomist Dr. *Highmore*, in his Treatise *Of Generation*, which though little in its bulk, is not little in weight and worth.

But we shall contract our selves into a closer compass to fall upon some mutations, (or transmutations rather) produced by Nature, or Art, that will sufficiently serve to make forth what we intend concerning the Transmutation of Metals, only we shall premise this,

That

That all Tranſmutations are made ſome of theſe three ways, or by two of them, or all joined together.

1. By adding of ſomething to the thing or ſubject to be changed that it had not before.

2. Or by taking away, and ſeparating from the ſubject that is to be changed, that was in it before.

3. Or by reaſon of motion ſo to alter, diſpoſe, and order the contexture of the parts, that thereby it appeareth another thing than what it was before. And either all of theſe, or ſome of them do concur in every tranſmutation, or elſe there cannot be any. Now we ſhall give ſome Inſtances to make good theſe Particulars, and examine the manner of Tranſmutation by them.

And firſt of that Tranſmutation which is produced by Nature, in which Art hath little or nothing to do, as in petrifying of wood, leaves, moſs, graſs, and the like, which is for the moſt part done either by Water or other lapideſcent Juyces, or ſteams turning the forementioned things into a ſtony matter or ſubſtance. The firſt we ſhall name (as being moſt known unto us) is that famous Dropping Well near the ancient Town of *Knaresborough* in the Weſt-riding of *Yorkſhire*, mentioned in our *Britiſh* Authors, by our learned Antiquary Mr. *Camden*, and of late written by Dr. *Dean*, and Dr. *French*. The latter of which ſaith of it thus; If any ſtick or piece of wood lie in it ſome weeks, it will be candied over with a ſtony whitiſh cruſt, the inward part of the Wood continuing of the ſame nature as before. But any ſoft ſpungie ſubſtance, as moſs, leaves of Trees, *&c.* into which

Yorkſhire Spaw, c. 16. p. 117, 118.

which the Water can enter, will thereby in time become ſeemingly to be of a perfect ſtony nature and hardneſs. Now the cauſe of this petrifying property, as Philoſophers call it, is *ſuccus lapideſcens*, *i. e.* a ſtony matter, which is in its *Principiis ſolutis*, for indeed the *Principia ſoluta* of all things, whether Animals, Vegetables, Metals, or Minerals, are in a liquid form, and are concreted by degrees, by a natural heat ſeparating from them all accidental humidities, and fixing them into their proper ſpecies. When the water with which this *Succus lapideſcens* is mixed, is in part waſted by the Sun and Air, it doth then depoſite it, as being too heavy for it any longer to bear it. And when that is depoſited, and faln down, it doth by a continued addition and concretion in time amount to a conſiderable ſtony moſs, *&c.* From whence we may note,

1. That by his obſervation and judgment, the ſtony ſubſtance bred by the water, is nothing but the appoſition and fixing of the ſmall ſtony particles hid in the water one unto another, which is meerly Aggregation, and ſo comes to increaſe the bulk or quantity by continual addition. And thus far according to this ingenious perſon and learned Chymiſt, here is nothing at all of Tranſmutation, but that the moſs, leaves, *&c.* become ſeemingly of a perfect ſtony nature and hardneſs.

2. Yet if we look a little more warily, we ſhall find not only an Aggregation of theſe ſmall ſtony particles, and an Incruſtation upon the out-ſide of the moſs and leaves, but even that the ſubſtance of the moſs and leaves, and the ſmall atomes of them are meerly petrified as far as our eyes, or the beſt Mi-

Microſcopes can inform us. And though the thicker and greater pieces of Wood, be not in ſo ſhort a time petrified, as are moſs, graſs, and the leaves of Trees, yet in a longer continuance of time, Wood of a conſiderable bulk, will be totally ſtonified both in the Internal and External parts: So that by this Water of the dropping Well, ſtones are not only bred by Aggregation of ſmall ſtony particles, nor Wood and Moſs only cruſted over with a ſtony Concretion, but alſo that the Moſs, Leaves and Wood, are really changed into a ſtony ſubſtance. And though the Explication of the true manner and way how it is done may be occult, and yet require the ſtudy of many Obſervators, and doth not belong to our preſent enquiry, curiouſly to ſearch forth: Yet thus much is evident, that upon the ſuppoſition, that the Moſs, and Leaves, *&c.* and the ſmall parts of them are truly changed into a ſtony nature, that then the aerial part, or the *Globuli æthereî* (as *Carteſius* calls them) are by the entry of the ſtony particles contained in the Water, extruded, and ſo ſeparated. Whereby two of the particulars are made clear; Firſt, that there is ſomething ſeparated from the thing changed that was in it before, and alſo that there was ſomething added, as the ſtony Particles, or petrifying Steams or Atoms that was not there before, and conſequently that there muſt be an alteration of the contexture and poſition of the particles of the body changed. But becauſe the ſtreſs of the matter lies what Tranſmutation is, which we are ſearching after, and yet it may be doubted whether or no there be any real Tranſmutation at all, *quoad naturam, ſed ſolummodò, quoad nos*, as when by a due proportionable commixture of

of Sand and Aſhes, Glaſs is made, which *quoad nos*, and in relation to our ſight is tranſparent, which neither Sand nor Aſhes are; and yet the Sand and Aſhes in their primitive nature and principles remain as they were, the individual particles of either of them being not changed, as may appear by the reducing them to the ſame Sand and Aſhes that they were before, which may be made manifeſt not only by the Alkaheſt, (only known to Adeptiſts) but alſo by other means that may and can be ſhown by expert Artiſts: And alſo when that Silver is diſſolved in *Aqua fortis*, according to our ſight it is changed, and the water remaineth tranſparent, and the Silver may again be ſeparated from it, as is known unto every expert Goldſmith: it may very well make us doubt whether there be any real Tranſmutation or not, but what is by addition, diminution, or altering of parts. And therefore we ſhall quote ſome more inſtances, omitting that of *Hector Boelius* of the Pond in *Ireland*, that if a piece of Wood be ſtuck down in it, at much of it as is in the earth or mud, is in the ſpace of a year turned into Stone; that part which is in the water, is turned into Iron; and that which is above the water doth remain Wood; ſo that the ſame entire piece is Stone, Iron, and Wood; which were a moſt ſtrange relation, and fit inſtance if true. But though we have had it affirmed by a learned Phyſician that lived long in *Ireland*, and that others do maintain that our Iriſh Stones or Whetſtones are of the ſame petrified Wood, (as the grain or bait would almoſt perſwade) yet becauſe the forecited Author is noted to be fabulous, and much ſuſpected in many things, and it not proved by later Authorities; therefore (I ſay)

Hector. Boetii Scot. regn. deſcript. p. 9. Sect. 50.

De Lithiaſ. l. c. 1. p. 13.

ſay) we ſhall omit it, and ſo come to ſome of thoſe that the faithful and Learned *Helmont* hath noted from Authors of better credit, who telleth us; For ſo the hand-glove of *Frederick* the Emperour was petrified in that one part of it that lay wet in the Spring, but the other part being fenced with a ſeal, remained Leather: ſo that not only Herbs, Woods, Bread, Iron, Eggs, Fiſhes, Birds, and Quadrupedes, were by a wonderful Metamorphoſis petrified; but by the teſtimony of *Ambroſius Pareus*, a Child at ripe age was cut out of the Womb petrified, which his friend told him that made Mathematical Inſtruments, that uſed the back of that petrified Child for a Whetſtone; and more to the ſame purpoſe he relateth in the ſame Chapter, from whence amongſt others he draweth theſe Concluſions.

1. That whereas other ſeeds require that the ſubſtrate, or ſubject matter be reduced into a ſequacious, or an obedient liquor, and ſuſceptible of the ſeed, which they have called the firſt matter of Generation, and do require that alſo that the figure, and all the comelineſs of the precedent Concrete be deſtroyed: yet the petrifying ſeed, the humane figure, being preſerved, without any intervening putrefaction, or diſſolution of the matter, doth petrifie the whole through the whole, to wit, as well the bones as the skin.

2. That the petrifying ſeed doth conſiſt alone in a ſaxeous or ſtony odour or ſteam, which is an incorporeal and inviſible Ferment.

We ſhall not here quarrel with this experienced and Learned Author, but only note theſe two things.

1. That whereas he placeth this petrifying quality in an odour or ſteam, which he maketh inviſible and in-

incorporeal, I take him by incorporeal, not to mean meerly that the ſteam is altogether ſpiritual, as the Schoolmen and Metaphyſicians underſtand, but that it is ſo ſubtile, tenuious and fine, that it is not liable to our ſight; and in regard of other more groſs bodies, may be called and accounted incorporeal.

2. He plainly holdeth forth petrifaction, not only in the ſuperficial parts, but that it is *totum per totum*, as well in the bones as in the skin, not only by incruſtation, or adheſion of the ſtony matter to the external parts, but by a real changing (in Animals) of the bony, ſinewy, muſculous, and fleſhy parts intrinſically and thoroughout, into a ſtony ſubſtance; to verifie which, more Authorities may be added to *Helmont*, as that of *Penſingius hiſtoria infantis, in abdomine inventi, & in duritiem lapideam converſi.* And ſomething of this nature in that accurate and ingenious piece of Mr. *Hooks* Micrography, as alſo much of this nature may be ſeen in Mr. *Boyles* Eſſay of firmneſs, and in ſome other places, to which I remit the Reader.

Micrograph. obſerv. 17. p. 107, 108, &c. Vid. Philoſ. Tranſ. n. 6. p. 101.

Now in all this that the Learned *Helmont* hath noted, or the reſt, it will appear that this ſaxeous Odour, or ſeminal Ferment, how thin or fine ſoever it were, is of a bodily nature, and ſo piercing the body to be changed, whether of Animals or other things, as Iron, Eggs, Leather, or the like, it doth add ſome ſuch ſteams and particles as were not there before, and ſo doth augment the quantity or weight, if not both; which was one of the things required to be proved. Again, by the ingreſs (which muſt be by motion) there muſt of neceſſity be a ceſſion of another body, which can be nothing but the Aiery Atoms, or Æthereal Steams, contained before in the porous parts of

the body to be changed, which are thereby extruded and separated; which was another thing to be proved. And as for the third, it necessarily follows, that when a softer body is changed into an harder, or a more fluid body into a firm, the parts are joined more close together; and however all motion in bodies must of necessity make a change of the position, contexture, and order of the minute or smaller parts. By all which we shall only urge thus much, That this petrification is as strange as that which the Philosophers call the Transmutation of Metals; as may appear by the comparing of their efficient causes, the manner of their operations together, and also of their effects. To make which plain, we shall here once for all lay down the requisites, and manner of metallick Transmutation; and so as we go, shew their accord or disagreement.

And first, in the Philosophers Transmutation of Metals, they have their subject which they intend to transmute, (to use that common word, though truly the thing that they do, is only to maturate and meliorate) which is some of the more base Metals (as they are commonly stiled) for as they never mean to change Gold into Gold, for that would be no change: so in the intent of Nature and its Operation, a Stone cannot be said to be changed into a Stone. And in this the Transmutation of Metals, and of changing Wood, Moss, Leaves, Animals, Iron, and the like, into Stone, doth agree that they both have a substrate, or subject matter to work upon, and so the one not to be wondered at more than the other: but there are two properties wherein they differ.

1. For first, in the petrification wrought by Nature, the things changed are not always contained under the same proxime *genus*, and the thing working the effect of stonifying is of a Lapideous or Mineral nature, and (according to common opinion) neither contained within the Animal nor Vegetable Kingdom, and yet are wrought upon by that petrifying agent, when in the Philosophick Transmutation, the thing changed is under the same proxime *genus*, with the nature of that which it is changed into, being both of a metallick root and nature, and so is less wonderful than the change made by Petrification.

2. Secondly, the things wrought upon by the petrifying agent, are more remote from that stony nature into which they are changed, whether they be Animals or Vegetables, as having had no prævious Preparation, to fit them for the susception of the Operation of that petrifying power: whereas in the Transmutation of Metals, the Metal to be changed is to be made as clean as Art is able to perform, according to that true and certain rule of our Country-man *Ripley*, who saith:

For who that joineth not the Elixirs, with bodies made clean,
He woteth not sykerly what Projection doth mean.

2. Secondly, And as the agent in the change wrought by Petrification, is (according to the doctrine of *Helmont*) a petrific Seed, consisting only in a saxeous odour, or invisible ferment: So the agent in metallick Transmutation, is a Seed of an aurifick or argentifick nature, for it is known to all that are Masters,

12 Gates, p. 189.
De Lithiasi c. 1, p. 13.

sters, that the Elixir or small part of that which they call the Philosophers Stone, or Tincture, hath a seminal power, able to produce its like, according as it was specificated by Fermentation. Which is sufficiently confirmed by that faithful description that the experienced *Polonian* hath given us, who saith, *Lapis Philosophorum, seu Tinctura nihil aliud est quam aurum in supremum digestum, nam aurum vulgi est sicuti herba sine semine, quando matureſcit producit semen, sic aurum quando matureſcit, dat semen sive Tincturam.* And again, *Aurum potest dare fructum & semen, in quo se multiplicat industria sagacis artificis, qui scit naturam promovere, sed si absq; natura, id velit tentare, errabit.* To which doth agree that often quoted saying of *Augurellus.*

No Lum. Chym. Tract. 10. p. 330, 331.

Theatr. Chym. Vol. 3. p. 203.

Hordea cui cordi demum serit hordea: ne tu
Nunc aliunde pares auri primordia: in auro
Semina sunt auri, quamvis abstrusa recedant
Longius, & multo nobis quærenda labore.

So that as they agree in having a subject matter to work upon, and in their agents, that they are both of a seminal power; so there is no cause to account the one strange or impossible, and the other not, except it be by reason that petrifying is more common, and the change of Metals, but seldom or rarely seen, which though it might stagger vulgar brains, yet can be of no moment to a learned and considerate mind.

3. Thirdly, They agree in the manner of their Operations, for in the act of Petrification, there is the saxeous odour or seminal ferment added to the thing changed,

changed, that was not there before, and the airy steams or particles are extruded forth of the body changed that were there before, so that the Position and Contexture of the small Particles of the body changed are thereby altered and changed. So in the Tranmutation of Metals, there is added some small part of the Philosophers Tincture unto the Metal (as suppose it Lead, or Quicksilver) that is to be changed: And also there is something that is separated from the body changed that was in it before, as less or more of that which some call the external, separable and combustible Sulphur; but *Trevisan* calls it *Scoriadrosse*, which being indeed of an Heterogeneous and differing nature from the Homogeneous Mercury, did make its small parts that were Homogeneous one to another, that they could not so nearly be joined *per minima*, which by the ingression of the small quantity of the Tincture are extruded and separated. But to illustrate this, we shall give the unquestionable testimony of *Helmonts* experience, who saith, *Cogor credere lapidem aurificum, & agentificum esse, quia distinctis vicibus manu meâ unius grani pulveris super aliquot mille grana argenti vivi ferventis, projectionem feci, &c.* And that a great multitude standing by, the matter, with the tickling admiration of them all (it seems himself not excepted) did succeed in the fire, as the Books of that Art do promise. And that he that first gave it him (so that it seems he had either given a second time, or more, or else he had made it himself, because he had of divers proportions) was a stranger, and but a friend of one nights acquaintance, and had at the least so much as was sufficient to change two hundred thousand pounds into Gold.

Arbor. vitæ. P. 793.

Gold. And that he gave him half (a grain he calls the ſixtieth part of a dram) and from thence 9 ounces of Quickſilver, and ½ were tranſmuted: which was an high proportion and noble exaltation.

Vita æterna. p. 543.

Again, That he had once given him (which differs from the other) the fourth part of a grain, which fourth part of a grain being wrapped in Paper, he projected upon 8 ounces of hot Quickſilver in a Crucible. And forthwith the Quickſilver with a certain noiſe, ſtaid from the flux, and ſetled like a yellow lump or morſel, and after being melted, with the blaſt of the bellows, there was found 8 ounces of pure Gold, wanting eleven grains. Therefore that one grain of that Powder had tranſmuted into the beſt Gold, of Quickſilver equal parts to it ſelf 19186: which was a moſt noble Multiplication exceeding the former.

Demonſt. Theſ. p. 671.

Again, he confeſſeth that ſometimes, or divers times he had handled it in his hands, and with his eyes ſeen the real Tranſmutation of common vendible Quickſilver, in proportion exceeding in weight the Gold-making Powder ſome thouſands of times; and that it was of colour like Saffron in its Powder, but very ponderous, and ſhining like beaten Glaſs, when it is leſs accurately made into Powder, and that once the fourth part of a grain was given him of it. And this he incloſed in Wax, leſt in throwing it into the Crucible, it might be diſperſed by the ſmoke; which he projected upon a pound of hot Quickſilver, newly bought, and put into a Crucible: And forthwith the Quickſilver, with a little murmuring noiſe, ſtaid from the flux, and ſettled to the bottom like a lump. And that the heat of the Quickſilver was but ſo much as might hinder

hinder melted Lead from recongealing. Then by and by the fire being increaſed under the blaſt of the bellows, the Metal was melted, and the melting Pot being turned upwards, he found it to weigh 8 ounces of moſt pure Gold. And a compute being made, a grain of that Powder did convert 19200 grains of impure and volatile Metal, that may be put away with the fire, into pure Gold; only in this there is required a moderate fire of glowing, or burning coals. And this is an higher Multiplication than the former. From all which we may note,

1. That theſe were three ſeveral ſorts of Powders, differing from, or exceeding one another in nobility and vertue.

2. It is probable that in the laſt mentioned projection, he was not punctually acquainted with the quantity upon which he was to project it; otherwiſe he would have caſt it upon leſs than one pound; which produced but 8 ounces, the other 4 being flown, or otherwiſe waſted in the fire.

3. From hence we muſt note, that in projection the metal to be changed, is to be in flux and open, that the Gold-making Powder may the more eaſily have Ingreſſion, and penetrate into the ſmalleſt parts of the Metal to be changed; for *Paracelſus* tells us, that as Water being hardened by cold into Ice, will not receive the Tincture of Saffron in Powder caſt upon it; but when melted into water, eaſily will: ſo the Metal to be changed muſt be in flux motion, and opened by the fire, otherwiſe the Tincture cannot have Ingreſſion nor ſpread it ſelf, and where there is no Ingreſſion there can be no Tranſmutation. Yet here *Helmont* tells, that it need but be eaſily hot, and

Rer. Natur. l. 7. p. 97.

not violently to any great degree, but as much as may keep melted Lead from recongealing. And this prævious artificial help, beſides the cleanſing of the Metal to be changed as much as Art can perform, is requiſite in metallick Tranſmutation, though in that wrought by Nature in Vegetables, or Animals, in petrifying of them, there is no ſuch precedent Preparation, nor adjuvant cauſe, as external heat or fire, but the petrifying ſteams, or ſeminal odour, doth effect the thing without ſuch helping Concomitants, ſo that (if duly conſidered) the Work of Nature, without the aſſiſtance of Art, in petrifying of Vegetables, and Animals, is more ſtrange and wonderful than the Tranſmutation of Metals.

4. We may note, That Nature in changing Vegetables or Animals into Stone, doth often work *pedetentim*, and by degrees, as alſo ſometimes ſubitaneouſly and quickly, as may appear by that ſtory of *Helmont*, which he thus relates. About the year 1320. betwixt *Ruſſia* and *Tartaria*, in the altitude of 64 degrees, not far from the Pond or Fen called *Kitaya*, it is read, that an Hord of the people cal'ed *Baſchirdi* with their whole herd of Cattel, their Waggons and Carriages were altogether tranſmuted into Rocks or Stones. And that yet to this day the Men, the Camels, the Horſes, the flock or herd of Cattel, and every other kind of thing that did accompany the Waggons or Carriages, do yet ſtand by an horrible ſpectacle, in the day-light turn'd into Stone, and that this was done in one night, without any preceding putrefaction. The like ſtory (if my memory fail not, for I have not the Author by me) is in *Olaus Magnus*, an Author of good credit and reputation,

De Lithiaſ. c. 1. p. 15.

tation, and the like may be found confirmed by ſome other Writers. Which (if true, and no miracle) ſheweth that this act of petrifying of Vegetables and Animals is ſometimes quick and ſubitaneous, as of one night, only that change of Metals is done in a far leſs time, and therefore may well be ſaid to be an acceleration of the work of Nature by the help of Art.

5. It may very well be believed, that in the changing of Vegetables or Animals into Stone, that the thing changed is of more ponderoſity, and for the moſt part of greater bulk than the thing was of before it was ſo petrified and changed; For ſo we have found in all our trials of Wood, Moſs, Leaves, and the like, ſtonified by the dropping Well neer *Knaresborough*, becauſe that is done by Incruſtation, but whether it happen to be ſo in all other ſorts of Petrification (for doubtleſs there are more ways than one) our experience cannot determine, but muſt leave it to the trial and examination of others. But in metallick Tranſmutation, if the exact degree of the vertue of the Powder tranſmuting be known, and ſo be projected upon a juſt and due proportion, the ponderoſity will not much differ from what the Metal changed was of before, as appeareth by that experiment of *Helmont's*, where he projected one fourth part of a grain of the Gold-making Powder, upon 8 ounces of hot Quickſilver, and it produced 8 ounces of pure Gold, wanting eleven grains, ſo that here was no great difference in the weight: For reckoning that the 8 ounces of Quickſilver, had the fourth part of a grain added to them, and when changed into pure Gold, had but loſt ten grains and three quarters of a

grain, which must be that either the Quicksilver had in it so much of combustible Sulphur (as *Helmont* in a certain place of his Writings confesseth that all common Quicksilver hath in it less or more of combustible and separable Sulphur) that was separated or wasted away in the fire: or that so much of the Homogeneous body of the Quicksilver did evaporate as being made too hot, and either of these ways it might have been, though the first is most certain, that all imperfect Metals have less or more separable and combustible Sulphur, which in projection is separated and wasted. But howsoever that there be little difference of weight in the metallick body changed from what it was before, yet it always becometh less in bulk, and possesseth lesser room, or place, as appeareth by this of *Helmont*, that the Quicksilver setled with a certain noise to the bottom of the Crucible, and so became of less bulk, and possessed less room. And that this is, and must be so in all metallick Transmutations, is most clear, not only from the authority of the Adeptists, but from their convincing reasons, shewing that in their Transmutation, there is a radical Solution and Penetration of all the small parts or atoms of the Metal to be changed, by the subtile penetrability and ingression of their so much purified and exalted Tincture, and thereby all things in it whatsoever that are of an Heterogeneous nature, are separated and extruded, and the Homogeneous Particles joined together *per minima* as much as Nature can admit of, and so must needs be of less bulk, and possess less room or place, which is manifest in Gold, that is one of the heaviest bodies in the same bulk that Nature doth produce, as

as being most dense, containing most of matter, and having its particles most closely joined together, that there are few *interstitiums* or spaces for the Air or Æther to enter or possess, which is manifest in its extension under the hammer, whereby it will be foliated farther, and be thinner than any other Metal whatsoever; and so a baser Metal changed into Gold, must of necessity possess less room, and be of less bulk.

6. And that we may come a little nearer to manifest this great work of Transmutation of Metals, we may consider, that though in petrification by the seminal Ordour, or saxeous Ferment, it works upon most bodies as it finds them, either more susceptible, or more apt to resist, which might render its operation and effects more difficult and strange. But here the matter is rendred more feasible and facile, not only by a previous cleansing of the Metal to be changed from its Heterogeneous parts, and gently opening of its body by fusion in an easie fire; but also our Learned Country-man *Roger Bacon* doth shew plainly that we having nearer Metals unto the more Noble, are excused from the more remote: for seeing that *Saturn*, *Jupiter* and *Mercury* are more near than *Venus* or *Mars*, we were foolish to take the latter, and to leave the former. Spec. Alchym. c. 7. p. 169.

7. The ancient Philosophers that were Masters of this great secret of Transmutation, and knew it by experience, and had seen it with their eyes, took little care of framing methodical Definitions or Descriptions of it, as little valuing such trifles and niceties, but contented themselves with the true understanding of it;

it; and yet to their Disciples which they termed the Sons of Art, they gave sufficient hints of the way and manner of it, but still as veiled and obscured. But I find that *Paracelsus* (however condemned of many for his too dark writing) to have said more of Transmutation in general, than the most of those that went before him; some of which we shall here recite, where he saith thus: If we shall write of the Transmutation of all natural things, it is equal and necessary, that before all things we first shew what Transmutation is: Secondly, what are the degrees to come unto it: Thirdly, by what means, and after what manner it is done. Therefore Transmutation is when a thing loseth its form, and is so altered, that it is altogether unlike its former substance and form, but assumeth another form, another essence, another colour, another virtue, another nature or propriety; as if a Metal be made Glass or Stone, if a Stone be made a burnt Coal, if Wood be made a Coal, Clay be made a Stone or Brick, a Skin be made Glue, Cloth be made Paper, and many such like: Now though this be far from a Logical Definition, as written by one that is generally believed to be no friend to Logick; yet is it no bad Description of Transmutation in general, and may well stand uncondemned, unless by those that can produce a better: for if the things that he doth instance in to be changed be duly considered, the most of them have incidents in the way and mode of their Transmutation, that are as difficult to explicate and declare as the principal things in metallick Transmutation. Is it not hard to open the true causes how Antimony, that is a metallick body, is *per se* (which every

Liber. natur. 7. p. 97.

every common Chymist can perform) brought into Glass, which is a transparent body, the matter considered, will not be found so easie? And so (if we had leisure) might be said of some of the rest.

8. And that we may more plainly understand the manner of this metallick Transmutation, let us a little consider the virtues and properties which they ascribe to their Tincture when perfected, because by it the operation is performed: for if the nature of the Agent be well known, the effects that it worketh upon the Patient may be the better perceived; and they are thus enumerated and described by that ingenious and experienced person *Johannes Spagnetus*, who saith, There are five proper and necessary qualities in the perfect Elixir, that it be fusile, permanent, penetrating, colouring, and multiplying; it borroweth its Tincture and fixation from the Leaven, its penetration from the Sulphur, its fusion from Argent-vive, which is the *medium* of conjoyning Tinctures, to wit, of the Ferment and Sulphur; and its multiplicative virtue from the spirit infused into the Quintessence. From whence we may gather not only its virtue and energy, but in some measure its manner of operation.

Arch. Herm. Can. 125. p. 249.

1. For, first, we are to note that all that are properly called Metals, that are to be changed, are fusile, and apt to be melted, and flow with the force of fire, though some more easily than others; and if the Tincture which is the efficient changing, were not of a fusile and flowing nature, it could never mix or conjoin it self with the Metal to be changed; for where there is no ingression, there can be no mutation.

2. That

2. That it muſt be permanent and fixed, that is, that the force of the fire cannot make it fly; for otherwiſe it could cauſe no Tranſmutation, for *nihil dat quod non habet*; and by theſe two properties all heedful and conſiderate perſons may eaſily conjecture, from what root it muſt needs originally ariſe, and ſo may truly know the firſt matter.

3. It is of a moſt penetrating nature: for if it were not ſo, the ſmall and homogeneous Atoms of the Metal to be changed could not be pierced, and thereby to be ſo ordered that they may be joined *per minima*, and united together, and thereby to extrude whatſoever is heterogeneous in the Metal to be changed.

4. It hath alſo the property of colouring, being indeed the Sulphur, or fire of Nature, from whence all colours do ariſe; and mixing it ſelf with the metallick Mercury of the body, or Metal to be changed, which radically in all Metals is one and the ſame, it becometh one with it as ariſing from the ſame root; and ſo by the help of Art accelerateth the work of Nature, and doth that in a ſhort time, that Nature cannot perform in many hundred of years, as ſaith the learned Philoſopher in theſe words: *Et hæc eſt auri forma, ſummum & optimum, quod ad metallicam naturam ſpectat. Si itaque pura iſtiuſmodi forma, quæ per artem, mediante natura, præparari poteſt, imperfectis Metallis addatur, tunc impurum imperfectorum Metallorum ſuperatur. Non enim impurum, ſed pura materia illi eſt ſimilis: Prima ſiquidem eſt forma ad quam materia iſta facta fuit. Idcircò par cum pari tempore incomprehenſibili conjungitur, impurum ſeparant, quaſi dicant:*

Muſ. Herm. tract. de lap. c. 7. p. 418.

dicant: An tu veniſti, quod meum eſt, & quod ad me ſpectat?

5. It hath a power to multiply the virtue, but not the quantity; and having theſe rare qualities, it is no ſuch wonder that it ſhould work ſuch effects upon the more imperfect metallick bodies.

9. And that we may more clearly apprehend the Nature of this Tranſmutation, we muſt conſider ſome of their Maxims; which though by many ſlighted, yet do they hold forth the certain and abſolute truth:

1. As firſt, that of *Bacon*, which they all allow of as the Baſis of all Philoſophick verity, which is this, ſpeaking of Sulphur or Natures Fire, and Mercury natural or radical moiſture, he ſaith, *Sed ex prædictis duobus fiant Metalla cuncta, & nihil eis adhæret, nec eis conjungitur, nec ea tranſmutat, niſi quod ex illis eſt.* Which is a golden ſentence, containing both truth and plainneſs to thoſe that will rightly conſider, and underſtand it. Spec. Alchym. c. 3. p. 260.

2. Another is this of the ſame Author: *Sed dico quòd natura ſemper propoſuit, & contendit ad perfectionem auri. Sed accidentia diverſa ſupervenientia transformavit metalla, ſicut in multis invenitur Philoſophorum libris ſatis aperté.* Ibid. c. 2. p. 258

3. A third is this: *Eſt itaque omnibus in Metallis verus Mercurius, rectumque Sulphur, æque tam in imperfectis, quam perfectis Metallis: Saltìm contaminatus, & impurus factus eſt in imperfectis Metallis, & quæ ſola perfecta maturatione deſtituuntur. Et ex iiſdem cauſis ad aurum, argentumque redigi poſſunt*, h. e. *ut ab aurea, vel argentea natura, quæ in illis eſt, ſeparetur impuritas,* Muſ. Herm. c. 2. p. 411.

puritas, qua cum inquinata fuerant, & forma auri, vel argenti iisdem ingeratur.

4. A fourth is, That all Metals are *in suo interiori*, Gold, Silver, and Mercury, and that metallick Mercury can no ways be destroyed, or otherwise the Art of Transmutation were utterly false, which is certain, true, and most true.

10. From all this we may plainly gather what Transmutation of Metals is, and how it is wrought: So that if Metals be in their root all of one Mercurial and Homogeneous nature, and that there be perfect Sulphur and Mercury equally as well in the imperfect as perfect Metals, then must their Transmutation be easie; for then the Heterogeneous matter, or combustible Sulphur, Scoria, or Dross, being removed, and some of the Tincture added, the parts are most closely joined, and so united *per minima*, and tinged, by which means they are maturated in a short time by the help of Art, that Nature could not perform in many years. So that all metallick Mercury wants nothing of the degrees and nature of Gold; but removing of its Heterogeneous parts, and the adding something more of the fire of Nature, and then it becomes most dense, and to have all the requisites that are necessary to Gold. Agreeable to what we say here, is the opinion of an ingenious person, who

Phil. Trans. n. 41. p. 813.

saith thus: To conclude, I shall presume to give you some of my thoughts concerning the so much discoursed-of Transmutation of Metals; concerning which I am of opinion, that the change is erroneously apprehended by many, imagining that the whole imperfect Metal is totally transformed into the more perfect

perfect by the substance mixed with it; whereas the mixture added to the melted Metal, joins it self (as I conceive) to those parts, which being Homogeneal, symbolize together with the nature of the more perfect, whereby the pure metalline parts are separated from the other Heterogeneal impure Sulphurs; which, together with other causes, did hinder Nature in the Mine from concocting that substance into the perfecter Metal.

2. A second instance that we shall give, is, That divers Virriolate Waters do change Iron put into them into Copper, which *Helmont* doth deny to be any Transmutation, and saith thus: But that Vitriol-bearing Juice is thought to change Iron into Copper, the Mine-men themselves not acknowledging the delusion, because that the succeeding Atoms of the Copper do fill up the place of the Iron that was wasted; neither regarding that as Copper doth render or make Silver dissolved in *Aqua fortis*, that otherwise was invisible, to appear to the view, and be corporeal. So that it is the propriety of Iron dissolved in the Vitriol to manifest the Copper by drawing it to it self, and together in the same act, that the Iron it self is dissolved, and doth vanish in the Fountain. My Witnesses (he saith) are the Fountains themselves; because verily the Vitriolate Waters are far more poor in Copper than they were before the Iron dissolved in them, and the Copper thereby recovered from them. Therefore to wit verily out of the very Fountain (where

De Spadan. font. l. paradox. 3. p. 692.

it is often continued, the flux of new Copper doth fail in the Pit or Spring) the putatitious Transmutation of Iron doth otherwise not happen. The manner of doing of which in the Mines of *Hungaria*, called *Herrengaundt*, *Athanasius Kircher* doth thus describe: They take rusty Iron that is unprofitable, as the remainder of various and old instruments used in Houses, and being put into the Furnace and made hot, they are upon the Anvile beaten forth into most thin plates. This being done, they put these plates into the bottom of Vitriolate Water, which doth flow in the most deep Pits of the Mines; and being put there, they leave them for certain months. And the due time ended, they come to the Pit, and find the plates to be gone (or changed) into a yellowish stuff, like unto a soft plaister, and these exposed to the Air and Winds, is hardned into Copper of the best account. And it is so used at *Neosel* in *Hungaria*: Therefore it is questioned whether this be a true Transmutation of Iron into Copper, or not. But I say that here true Transmutation is not at all given, seeing that all the whole Iron is not changed into the substance of the Copper, but by accident only, I do explain my self. For seeing that in Vitriol infinite Copperish Corpuscles do inexist, and as those have the greatest sympathy with Iron, so that also it cometh to pass, that forthwith they flow unto the Iron, and do most intimately insinuate themselves into its pores; but seeing that they abound with Spirits of great Acrimony, from hence being insinuated into the Iron,

Mund. Subter. l. 10. Sect. 4. c. 10 p. 223, 224

Iron, forthwith they begin to corrode it, so far, that all the fatness of the Iron being consumed, the irony substance being dissolved, doth pass into dust, or a rusty powder, the Vitriolate Corpuscules substituting themselves into the place of the Iron being consumed, and the native particles both of the Iron and Vitriolate Water are conglutinated into one mass, which first truly is soft within the Water, but being exposed unto the more free Air, the wind and beams of the Sun are indurated into perfect Copper, and by this means it is made the same thing that it was before: before verily by the dispersion of its Corpuscles in the waters, now by the union of the same attracted from the Iron. But if here were given a true Transmutation, nothing of the Iron should remain after. But experience teacheth, that so much of the irony rust doth remain, almost as much as the irony mass did weigh before. And after he sheweth an experiment, by a rod or thread of Iron put into some of this Vitriolate Water sent him forth of *Hungary*, in this order: I (he saith) put an Iron thread into a Viol full of this water, which in the space of three days was all consumed, a certain soft matter remaining in the bottom, which separated from the Dross, did yield pure Copper; but the Dross remaining, did almost come to the weight of the thread of Iron; so that from hence no man need further doubt of this matter. Thus far the experience and opinions of these two Learned persons touching this kind of change, which they will

will not allow to be a true Tranſmutation, from whence we ſhall move ſome conſiderable Obſervations, and ſubmit them to the judgment of thoſe that have Learning and leiſure to examine the pertinency and validity of them.

1. And firſt, if this (in their ſenſe) be not a true mutation, yet of neceſſity it is an apparent one: for the Iron not only to ſenſe had in it the requiſites that are accounted proper to that Metal, but alſo really had that which all account the properties of that Metal, as to indure ignition, extenſion by the hammer, and fabrication into inſtruments, which by being brought into Copper, hath not only a more glorious colour than that of Iron, but will indure ignition even to fuſion, and that more eaſily than any Iron, and is become more extenſible than Iron, and admitteth of more eaſie fabrication into inſtruments. So that this change, (of what ſort ſoever it be taken to be) is a meliorating of the thing, a graduating and exalting of it both in intrinſick and extrinſick virtue, the metallick root or nature ſtill remaining. So when the Philoſophers mention the Tranſmutation of Metals, as the changing of Lead or Quickſilver into Gold or Silver, they do but underſtand a bettering, exalting, and graduating of them, the metallick root ſtill remaining: ſo that there is no ſuch great difference as many ignorantly do conceive and imagine.

2. Secondly, if they mean (as they ſeem to hold forth) that no Tranſmutation is true, but where all the Atoms and Corpuſcles of the Body to

to be changed, are every and all of them tranſmuted, without ſeparating of any of them, or adding any thing unto them, then we muſt ſay, that (as far as we either know or underſtand) few ſuch Tranſmutations will be found in *rerum natura*, brought to paſs either by Nature or Art. And for the metallick change that the Philoſophers ſpeak of, they never held that all the Atoms or Particles of Lead and Mercury are tranſmuted into Sol or Lune, but that the Homogeneous parts onely are, and the Heterogeneous parts ſeparated by the addition of ſome part of their Noble Stone, which is not much differing from this mutation of Iron into Copper.

3. We may conſider the manner how this change is done, and that is by taking it for granted, that in the Iron before it be changed, there are ſtore of Corpuſcles of Copper, as alſo in the Vitriolate Water, and the Water by its Acrimony corroding the Iron, and thereby ſeparating the Atoms of the Iron, thoſe of the nature of Copper reſiding in the ſaid Water, do ſubſtitute themſelves in the place of the Atoms of Iron, being ſeparated; and ſo being Atoms of a congruous Figure, Size, and other Properties, do eaſily couple themſelves together, as being Homogeneal, and refuſing others as of a diſagreeing nature. So the Maſters do hold that their Stone when exalted and prepared to the red, is *aurum intenſum, exuberatum & animatum*, as being indeed brought and wrought from a Golden Seed; and

and that the Homogeneous Mercury of all Metals, is *in ſuo interiori* of a golden nature, theſe two eaſily unite moſt cloſely together, and refuſe union with any Heterogeneous body, and ſo the manner of both theſe changes are alike.

4. It would be worth labour to examine the certainty, whether all Iron, or the Ore from whence it is drawn, have ſomething of the corpuſcles of Copper in it, and (if poſſible) in what proportion: That thereby it may be conſidered whether the atoms of Copper be in the Iron, and the atoms of Iron in the Copper, by accidental commixture, or that they come to be ſo by progreſſive Generation. And then it may be conſidered, that where there is particles of Copper and Iron mixt in one body, which ſeemeth to be Iron, and to which we give that denomination, be when it will, or its Ore is found ſo, in its aſcenſion or deſcenſion, as the Mineraliſts ſpeak, that is, whether in continuance of time more Copper would increaſe and grow in it, or that in length of time the Copper Atoms would decay or grow into Iron? A Quærie that may be neceſſary for all Lovers of Mineral knowledge.

5. There is a paſſage in that profound, though dark piece, written by *Paracelſus*, which is commonly called *Cælum Philoſophorum*, or *Liber Vexationum*, though ſome of great judgment call it *Liber Fixationum*, which here may well be conſidered of, and that in this, *Omnia ſunt in omnibus occultata. Unum ex ipſis omnibus eſt occultator eorum, & corporeum vas, extrinſecum, viſibile,*

Can. 1 p. 121.

ſibile, & mobile. This hint with divers others, in that obſcure and ænigmatical Writing, though not regarded by many, that are ſo idle and lazy, that they will not take pains to break the hard ſhell, thereby to gain the precious kernel, not minding that *Roſa non naſcitur ſine ſpinis*, and that *Dii ſua bona laboribus vendunt*, do ſufficiently ſhew, that the nature of Metals is not yet perfectly underſtood. And to me by this he ſeemeth to intimate that all Metals are hid in all Metals, and that one is the hider of them. And therefore the queſtion pertinent to this caſe, will be, whether the Iron doth hide the Copper, or the Copper the Iron, and ſo of other Metals; which we ſhall not decide, but leave it to the judgment and trial of others.

A third Inſtance that we ſhall give, is in an artificial Tranſmutation (if we may call it ſo) and that is of Quickſilver, which is a fluid, open and volatile metallick body, and yet is and may be by Art brought into a firm, cloſe and fixed body, as *Helmont* declareth thus at large. There is alſo the Purgation *Dinceltateſſon, quæ Podagram non minùs, quam febres radicitus curat. Ejuſq; arcanum corallinum vocatur, quod paratur ex eſſentia auri Horizontalis, hoc modo. A Mercurio vulgo venali, abſtrahe liquorem Alkaheſt, cujus meminit* 2. de viribus membrorum, c. de hepate. *Quod fit unius horæ quadrante. Nam, inquit Raymundus, aſſantibus amicis & præſente Rege, coagulavi argentum vivum, & nemo præter Regem, ſcivit modum. In quâ coagulati-*

De Febrib. c. 14. p. 52.

one iſtud eſt ſingulare. Quod liquor Alkaheſt idem numero, pondere & activitate tantum valet milleſima actione, quantum primâ. Quia agit ſine reactione patientis. Mercurio igitur ſic coagulato, abſq; ullâ coagulantis remanentia, fac indè pulverem minutum, & deſtilla ab illo quinies aquam ab albuminibus onorum deſtillatam, atq; Sulphur Mercurii, quod per ſui præfatam coagulationem foras deductum eſt, fiet rubicundum inſtar coralli: & quanquam fœteat aqua albuminum, tamen iſte pulvis dulcis eſt, fixus, ferens omnem follium ignem, nec perit in plumbi examine. Spoliatur tamen virtute medicâ, dum in album metallum reducitur. A relation of this notable Experiment and moſt ſtrange Mutation may alſo be found in the Theory of *Raymund Lully* the 87. Chapter, which the learned Reader may conſult and conſider of.

But from hence we ſhall obſerve theſe few things.

1. That this ſeemeth to be a more ſtrange mutation than any other we can meet with, for by this the common Mercury, an open, fluid, tremulous and volatile body, is made a ſhut, firm, ſetled and fixed body, even to abide all the fire of the Bellows, and not to periſh in the trial of Lead, which is all that Silver will endure.

2. Here is nothing at all added unto it, but which is again wholly ſeparated from it, for the Alkaheſt is drawn of the ſame in number, weight and activity, leaving not the leaſt atome remaining,

ing with the Mercury: Whereas in the Tranſmutation of Metals by the Elixir, the part of the Powder projected doth remain inſeparably with the Metal changed, ſo that of the two, this act of the liquor Alkaheſt upon the Mercury is more ſtrange than that of the Elixir upon another Metal.

3. They agree in this, that in the Tranſmutation of Metals by the Elixir, the extraneous Sulphur, and Heterogeneous parts (which in quantity leſs or more are in all Metals) are removed and ſeparated, and ſo in the fixing of the Mercury the extraneous Sulphur, is extroverted and turned to the outſide, by the operation of the Alkaheſt, which Sulphur containeth in it the Medical virtue, which by melting down is waſted, conſumed, or ſeparated, and ſo the change in both is made by ſeparating ſomething from the body changed, that was in it before.

4. By this it is manifeſt that in both theſe Mutations, the Mercury by the Alkaheſt, and ſome other Metal by the Elixir, both after the change become of leſs weight than they were before, according to the quantity of the Heterogeneous parts ſeparated from them.

5. Laſtly, The Mercury is fixed by having the extraneous Sulphur thruſt from betwixt the Homogeneous atomes of the Mercury, and thereby they become more cloſely united *per minima*, which is the cauſe, or rather the fixation it ſelf:

and the Tranſmutation of imperfect Metals is not only performed by the Extruſion and Separation of their combuſtible Sulphur, whereby their parts may lie more cloſely together, but alſo by the perfect union of the Powder projected, with the Mercury of the Metal changed, being both of one radical nature, and of a ſymbolizing and homogeneous quality and condition.

FINIS.

Dissertatio de Urim & Thummim, in Deuteron. 6.33. v.8. *in qua de earum Natura, & Origine, non Paucorum Rituum Mosaicarum rationes; & Obscuriora quædam Scripturæ Loca Probabiliter Explicantur. Authore Joanne Spencero,* S. T. D. 8.

A Letter in answer to certain Queries and Objections made by a Learned *Galenist* against the Theory and Practice of Chymical Physick. By *George Acton,* Doctor in Physick. 4.

Buchleri Elegantiæ Poeticæ. 12.